

CALFED Bay-Delta Drinking Water Quality

WORKSHOP REPORT

Facilitated by:

National Water Research Institute

In cooperation with:

**CALFED Bay-Delta Drinking Water Quality Program
and USEPA Region IX**

July 29-31, 2003

**Kellogg West Conference Center
California Polytechnic University, Pomona
Pomona, California**

FOREWARD

With the formation of the California Bay-Delta Authority and the passage of Proposition 50, the CALFED program entered a new phase of its existence. Nevertheless, the CALFED drinking water quality objective – to continuously improve source water quality such that drinking water meets and, where feasible, exceeds applicable drinking water standards – remains as a solid foundation. The CALFED specific water quality target, as described in the Record of Decision, is to achieve either (a) an average concentration at Clifton Court Forebay and other south and central Delta drinking water intakes of 50 µg/L bromide and 3.0 mg/L total organic carbon (TOC) or (b) an equivalent level of public health protection using a cost-effective combination of alternative source waters, source control, and treatment technologies.

These targets serve as surrogate indicators and were suggested in 1998 by a panel of experts engaged by the California Urban Water Agencies, based upon predicted changes in drinking water standards set by the United States Environmental Protection Agency and best-available disinfection technologies.

Because of relatively recent regulatory and technical developments, achievements of numerical goals per se for bromide and TOC may not be an effective means of ensuring public health protection. Neither bromide nor TOC is of health concern. They are relevant, however, as precursor materials to toxic by-products from certain chemical disinfection treatment practices. However, since any health risks associated with bromide and TOC are dependent on treatment and distribution specifics, it is unclear what “equivalent level of public health protection” really means. As a first step, it is important that an agreed-upon, understandable, and practical set of drinking water public health goals be established for CALFED. From these, a definition of “equivalent level of public health protection” can be determined that will facilitate planning and the further achievement of CALFED drinking water goals.

Because the CALFED process is deliberately based on stakeholder input, a stakeholder process to determine the appropriate level of public health protection is warranted. It is with this background that the National Water Research Institute was approached to organize a workshop that would bring together a wide range of interested stakeholders from the federal, state, and local levels to identify those important issues that must be addressed to meet the CALFED drinking water quality goals,

This workshop is based on the nominal group technique (NGT) developed by Andre Delbecq, Ph.D. while he was at the University of Santa Clara. The NGT offers a format that addresses a focused question that no person can answer alone but in concert with others can identify issues and define options to approaching a resolution to the question. Since 1992, NWRI has used the NGT format as a process of identifying, prioritizing, and developing approaches to address critical local, state, and national water issues. The NGT process is rigorous and robust, and its protocol provides a controlled environment that allows every voice to be heard regardless of perspective. The ability of the workshop participants to focus on a single question allows for the maximum use of time and energy during the intensive 2 days. The participants attending were invited because of their expertise and credibility in their respective fields.

This report documents the results of the 31 participants attending the workshop who provided their expertise to answer the question: *What are the most important issues that must be addressed to meet the CALFED drinking water quality goals in a cost-effective and equitable manner?*

This report comprises two parts: Part 1 (Working Group Reports) presents a more detailed version of the top 10 issues that were prioritized from the 26 issues consolidated by the participants during the NGT portion of the workshop. Participants were assigned to one of the 10 working groups that were assigned to digest and synthesize all of the individual issues consolidated under their particular overarching issue. The power point slides used by the working group during their presentations can be found in Appendix E.

Part 2 (NGT Workshop) reports the results of the issue identification and consolidation elements of the workshop. The participants identified 86 issues that were consolidated into 26 overarching themes. The fact that the participants were able to identify 86 issues suggests the significance of the workshop question from their individual perspectives.

The success of any activity is due in great part to the participants and their enthusiasm for engagement in the process. The participants in this workshop are to be commended for just that, great enthusiasm!

Thanks is expended to the NWRI team that facilitated the workshop; Brian Brady, who so masterfully facilitated workshop, and to Tammy Russo, Workshop Coordinator; Patricia Linsky and Gina Melin, Editors; Barbara Close, Graphic Coordinator; Tifanie Cole, Teresea Colomac, and Margaret Ridgway, Word Processors; Jesse Rosas, Graphics Assistant; and Teresa Taylor, Photographer.

Ronald B. Linsky
Executive Director
National Water Research Institute

CONTENTS

Foreword	i
Contents	iii
Part 1: Working Group Reports	1
Priority Ranking of Issues by Working Groups	
Priority 1	Develop Integrated Water Quality Improvement Strategies at the Local and Regional Levels 3
Priority 2	Long-Term Financing for Water Quality Improvement 7
Priority 3	Impact of Population Growth and Various Land-Use Practices on Water Quality 13
Priority 4	Identify a Common, Statewide Definition of “Safe” Drinking Water Suitable for Use As the CALFED Drinking Water Quality Goal of “Equivalent Level of Health Protection” 19
Priority 5	Identify and Prioritize — Through Appropriate Data Acquisition and Science — the Most Significant Sources of Degradation of Delta Water Quality 23
Priority 6	How Shall Regionally Developed Drinking Water Strategies Be Coordinated, Approved, and Funded, and by Whom? 29
Priority 7	A Risk Analysis Approach to Characterizing Alternatives for Meeting CALFED Water Quality Objectives 31
Priority 8	Methodology for Sustainable Development Assessment of Water Resources 37
Priority 9	Maximize the Use of the Basin Planning Process to Integrate Implementation of the CWA, SDWA, Porter-Cologne Water Pollution Control Act, and CALFED Water Quality Program Plan 41
Priority 10	Encourage Collaboration among Staff and Managers at State and Federal Agencies to Meet CALFED Drinking Water Quality Goals 45

Part 2: NGT Workshop		49
Priority 1	Develop Integrated Water Quality Improvement Strategies and Management Options to Achieve Receiving Delta/SWP Water	51
Priority 2	Long-Term Financing for Water Quality Improvement	59
Priority 3	Impact of Population Growth and Various Land-Use Practices on Water Quality	67
Priority 4	Identify a Common, Statewide Definition of “Safe” Drinking Water Suitable for Use As the CALFED Drinking Water Quality Goal of “Equivalent Level of Health Protection”	75
Priority 5	Identify and Prioritize – Through Appropriate Acquisition and Science – the Most Significant Sources of Degradation of Delta Water Quality	81
Priority 6	How Shall Regionally Developed Drinking Water Be Coordinated, Approved, and Funded, and by Whom?	85
Priority 7	Quantify the Level of Public Health Risk Associated with Achieving the Suggested Water Quality Objectives for Each Water System Situation	91
Priority 8	Methodology for the Sustainable Development Assessment of California Water Resources	97
Priority 9	Implementation of the CWA and SDWA Must Fit Together to Address Delta-Specific Water Source Problems	105
Priority 10	How to Encourage Collaboration among Staff and Managers at State and Federal Agencies (Including Operators of the CVP and SWP) to Meet CALFED Drinking Water Goals	109
Priority 11	Develop an Economic Balance Sheet for the Entire Process That Identifies the Value of the Targets	113
Priority 12	Public Awareness of Water Issues	117
Priority 13	Prioritize Fully Funded Continuous Basin Planning Activities to Improve Implementation of All Water Quality Protection Programs	123
Priority 14	Meeting Drinking Water Quality Objectives at the Tap and Fish and Wildlife Objectives in the Delta	127

Priority 15	Require the Use of BMPs in County and City General Plans	131
Priority 16	Make Achieving Multiple Benefits a Top Priority in Funding Projects to Attain CALFED Drinking Water Quality Goals	135
Priority 17	Competing Beneficial Uses – Municipal Drinking Water Versus Aquatic Life Protection	139
Priority 18	Source Water Improvement Will Be Long Term and Incremental, So Treatment Development Will Relieve CALFED from Source Water Protection Responsibility	143
Priority 19	Rational Plumbing of the Delta-Peripheral Canal	147
Priority 20	Implement Widespread Conjunctive Use between Bay-Delta Water and the State’s Groundwater Basins	153
Priority 21	Ensure That CALFED Drinking Water Quality Work-to-Date Is Incorporated into the Strategic Plan’s Development	157
Priority 22	Lowering TDS Content of Bay-Delta Water Delivered into Southern California	161
Priority 23	Bay-Delta Ecosystem Watershed Objectives May or Will Influence and Possibly Direct the Water Quality Program	167
Priority 24	Ensure That Improvements in Water Quality Are Maintained As Improved Water Quality and Not Turned into Improved Water Supply or Fisheries	171
Priority 25	Embrace “Zero” Discharge	175
Priority 26	Small Systems, or Rural Areas without Systems, Skew the “Report Card” on Drinking Water Quality	179
<hr/> Strength of Feeling Analysis		183
<hr/> Table 1 Issues (86) Ranked by All Participants (31)		184

Appendices		187
A	Acronyms	189
B	Previous NGT Workshops Conducted by NWRI	191
C	Participants' Biographical Sketches	195
D	Participants' Address List	207
E	Working Groups' Visual Presentations	213

WORKING GROUP REPORTS



PRIORITY 1

Develop Integrated Water Quality Improvement Strategies at the Local and Regional Levels

Working Group Members:

Davis, Holm, and Smith

Issue Description:

The CALFED Drinking Water Quality Framework envisions a diversified and integrated strategy to meet CALFED drinking water goals. This CALFED strategy needs to build upon and leverage existing local and regional water quality improvement plans for CALFED to identify and pursue a cost-effective portfolio of water quality actions.

Local agencies are grappling with water quality issues on a daily basis. They know their systems and the water quality issues that they must address. They must anticipate and cope with changing circumstances and are in the best position to respond rapidly to new events. Because each agency's water supply comprises a mix of different sources and challenges, these agencies are in the best position to evaluate management options that will best achieve the CALFED goals or their equivalents.

Importance:

CALFED needs to have a good, shared understanding of what actions are most likely to improve water quality at the lowest cost so that money is not spent on projects that may never measurably improve water quality. This planning cannot occur in a vacuum.

Each agency/region has a different mix of water quality issues and management options for achieving the CALFED goals or their equivalents. The value of understanding these individual and regional water quality strategies is that it provides a context for deciding what the most cost-effective investments would be at local, regional, and statewide levels.

Further, the approach of encouraging development of local and regional strategies will promote identification of common problems and the opportunity for collaboration at the local, regional, and statewide levels. This is important to water suppliers who are trying to meet multiple objectives under multiple regulatory requirements and non-regulatory actions.

How Do You Propose Meeting or Complying with This Issue:

Effectively, this recommendation is that each agency develops its own Equivalent Level of Public Health (ELPH) plan with input from local stakeholders. Local ELPH plans need to begin with the baseline assessment of the overall water quality describing all source waters (e.g., volume and quality) and options for water quality improvement. To develop this information, there needs to be uniform data gathering so that comparisons can be made from one local area to another. To evaluate the options for water quality improvement, the agencies need good technical feasibility and cost-effectiveness information. These plans should also indicate emerging contaminant issues. Local ELPH plans need to consider options which could be cost effective at the regional or statewide level.

Currently, local agencies do not have the information needed to incorporate, in a meaningful way, statewide options into their local strategies. Ideally, local agencies would decide to implement local options based on an optimization of the cost effectiveness and water quality improvement of local, regional, and statewide options. In order to fill this gap, the Drinking Water Quality Program needs to develop a list of the statewide options it is pursuing, along with water quality improvements it expects, and the deadlines for when this information will be provided to local agencies. There should be an on-going process which re-evaluates the targets and goals and assesses the status of regional and state options so that adjustments to local strategies can be made, when needed.

CALFED and its implementing agencies should form partnerships with local and regional agencies to conduct the needed technical studies and develop cost information. In addition, CALFED should establish a Technical Advisory Committee (TAC) comprising local agency representatives to help design guidelines for the development of an ELPH plan and related background materials.

While the ELPH plans are being developed, it is important that CALFED continue to work on and implement state actions to improve water quality and provide locals with an assessment of the expected costs and degree of improvement resulting from these actions.

Who Are the Individuals Best Able to Address, Illuminate, Refine and Focus This Issue?

- The Drinking Water Quality Program.
- Local and Regional Agencies.
- CALFED Regional Entities.
- CALFED Drinking Water Subcommittee.
- CALFED Watershed Subcommittee.

- CALFED Environmental Justice Subcommittee.
- CALFED Water Efficiency Subcommittee.

Budget:

Funding available for the initial implementation of this recommendation is clearly inadequate. An estimated \$50 million is needed –to support information development, ELPH plans, and implementation of targeted ELPH actions, as follows to:

- Develop ELPH guidelines and related materials, including TAC and statewide workshops: \$500,000.
- Provide grant funding, on a matching basis, to develop the ELPH plans: \$10 million.
- Provide grant funding for targeted actions: \$35 million.

Comments:

“I would like to see a broader cross-section of attendees at future CALFED meetings – agricultural representatives (e.g., cattleman, row-crop, etc.), more wastewater dischargers (e.g., municipal and industrial), and perhaps a representative from the California Chamber of Commerce. In scanning the list of attendees, I believe that some of these groups were under-represented and some were not represented at all.” – ***Harvey Collins***

“Conjunctive use: By using Delta water to recharge groundwater basins, that water could be made available for water supply needs during a drought. Furthermore, based on recharge studies in southern California, I would expect approximately 50 percent of the dissolved organic carbon (DOC) to be removed (e.g., physically or oxidized) during the recharge process. This removal would occur in a very short period of time (i.e., days, not months or years). This conjunctive use would therefore fit will into the CALFED objective of limiting the concentration of organic carbon in water used for drinking water and would provide additional water during emergencies.” – ***Harvey Collins***

“The Drinking Water Subcommittee has, on more than one occasion, asked for local/regional entities to develop and submit water quality improvement plans. To date, none have come forward. Does this mean there are not any local/regional water quality plans? I am assuming that the grant funding proposed will be contingent on having a fully developed plan in place. This will create a powerful incentive for planning.” – ***Sam Harader***

“How do you prevent local or regional actions from precluding statewide actions necessary for source protection and source water quality improvements? For example, if local agencies go straight to treatment to meet water quality standards at the tap, how do you ensure statewide actions will still move forward on source protections and improvements? Another way to say it:

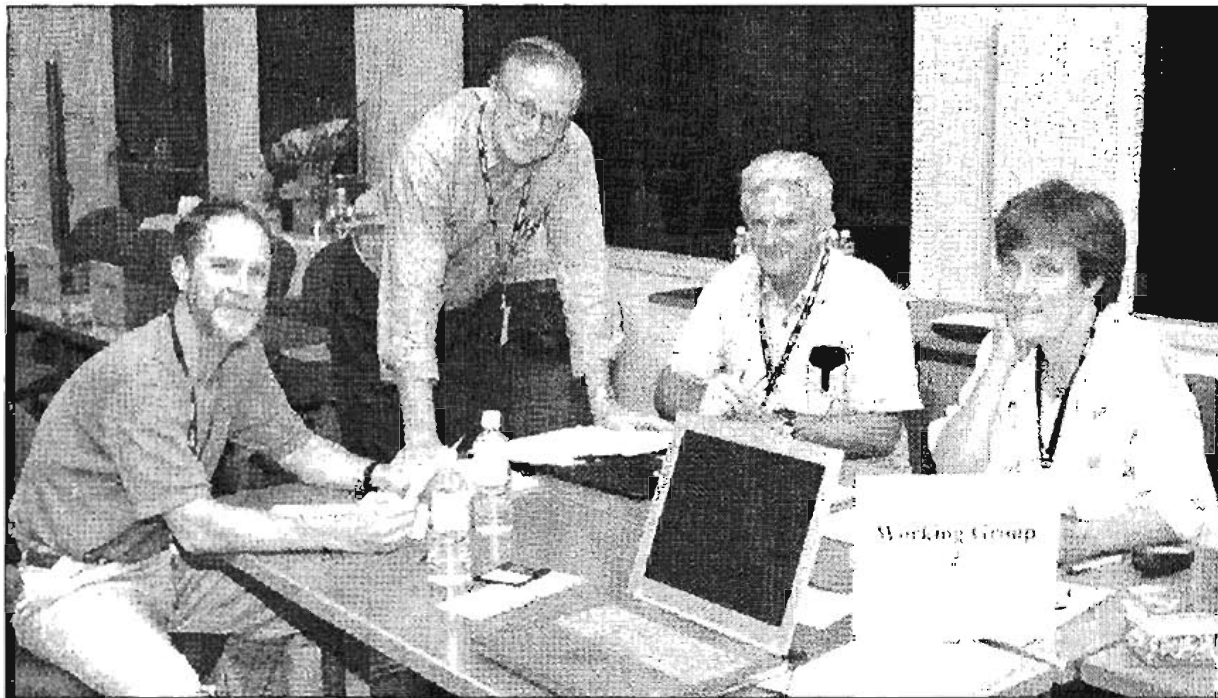
how do you retain active responsibility at all levels despite actions taken at local or regional levels? – *Ellen Levin*

“Regional agencies involved in the strategies and management options should include the Regional Water Quality Control Boards. The results of the plans developed should be cited or referenced in the appropriate Basin Plan updates and integrated with proposed regional goals, policies, and actions identified in the Basin Plan.” – *Kris Lindstrom*

“Implementation of local ELHP plans will take more than money. Local buy-in with respect to benefit, training, and coordination of local agencies to have some consistency, and provision of adequate local human resources is also necessary. Recognizing the diversity among communities in the Delta, substantial effort will be required. It will take time.” – *Bruce MacIer*

“It will be helpful to emphasize the time management of the various approaches at state, regional, and local levels – towards achieving the overarching CALFED goals.” – *Pankaj Parekh*

“Over what time horizon do you envision these expenditures taking place?” – *Marguerite Young*



PRIORITY 2

Long-Term Financing for Water Quality Improvement

Working Group Members:

Harader, Mills, Wallace, and Young

Issue Description:

Though some funds are currently available for drinking water improvements, prospects for additional funding are currently dismal. Bond funding is unpredictable, restricted to capital improvements, and is uneven in distribution. General fund revenues for the foreseeable future will be scant from both the state and federal side. Local cost-shares have traditionally provided, and will continue to provide, the lion's share of funding. A compelling argument will need to be made before legislators and/or the public will support a more stable source of funding. A statewide approach to long-term funding will help target investments where they will do the most good, so that improvements that are not locally cost-effective (but are effective at the regional or statewide level) can be implemented. This necessitates setting clear goals; developing performance measures, and indicators of program progress; maintaining a comprehensive science, monitoring, and assessment program; and, most critically, translating this information into a compelling call to action for decision makers and the public. The foundation of the long-term finance plan should be built upon a water quality improvement fee, probably on an acre-foot basis, levied on all users of groundwater and surface water in the State.

Importance:

Without additional funding, the California Bay-Delta Authority (CBDA) CALFED drinking water goals and other statewide water quality goals will not be met. Long-term investments, such as source water protection, require a stable funding stream to realize their benefits. The public and legislators need to be convinced that drinking water must and will be improved if additional funding is provided. Examples follow:

- The provision of clean water is a primary preventive health strategy. Developmental disorders in infants and children may arise from exposure to waterborne toxicants and result in major health problems soon after exposure or in later years. Communities that fail to make needed investments will suffer from poorer health among their population and increased health service costs. Alternatively, small communities that do make investments may face high water rates that hinder economic development and result in the out-migration

of residents and in long-term population decline. Mobility between regions means that health problems associated with poor water quality in one region will impact other regions of the State.

- Reducing source water pollution is a vital factor in achieving CALFED goals. At the same time, local agencies are making investments every day to address water quality issues within their service areas. It is in this context that options for projects that would meet CALFED's goals need to be factored into the prioritization process. Part of the evaluation process needs to assess the multiple benefits and different scales (e.g., local, regional, statewide) of the actions.

Salinity provides an interesting example of the above. Salinity management is one of the critical issues facing southern California. About 50 percent of the salinity problem comes from "imported" supplies; the other 50 percent comes from local sources. To manage the problem, we need to develop strategies that will reduce the amount of salt in source waters; reduce the contribution of salts locally (e.g., from water softeners); and, ultimately, invest hundreds of millions of dollars into the development of brine lines and desalinization plants to reverse salinity buildup in local groundwater supplies, which currently provide about one-third of the water demand in the southern California metropolitan area

How Do You Propose Meeting or Complying with This Issue?

The long-term finance plan should include a water quality improvement fee, probably on an acre-foot basis, levied on all users of groundwater and surface water in the state. It is envisioned that these improvements would provide benefits in all hydrologic regions of the state.

- Establish principles to guide the deployment of the fee, such as:
- Cost-effectiveness.
- Equity.
- Ability to leverage local, regional, or federal dollars (not for disadvantaged communities).
- Multiple benefits.
- Consistency with CALFED solution principles.
- Inclusion of performance measures.

In addition to the examples above, fees could also be used to support:

- Long-term programmatic work such as the Surface Water Monitoring and Assessment program, AB599 groundwater monitoring program, supporting science in the CALFED drinking water program, Central Valley Board basin planning in this area, and other programs that add to our ability to achieve real water quality improvements.
- Operations and maintenance (O&M) and disposal costs of treatment systems servicing disadvantaged communities.
- A *lifeline account* similar to those used in electricity rates could be devised to ensure high-quality, affordable water to low-income households, and small businesses.
- Watershed improvements and other investments that have a long time-scale, have statewide benefits, or which take place on a large geographic scale.

Who Are the Individuals Best Able to Address, Illuminate, Refine and Focus This Issue?

Incorporate this into the development of the CALFED long-term financing plan. Coordination would need to happen between Department of Health Services (DHS), state and regional boards, Department of Water Resources (DWR) and other state, regional, and local agencies, and in cooperation with federal agencies. Meaningful involvement of diverse stakeholders using existing advisory committees and a dedicated stakeholder process to develop criteria and priorities for allocating the money (e.g., the ecosystem roundtable or Central Valley Project Improvement Act restoration roundtable).

Budget:

Between \$250,000 to \$500,000 to do a legal, institutional feasibility, and public acceptance study. The study should include a review of existing fees, structures, and authorities.

Comments:

“Bond Funding – important to make sure the non-sexy CALFED needs are provided funding.” – ***Rich Brewer***

“I would like to see a broader cross-section of attendees at future CALFED meetings – agricultural representatives (e.g., cattleman, row-crop, etc.), more wastewater dischargers (e.g., municipal and industrial), and perhaps a representative from the California Chamber of Commerce. In scanning the list of attendees, I believe that some of these groups were under-represented and some were not represented at all.” – ***Harvey Collins***

“Conjunctive use: By using Delta water to recharge groundwater basins, that water could be made available for water supply needs during a drought. Furthermore, based on recharge studies in southern California, I would expect approximately 50 percent of the DOC to be removed (e.g., physically or oxidized) during the recharge process. This removal would occur in a very short period of time (i.e., days, not months or years). This conjunctive use would therefore fit into the CALFED objective of limiting the concentration of organic carbon in water used for drinking water and would provide additional water during emergencies.” – **Harvey Collins**

“Would a levy fee apply to agricultural users as well? Who are the strategic political supporters?” – **Phillippe Daniel**

“Funding must get out to smaller agencies as well as to the larger ones. In the long run, the public will be more likely to support bonds and other water quality fees if they believe that their communities are benefiting from the actions supported by those funds. The concept of an earmark [budgeted line item] that ensures a competitive fund for smaller agencies will be key.” – **Martha Davis**

“Need a process for determining priorities for spending. Water quality improvement priorities or needs basis?” – **Sarge Green**

“A fee needs to have a nexus to the proposed expenditures. A statewide fee that funds just CALFED is probably not possible and certainly not equitable. That said, I believe the process will die if no user fees are imposed to provide baseline funding.” – **Joe Grindstaff**

“Would the fee be based on a particular water body and the work being done in that water body? (How else can a local decide on a cost-effective strategic mix which includes specific state actions?). And, if agriculture does not need water quality improvements, why would they pay a user fee (or is it also based on discharges – and how do dischargers fit into this?). Shouldn’t polluters contribute” – **Lisa Holm**

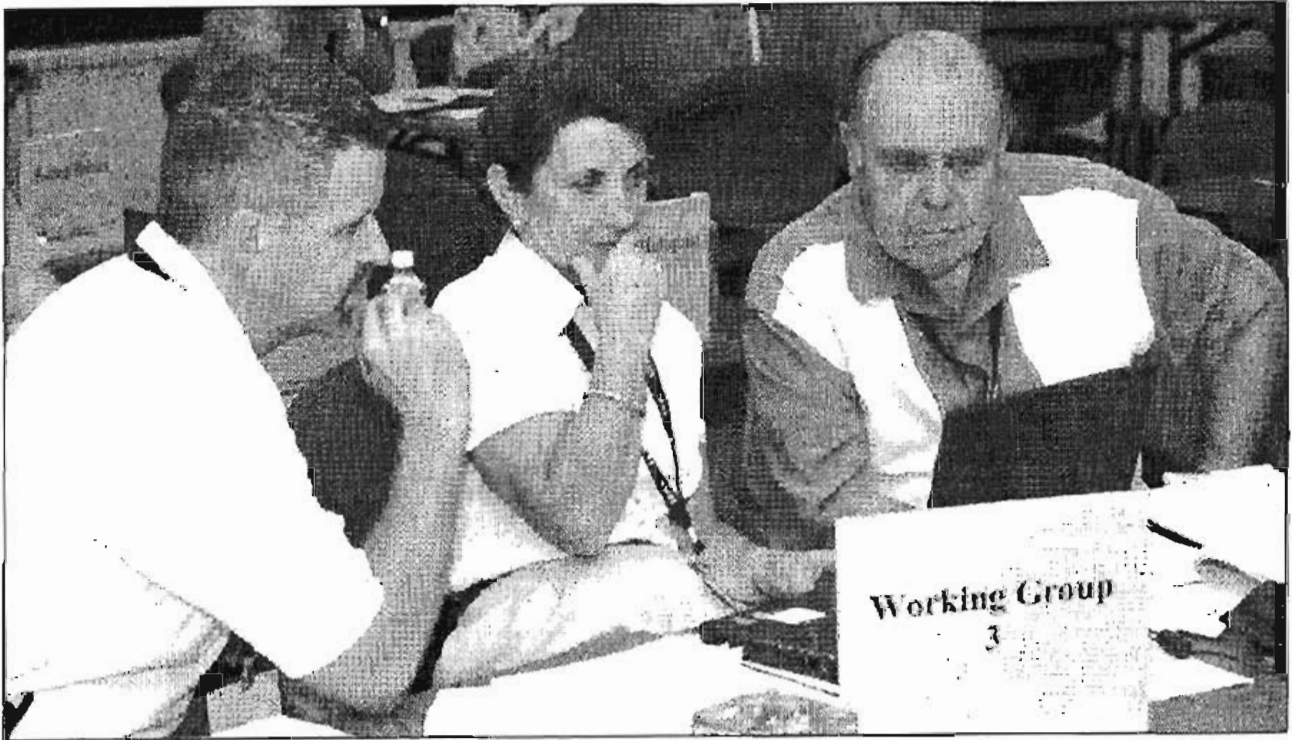
“Would there be a greater long-term benefit and a more cohesive process to align state budgeting to perhaps invest time and effort within CALFED to establish line items in existing programs of partner agencies rather than create yet one more independent funding mechanism (e.g., fees, bonds, etc.)? Seems like there would be greater public support for the raising of existing fees, etc. than a “new” fee. – **Pankaj Parekh**

“Need to consider the relationship between the water quality water-user fee and other water-user fees that CALFED is, or may be, considering (e.g., water-user fee to support ecosystem actions and the Environmental Water Account.) What entity would be responsible for managing the funds?” – **Lynda Smith**

“Acre foot-based fee rather than hook-up fees or export fees are biased against agricultural, rural, and environmental users and subsidizes urban users. Need a life-line rate. Infeasible to collect from water users. Not in districts (e.g., private domestic water well users who may receive little or no benefit from the program anyway) for a variety of reasons. – **Leah Wills**

“The proposal to tax groundwater extraction on a volumetric basis implies the need to regulate groundwater use. Prior efforts to establish groundwater regulations have been highly controversial and have not been successful.” – ***Rick Woodard***

“A water user fee for water quality on all water uses is not likely politically feasible – viz: SWRCB Bay-Delta proposed D1600 – for two reasons (at least): (1) burden will fall very heavily on agricultural uses, an economically impacted industry; and, (2) water rights priorities are ignored—burden should fall heaviest on most junior rights. Would work better if imposed on water exports and transfers, which by definition are higher-value uses.” – ***Tom Zuckerman***



PRIORITY 3

Impact of Population Growth and Various Land-Use Practices on Water Quality

Working Group Members:

Archibald, Breuer, and Collins

Issue Description:

One component of the CALFED Drinking Water Program strategic plan is the improvement of source water quality. Delta water quality is currently degraded by contaminants from a variety of sources in the Sacramento-San Joaquin watershed. The key drinking water contaminants are organics, disinfection by-product (DBP) precursors, salts, turbidity, pathogens, and nutrients. Current sources of contaminants include agricultural runoff, wastewater discharges, and urban runoff. The Sacramento-San Joaquin watershed is one of the fastest growing regions in California. The challenge facing CALFED is that source water quality in the Sacramento-San Joaquin watershed is likely to further degrade as a result of the increased urban development and the concomitant increase in wastewater discharges and urban runoff. In addition, ecosystem restoration activities within the Delta have the potential to adversely affect drinking water quality. The impacts on water quality of these land-use changes and ecosystem restoration activities need to be understood and managed.

Importance:

The goal of the CALFED Drinking Water Program is to continuously improve water quality conditions in the Delta. This is a tremendous challenge due to the current sources of contaminants and the increased load of contaminants expected from population growth and land-use changes.

Non-point sources of pollution are particularly difficult to monitor and control. Agricultural runoff is currently regulated under a conditional waiver in the Central Valley. The conditional waiver requires agricultural dischargers to form watershed groups to monitor and develop management practices. Control methods for non-point agricultural discharges (e.g., establishing "no-spray buffer zones" for pesticides near sensitive waterways) will have a huge impact on California agriculture. This issue is already facing legal challenges in the State of Washington. One farm spokesperson argues that these no-spray zones "create zones for insects and diseases, as well as noxious weeds." And that "invasive weeds can establish in buffers and spread across farmlands."

Non-agricultural discharges, such as storm runoff from urban areas, also present unique challenges. Urban runoff contains oil and grease, heavy metals, microbiological organisms, nutrients, and carbonaceous matter. All of these constituents can adversely impact drinking water quality. Management practices to reduce the load of these contaminants are available and in use in some urban areas. Implementation of urban runoff management practices will increase in importance as the population of the watershed increases.

There are numerous wastewater treatment plants that discharge to the Sacramento and San Joaquin river system. These discharges are currently regulated by the Central Valley Regional Water Quality Control Board (CVRWQCB); however, several constituents of concern to drinking water suppliers, such as organic carbon, are not regulated under current National Pollution Discharge Elimination System (NPDES) permits. Increased growth has led to new and enlarged wastewater treatment plants. The cumulative impact of the increased wastewater load to the river system has not been evaluated.

CALFED is investing heavily in wetland restoration in the Delta and the watershed. Recent studies have shown that wetlands in the Delta generate substantial loads of organic carbon. This may result in increased concentrations of organic carbon at Delta pumping plants. Additionally, studies in southern California have shown that birds using wetlands are a significant source of microbiological organisms; therefore, the net effect of ecosystem restoration actions must be considered in the overall management plan.

In summary, robust point and non-point source control measures are necessary to maintain existing water quality and to prevent any adverse impacts resulting from changing land-use patterns and population growth. Source control is particularly important to smaller communities that are not investing in costly advanced treatment processes. An alternative option would be to abandon source control efforts and shift the burden of treatment to comply with drinking water standards at the point of use; however, this would be contrary to existing state and federal laws and CALFED's principles and directives regarding environmental justice.

How Do You Propose Meeting or Complying with This Issue?

Monitoring and Assessment

CALFED, in concert with other state and federal agencies, needs to conduct the monitoring required to quantify the sources and loads of drinking water contaminants from point and non-point sources. Specifically, quantifying the sources and loads of drinking water quality constituents of concern and developing the tools to assess the relative impacts of each source in the Delta will allow CALFED to:

- Focus watershed protection efforts on point and non-point sources of contamination that have the most impact on drinking water quality.

- Establish a drinking water quality baseline against which to assess the impacts of proposed CALFED actions, such as restoring tidal wetlands or drinking water quality. This would allow the assessment of different options, such as the geographical placement of proposed projects in the Delta and its source waters.
- Assess non-CALFED directed land-use changes, such as urban growth, and its relative impact on drinking water quality in Delta waters.

To develop the necessary assessment tools, CALFED should provide:

- Continuous (and synoptic) monitoring and assessment of different land uses under a variety of hydrologic conditions (e.g., drought and floods) to provide the discharge profile for each type of land use.
- The current and future establishment of continuous, real-time drinking water quality monitoring stations to provide hydrologic and tributary water quality data to feed into computer models.
- The creation and refinement of contamination transport models within the Delta, its tributaries, and throughout the State Water Project (SWP) system to provide the estimated relative contribution of various upstream sources.

Implementation of Management Practices

Once the key sources of drinking water contaminants have been identified, the CALFED implementing agencies should evaluate and implement management practices that will cost-effectively reduce contaminant loads. Plans should include a monitoring and assessment program to evaluate the effectiveness of the measures.

Drinking Water Policy

The CVRWQCB should establish an aggressive policy for protecting drinking water quality in the Bay-Delta watershed. This policy should include narrative or numeric water quality objectives for drinking water constituents of concern. This will allow the Regional Board to establish effluent limitations for drinking water constituents in NPDES permits and to require monitoring of these constituents. Furthermore, this policy needs to address non-point sources so that they can be monitored and controlled.

Equitable Regulations and Best Management Practices (BMPs)

Regulations should be developed that are equitable, cost-effective, and result in measurable benefits to the State's waters. The Regional Board should consider developing a "pollutant trading policy" that would allow point-source dischargers to fund non-point source control programs that more cost-effectively reduce loads of contaminants. Regulations should be applied in a way that does not shift development from urban to rural areas. Source water

improvements resulting from these regulations and BMPs will benefit all drinking water purveyors, especially those that serve smaller communities.

Ecosystem Restoration Activities

CALFED should require that all Ecosystem Restoration Program projects have a monitoring and assessment program to evaluate the potential impacts on drinking water quality.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus This Issue?

Monitoring and Assessment

CALFED funds have been awarded to USGS and DWR to determine the loading of organic carbon from wetlands and agricultural land-use sources in the Delta. In addition, DWR's Municipal Water Quality Investigations (MWQI) program has spent 20 years collecting Delta drinking water quality data and conducting research in the Delta. The MWQI Real Time Data and Forecasting program element blends SWP funds with CALFED grants to continue the expanded development of continuous drinking water quality monitoring and models for forecasting water quality throughout the system. The United States Geological Survey (USGS), DWR, and water agencies will need additional funding to conduct the detailed monitoring described above. The key contact at USGS is Roger Fujii, and the key contact in DWR is Phil Wendt.

Implementation of Management Practices

The Regional Board should be the lead agency due to their jurisdiction over discharges in the Central Valley. They should work collaboratively with individual dischargers, the California Department of Pesticide Regulation (DPR), Resource Conservation Districts, and academic institutions. The key contact at the Regional Board is Ken Landau.

Drinking Water Policy

The Drinking Water Policy is currently being developed through the joint efforts of the Regional Board, DHS, State Water Resources Control Board (SWRCB), CALFED, California Urban Water Agencies (CUWA), and Sacramento Regional County Sanitation District (SRCSD). A technical work plan has been developed that lays out a 5- to 6-year process to amend the Basin Plan. The key contact at the Regional Board is Karen Larsen.

Equitable Regulations and BMPs

The Regional Board should be the lead agency in developing regulations to control point and non-point contaminants; however, they should work in concert with other state and federal agencies. The United States Environmental Protection Agency (USEPA) has proposed a "pollutant trading policy" that has not been finalized. The Regional Board should work with

USEPA staff to take advantage of efforts to date. The key contact at the Regional Board is Ken Landau.

Budget:

Initial budget estimates for the Drinking Water Program were \$40 million per year; however, this money was never appropriated and the program has been severely under funded and understaffed from the beginning. Activities by participating agencies have largely been funded through proposition grant funds (\$2 to \$4 million) and agency budgets.

Comments:

“I would like to see a broader cross-section of attendees at future CALFED meetings – agricultural representatives (e.g., cattleman, row-crop, etc.), more wastewater dischargers (e.g., municipal and industrial), and perhaps a representative from the California Chamber of Commerce. In scanning the list of attendees, I believe that some of these groups were under-represented and some were not represented at all.” – ***Harvey Collins***

“Conjunctive use: By using Delta water to recharge groundwater basins, that water could be made available for water supply needs during a drought. Furthermore, based on recharge studies in southern California, I would expect approximately 50 percent of the DOC to be removed (e.g., physically or oxidized) during the recharge process. This removal would occur in a very short period of time (i.e., days, not months or years). This conjunctive use would therefore fit well into the CALFED objective of limiting the concentration of organic carbon in water used for drinking water and would provide additional water during emergencies.” – ***Harvey Collins***

“How would you define diminishing returns of non-point source controls?” – ***Phillippe Daniel***

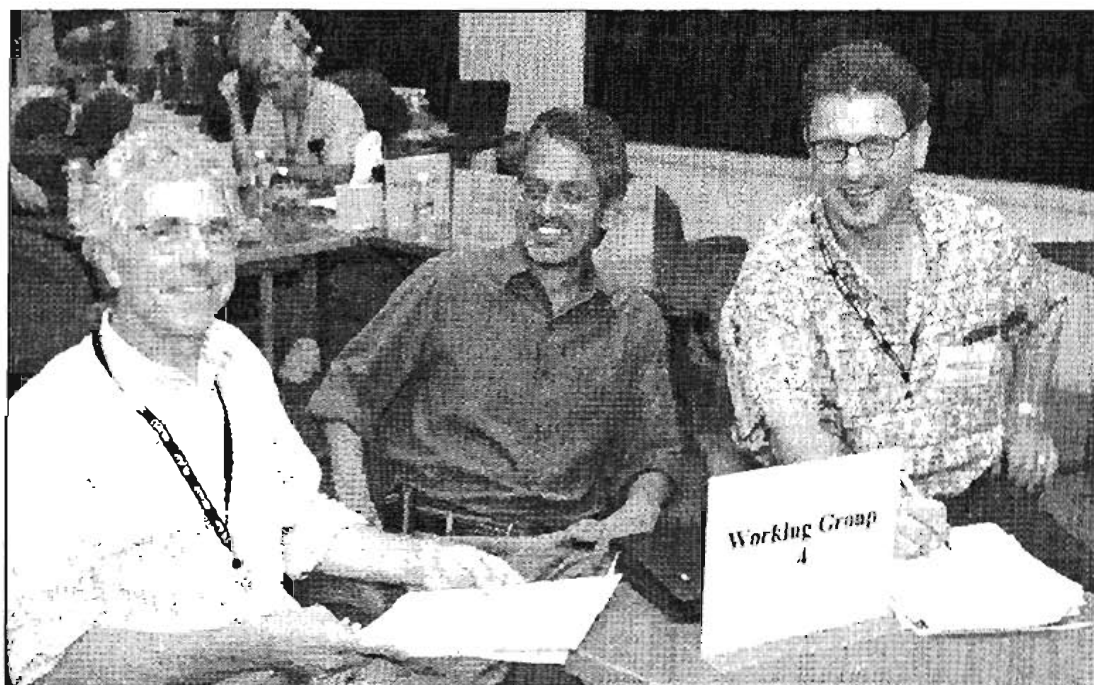
“Key challenge is the current rapid growth and probability that infrastructure investments will have been made by the time we have data/monitoring information documenting the water quality degradation. There is an overwhelming need to find ways to tie today’s development decisions back to actions that will protect regional water quality. How to do this? Use examples from Los Angeles where infrastructure is being changed at great expense to undo the damage?” – ***Martha Davis***

“There are almost certainly lower-cost opportunities for municipal wastewater plants to achieve significant reductions in discharge of drinking water pollutants of concern. For example: minimizing total organic carbon (TOC)/DOC discharge is not a design or operating parameter for wastewater plants. If wastewater plants were designed and operated to minimize TOC/DOC (even with secondary treatment only), loads could be significantly reduced. There may also be treatment processes beyond secondary that could be cost effective, particularly if multiple water quality benefits (e.g., mercury reduction) are considered. Treatment solutions have the advantage of having a high degree of certainty about effectiveness. This includes treatment scenarios for non-point sources. – ***Sam Harader***

“Focus activities on ensuring that recharge basins are protected; installing water conservation measures to reduce growth pressure on sewage treatment plants; exploring and implementing where there are customers for a water recycling program in urbanizing areas. – *Frances Spivy-Weber*

“Need to include water conveyance. Storage facilities are contaminant sources. Loads need to be calculated for them also, especially those who export from the Delta. The Central Valley Basin Plan Amendment should be the first one, but all basin plans should be addressed so that there is consistency.” – *Leah Wills*

“We have to identify actions that can be required today to draw the line, so that we do not fall further behind, while we are gathering data.” – *Marguerite Young*



PRIORITY 4

Identify a Common, Statewide Definition of “Safe” Drinking Water Suitable for Use As the CALFED Drinking Water Quality Goal of “Equivalent Level of Health Protection”

Working Group Members:

Macler, Parekh, and Summers

Issue Description:

Regions, cities, regulators – all have different expectations of what constitutes “safe” drinking water. For a statewide effort like CALFED, it is essential to have a singular expectation about a minimum protective level necessary for drinking water. It may not necessarily be regulatory based.

Currently, CALFED water quality goals in the Record of Decision include achieving source levels of 3 mg/L TOC and 50 mg/L bromide, or an equivalent level of health protection. But organic carbon and bromide have no health consequences, per se. They are only precursors to DBPs of health concern, depending on treatment technologies used.

We need reasonable and agreed-upon health-based goals. Some possibilities include no waterborne-disease outbreaks; compliance with drinking water regulations; and, total risks that are less than 1/10,000 excess disease.

Importance:

Without specific public health goals, efforts can neither be prioritized, nor the results evaluated.

This definition, which may change over time, will allow for the creation and evaluation of projects and policies to meet the goal. It must consider both the Safe Drinking Water Act (SDWA) and Clean Water Act (CWA) public health goals, as well as other criteria and views of what constitutes “safe.”

A common denominator may also help evaluate whether a Bay-Delta solution is feasible or not to achieve that “safe” target.

How Do You Propose Meeting or Complying with This Issue?

In the CALFED Record of Decision, benchmarks of 3 mg/L TOC and 50 µg/L for bromide were established based on treatment to achieve potential drinking water standards of 5 µg/L for bromate, 40 µg/L for total trihalomethanes and, 30 µg/L for haloacetic acids. In interpreting equivalent level of health protection, a reasonable approach is to consider risk estimates associated with these concentrations.

Of the three, the level for bromate has the highest estimate of risk, at one additional cancer per 10,000 people exposed over a lifetime. Risks from trihalomethanes and haloacetic acids are more than an order of magnitude lower than this, so that bromate risk dominates.

At the same time, the treatments considered were also designed to achieve *Cryptosporidium parvum* inactivation adequate to achieve no more than one additional infection per 10,000 exposed per year.

Therefore, we propose a plausible interpretation of equivalent level of public health protection for treated Delta water to be no more than an aggregate total risk of 1/10,000 for lifetime cancer risk and 1/10,000 for annual infection risk, regardless of contaminant or contaminant mixture.

We believe that these levels will also be protective for the currently known non-cancer health impacts from Delta constituents or DBPs. We recognize that there may be cases in the future where this would not be so. Those cases would need to be addressed on a case-by case basis.

Who Are the Individuals Best Able to Address, Illuminate, Refine and Focus This Criterion?

The Drinking Water Subcommittee will need to consider this recommendation. If it is suitable as a candidate, the larger public should have an opportunity to comment.

Budget:

None needed. Job done.

Comments:

“Does your recommendation for revised goals incorporate other contaminants? The goals of TOC= 3mg/L and Br= 50µg/L incorporate other contaminants because measures to control these contaminants will likely control other contaminants.” – ***Elaine Archibald***

“I would like to see a broader cross-section of attendees at future CALFED meetings – agricultural representatives (e.g., cattleman, row-crop, etc.), more wastewater dischargers (e.g., municipal and industrial), and perhaps a representative from the California Chamber of

Commerce. In scanning the list of attendees, I believe that some of these groups were under-represented and some were not represented at all.” – **Harvey Collins**

“Conjunctive use: By using Delta water to recharge groundwater basins, that water could be made available for water supply needs during a drought. Furthermore, based on recharge studies in southern California, I would expect approximately 50 percent of the DOC to be removed (e.g., physically or oxidized) during the recharge process. This removal would occur in a very short period of time (i.e., days, not months or years). This conjunctive use would therefore fit into the CALFED objective of limiting the concentration of organic carbon in water used for drinking water and would provide additional water during emergencies.” – **Harvey Collins**

“Significant difference using a proxy with a 10^{-4} risk level or saying that you will target an aggregate risk of 10^{-4} .” – **Phillippe Daniel**

“I am concerned that the objectives proposed—no more than 1 in 10,000 cancer risk over a lifetime and 1 in 10,000 annual illness risk, as cumulative risk totals— are not currently financially feasible. I also believe they are not well understood. I support the concept of changing our approach to look at things using this type of risk analysis.” – **Joe Grindstaff**

“Maximum contaminant levels (MCLs) consider cost and other practical aspects; this proposal does not. No one wants to drink water close to MCLs (or with a 1/10,000 illness risk per year). In California, that would be 3,500 illnesses per year from *Cryptosporidium*. Will that be accepted? Does not address issue of the high uncertainty associated with estimated risk at levels extrapolated orders of magnitude below reliable epidemic results.” – **Jean Moran**

Under the proposed approach, would the water quality goal be adjusted over time as the health risk estimates for various pollutants change? The water quality goal needs to be durable enough to serve as a long-term planning goal (i.e., the 30-year CALFED implementation), since we cannot predict how drinking water regulations may change.” – **Lynda Smith**

“Question: How would the proposed ELPH address more cancer impacts (e.g., miscarriages from TTHM.)? Answer: Reducing the cancer risk would also reduce other public health risks.” – **Doug Wallace**

“If arsenic (1/10,000/0.5 ppb) is the real health risk, can you make that explicit in your presentation? If compliance with health goals is the real issue, can you also state that? –**Leah Wills**

“As it currently stands, under this proposal, arsenic (with a 1:10,000 risk level of 0.5 ppb and Delta occurrence at 2-4 ppb) would become the driver for achieving an equivalent level of public health protection. Given the likelihood that MCL for arsenic will be less stringent than this level, will a CBDA policy such as this set up a de facto double standard of funding and public health protection for those not using Bay Delta water? How would source water protection watershed improvement actions/priorities change? Arsenic, like bromide, is largely a naturally occurring constituent.” – **Marguerite Young**



PRIORITY 5

Identify and Prioritize — Through Appropriate Data Acquisition and Science — the Most Significant Sources of Degradation of Delta Water Quality

Working Group Members:

Levin, Robles, and Woodard

Issue Description:

To cost-effectively and equitably improve Delta water quality, the major sources of degradation must be identified and quantified. This includes quantifying contaminant inputs from manmade and natural sources. The inefficient use of resources can lead to data gaps and redundancy. There are many activities that degrade water quality and pose risks to public health, yet those activities have their own benefits (e.g., body contact recreation, animal grazing, etc.). There is a need to gather more complete data to gain the information necessary for understanding the most significant sources of water quality degradation.

Importance:

Limited federal, state, and local resources will be used ineffectively unless expended in those areas that will, to the greatest extent, improve Delta water quality. Without appropriate data and science, it is not possible to make effective decisions on actions that result in improved water quality. Data acquisition creates a fundamental necessity to move toward evaluating CALFED actions based on risk, and not simply related to the pounds of pollutants removed per dollar spent. Delta water from pathogenic microorganisms may be the most cost-effective option, given that the highest risk is from microbial disease.

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program. A better collection of data and science will provide adequate information for stakeholders to understand Delta water quality degradation issues leading to the necessary support from stakeholders.

How Do You Propose Meeting or Complying with This Issue?

Develop a Joint Powers Authority (JPA) that secures the involvement of diverse stakeholders and the environmental justice community. The principal function of the JPA will be drinking water quality data acquisition. The goal of the JPA should be to ensure local, regional, and state decision-makers understand and use scientifically sound data to make management decisions that will result in improvements and enhancements in the Bay-Delta system. The JPA should focus on the following objectives:

- Collect data on the quality of waters in the Bay-Delta system.
- Coordinate the work of the JPA with related work of other agencies or organizations.
- Interpret data collected by the JPA and by others to assess the effects of constituents of concern and other factors on the Bay-Delta system.
- Manage this data to assure its continued usefulness.
- Carry out other tasks in support of the collection, interpretation, and management of data.
- Develop and disseminate information about drinking water quality in the Bay-Delta system.
- Carry out other programs of mutual interest.

The JPA will have short-and long-term goals related to data acquisition. The short-term goal will be to develop a baseline against which the effectiveness of CALFED actions can be measured. The principal task would be to collect data available from disparate sources to establish a baseline, which could take about 1 to 2 years.

The long-term goals should include assessing CALFED and non-CALFED actions that have possible impacts on water quality and develop a priority list of impacts to Delta water quality. This could take about 2 to 5 years.

The JPA would initiate standing committees to implement its objectives. The work of the JPA will be committed to an open and transparent process, with stakeholder access to the data collected.

The JPA should be initially charged to undertake the following actions:

- Quantify risks on a local level in watershed sanitary surveys.
- Develop a statewide task force to revisit the issue of recreational uses of reservoirs.
- Develop a task force to address grazing and acceptable BMPs.
- Model and consider public health risk when alternative CALFED actions are evaluated.

- Identify the sources of pathogens and their relative importance.
- Identify effective means of reducing pathogen densities for various sources.
- Implement the most cost-effective methods for reducing pathogens.
- Determine the reduction in health risk.
- Identify opportunities to offset benchmark disinfection levels and redundant log reductions with source protection.
- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus This Issue?

The JPA would consist of members spanning the CALFED solution area's geographic region. The following entities should be invited to be contributing members of the JPA:

- DWR.
- DHS.
- Regional Water Quality Control Board (RWQCB).
- SWRCB.
- USGS.
- CUWA member agencies.
- California Association of Sanitation Agencies (CASA).
- City of Sacramento.
- City of Vacaville.
- City of Stockton.
- State water contractors.
- Sacramento River Watershed Program (SRWP).

- University of California, Davis.
- Delta-keepers.
- North Delta water agencies.
- Central Delta water agencies.
- South Delta water agencies.
- Agricultural interests.

Budget:

\$2 million dollars per year.

Fifty-percent cost-share between JPA and CALFED.

Comments:

“Clarify what is meant by monitoring for pathogens. From a practical and economic point of view, bacteriological and viral monitoring should be limited to indicator organisms. For example, use ether coliform, fecal coliform, *E. coli*, and perhaps fecal streptococci as indicators of bacterial pathogens. Male-specific coliphage could be used as indicators of viral pathogens. – ***Harvey Collins***

“I would like to see a broader cross-section of attendees at future CALFED meetings – agricultural representatives (e.g., cattleman, row-crop, etc.), more wastewater dischargers (e.g., municipal and industrial), and perhaps a representative from the California Chamber of Commerce. In scanning the list of attendees, I believe that some of these groups were under-represented and some were not represented at all.” – ***Harvey Collins***

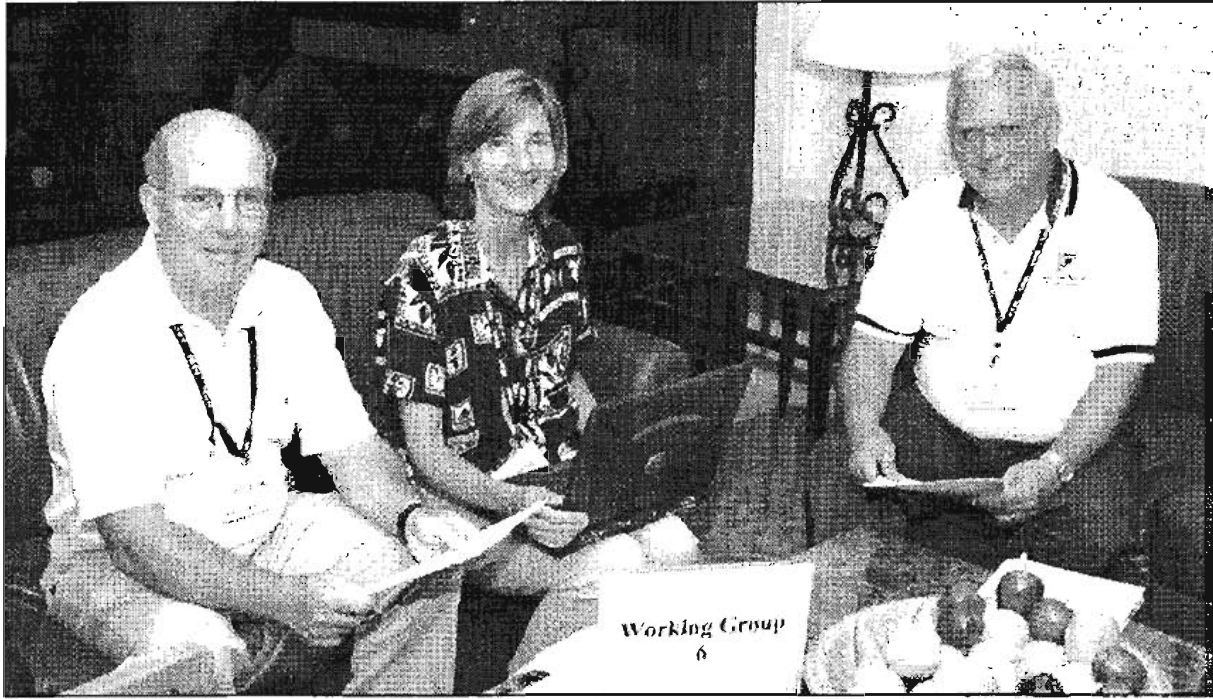
“Conjunctive use: By using Delta water to recharge groundwater basins, that water could be made available for water supply needs during a drought. Furthermore, based on recharge studies in southern California, I would expect approximately 50 percent of the DOC to be removed (e.g., physically or oxidized) during the recharge process. This removal would occur in a very short period of time (i.e., days, not months or years). This conjunctive use would therefore fit will into the CALFED objective of limiting the concentration of organic carbon in water used for drinking water and would provide additional water during emergencies.” – ***Harvey Collins***

“Where would the data reside? Need a neutral third party to be the gatekeeper/repository. Transparent management/open to all. – ***Sarge Green***

“Assuming that there will be entities that will resist data collection related to their activities, how would you eliminate their objections and/or obtain the needed data? –**Bill Mills**

“Could use A.B. 599 example for data sharing/data management and electronic data format that participating agencies must use. Include University of California in JPA? –**Jean Moran**

“Would the JPA consider electronic collection of data and transparency of access to data via a web portal? –**Michael Stanley-Jones**



PRIORITY 6

How Shall Regionally Developed Drinking Water Strategies Be Coordinated, Approved, and Funded, and by Whom?

Working Group Members:

Grindstaff, Moran, and Zuckerman

Issue Description:

Multiple state and federal agencies are currently involved in regulating and funding drinking water. If regional solutions are to be implemented, the various agencies must coordinate efforts; furthermore, a single blueprint must be available to stakeholders engaged in regional solutions. A well-defined process, with defined solution areas, will aid participants in developing worthwhile projects. The process must include the authority, financing, and flexibility to change with time.

Importance of Issue:

Local and regional approaches may be thwarted by the lack of a single, coherent process that is directed at CALFED water quality goals. Without a long-term strategy, the latest crisis will take precedence over strategic plans.

How Do You Propose Resolving This Issue?

- There should be a provisional grant of authority by the federal agency to the state decision-making process (i.e., delegate first cut to state agencies).
- Tie-breaking process and funding to regional planning.
- Let a state agency have decision-making authority.
- Coordinate actions by state agencies.
- Add a legislative “hammer” to motivate state agencies to work together (e.g., Machado’s bill).
- Make regional strategies support CALFED goals.

- There may be local strategies that fit CALFED goals and do not add cost.
- The CBDA needs more “authority” (i.e., help fund regional activities; provide incentives to regions).
- Use a “carrot” to get regions to develop plans.
- *Real* stakeholders should supply the plan – a coordinated process will help stakeholders define and develop projects.
- Take an integrated approach that moves beyond water quality (this requires expertise from various state agencies).
- May need to go outside CALFED solution areas/source areas when it comes to drinking water quality issues.

Comments:

“I would like to see a broader cross-section of attendees at future CALFED meetings – agricultural representatives (e.g., cattleman, row-crop, etc.), more wastewater dischargers (e.g., municipal and industrial), and perhaps a representative from the California Chamber of Commerce. In scanning the list of attendees, I believe that some of these groups were under-represented and some were not represented at all.” – ***Harvey Collins***

“Conjunctive use: By using Delta water to recharge groundwater basins, that water could be made available for water supply needs during a drought. Furthermore, based on recharge studies in southern California, I would expect approximately 50 percent of the DOC carbon to be removed (e.g., physically or oxidized) during the recharge process. This removal would occur in a very short period of time (i.e., days, not months or years). This conjunctive use would therefore fit well into the CALFED objective of limiting the concentration of organic carbon in water used for drinking water and would provide additional water during emergencies.” – ***Harvey Collins***

“Joe provided a great example of how local options can help address Delta water problems. In southern California, groundwater basins can recharge raw, high-TOC water and store in groundwater for use later during droughts. This will reduce the need to treat high-TOC water that produces the problem by-products.” – ***Martha Davis***

“A definition of what best constitutes a “regionally” developed strategy is a significant issue. For example, would this be a watershed agency, regional board region, MWDSC service area, etc.” – ***Bill Mills***

“Local land-use planning agencies may wish to be involved in regionally developed drinking water quality strategies. What is the appropriate role for them?” – ***Doug Wallace***

PRIORITY 7

A Risk Analysis Approach to Characterizing Alternatives for Meeting CALFED Water Quality Objectives

Working Group Members:

Daniel, Hultquist, and Stanley-Jones

Issue Description:

Equivalent protection cannot be recognized unless there is a method for measuring the effectiveness of alternative protection approaches and a standard for comparison.

Importance:

Providing an equivalent level of protection may be the only practical method to meet the goal of safe, reliable, and affordable drinking water. This requires a means of comparing options and determining equivalence.

Approach:

Background

Regulations are often promulgated independently and are at times in fundamental conflict with one another. The USEPA Science Advisory Board just released a report, *Integrated Environmental Decision Making in the 21st Century*, calling on the USEPA to focus on the reduction of total risks resulting from risk management decisions rather than focusing on the reduction of any particular risk (EPASAB, 2000):

... there is a growing consensus, both within and outside the Agency, that a more integrated approach to environmental management is needed. Prioritizing and managing risks pollutant by pollutant...can be both inefficient at reducing the major burdens of environmental impacts on human health and ecosystems and costly in the face of today's shrinking budgets. Of still greater concern is the possibility that such a fragmented approach may cause us to overlook significant environmental problems while we busy ourselves with comparatively minor issues that contribute little to the overall protection of human health....

Attempts toward more integrated environmental decision making are just beginning to be made. The USEPA is, in fact, authorized to incorporate such considerations by the 1996 SDWA Amendments:

...the level or levels of treatment techniques shall minimize the overall risk of adverse health effects by balancing the risk from the contaminant and the risk from other contaminants the concentrations of which may be affected by the use of a treatment technique or process that would be employed to attain the maximum contaminant level or levels.

How does one craft a treatment strategy that reduces the overall public health risk associated with what is acknowledged to be a "soup" of constituents?

Steps

- Record of Determination (ROD) prescription of 3.0 mg/L and 50 µg/L for TOC and bromide. Current operational definition.
- Need to translate this source water quality into a benchmark value against which to compare alternative source water quality – technology combinations.
- Develop an index: The risk posed by a given compound can be expressed as the potency (or the strength of its particular adverse health-effect response) multiplied by the concentration at which this constituent occurs.

$$\text{Risk} = \text{Potency} \times \text{Concentration}$$

- While many constituents (e.g., regulated and unregulated) are monitored by water utilities, currently health effects information are available for a limited number of these. A risk index that calculates the values for cancer, non-cancer, and microbiological endpoints can be developed (though subject to many limitations). Emerging contaminants (e.g., N-nitrosodimethylamine [NDMA], perchlorate, endocrine disruptors) need to be considered as well. Potency factors may be obtained from published values, calculated from short-term *in vitro* and *in vivo* tests, and estimated through structure activity relationship and/or other forms of expert judgment.

$$\text{Risk index} = \text{Sum of all constituent concentrations multiplied by their respective potency factors}$$

- Risk indices have their limitations and should be supplemented with an array of other tests for whole mixture risk assessment that assess a variety of constituent groups and endpoints (e.g., Medaka fish, the frog embryo teratogenesis assay-*Xenopus* [FETAX]), other test batteries (i.e., arrays of *in vitro* tests akin to the Ames test for mutagenicity and others) as these may be helpful for comparing technology alternatives.
- Use this tool to characterize current risk at plants treating Delta water.

- Evaluate an array of source water conditions (Table 1) against a variety of candidate technology alternatives (Table 2).

Table 1	
Source Water Conditions	
TOC	Bromide
3	50
	100
	200
4	50
	100
	200
5	50
	100
	200
6	50
	100
	200

Table 2		
Sample Treatment Scenarios for Evaluation		
Treatment		Performance
Ozone		
	+pH	
	+ hydrogen peroxide	
	+ GAC	
GAC	+ Chlorine	
	+ UV	
	+ Chlorine dioxide	
Low pressure membrane filtration	+ Chlorine	
	+ UV	
	+ GAC	
Nanofiltration	+ Chlorine	
	+ GAC	

- Once the source water quality-technology matrix evaluation is complete, it is possible to compare to source protection alternatives that would impact bromide, TOC, pathogens, and other constituents driving the risk. These source protection alternatives might include limiting the type and level of recreation on reservoirs or controlling the level of grazing with various BMPs.

The benefits that may be diminished by source protection efforts, such as recreation and agricultural production, must also be considered in some fashion.

- The benchmark for determining equivalent protection can be identified by a CALFED process. The default benchmark is the set of water quality objectives identified in the ROD.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus This Issue?

- Phillippe Daniel, Camp Dresser & McKee
- R. Scott Summers, Ph.D., University of Colorado
- Bruce A. Macler, Ph.D., USEPA
- Linda Teuschler, USEPA
- Chuck Haas, Drexel University
- Steve Hrudey, University of Alberta at Edmonton

Budget:

\$6 million dollars over 5 years.

Comments:

“Going after new definitions of public health over existing regulations may dilute efforts to get CALFED to address immediate projects that could provide immediate improvements to drinking water quality. Analogy: Everyone has ordered dinner, and you are still looking at the menu. Also naturally occurring contaminants that are present due to natural sources that CALFED actions cannot affect may skew the process, rendering improvements to other contaminants moot.
–**Rich Breuer**

“I would like to see a broader cross-section of attendees at future CALFED meetings – agricultural representatives (e.g., cattleman, row-crop, etc.), more wastewater dischargers (e.g., municipal and industrial), and perhaps a representative from the California Chamber of Commerce. In scanning the list of attendees, I believe that some of these groups were under-represented and some were not represented at all.” – **Harvey Collins**

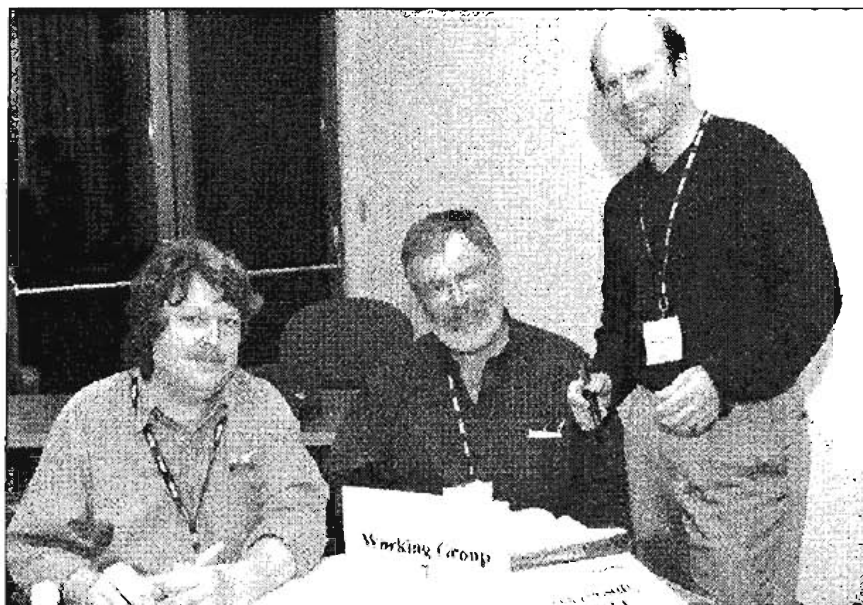
“Conjunctive use: By using Delta water to recharge groundwater basins, that water could be made available for water supply needs during a drought. Furthermore, based on recharge studies in southern California, I would expect approximately 50 percent of the DOC to be removed (e.g., physically or oxidized) during the recharge process. This removal would occur in a very short period of time (i.e., days, not months or years). This conjunctive use would therefore fit will into the CALFED objective of limiting the concentration of organic carbon in water used for drinking water and would provide additional water during emergencies.” – **Harvey Collins**

“Excellent example of the type of analysis that would help local agencies understand what would be the best technology investments for addressing water quality problems. The Los Angeles Department of Water and Power (LADWP) example underscores the point that, for that agency, arsenic is a primary concern. This tool would be very helpful to agencies that want to develop ELPH plans.” –*Martha Davis*

“The proposed tool is useful but should probably be provided as a model that any agency could use, or, in fact, the CBDA should use the tool on every system using Delta water. It does seem to me that setting cumulative risk numbers, as described by Working Group 4, is still necessary. We cannot ultimately accept just an equivalent level of health protection but must meet the standard the public expects of us.” –*Joe Grindstaff*

“It is unclear how this useful approach would be used in practice by CALFED. Since it is dependent on treatment choices, it would seem to need to be applied on a treatment-plant-by-treatment-plant basis, using water quality information specific to the intake. This is something a utility might be expected to do with its own money. If this were done generally for Delta water, the treatment choices are less likely to fully consider non-risk components in treatment choices made by utilities (such as operational ease, compatibility with existing components, consultant bias, chance, etc.) Will a few utilities get this done to get a limited picture, or will all benefit? –*Bruce Macler*

“Might you use this tool to benchmark the 50/3 targets to an index value and then state that an equivalent level of public health protection is a combination of strategies that meets or exceeds the index value?” –*Marguerite Young*





PRIORITY 8

Methodology for Sustainable Development Assessment of Water Resources

Working Group Members:

Green, Hermanowicz, and Wills

Issue Description:

Water resources development must be sustainable. The elements of sustainability include economic, environmental, and social issues. Rational decision making would benefit from a framework (as yet not fully developed) to quantify as much as possible the impacts of various alternatives.

The calculations of the costs associated with water resources development are rarely comprehensive and fail to pass the test of a life-cycle analysis of sustainability. Cost estimates fail to account fully for energy costs and the associated impacts of energy supply on the environment. For example, greenhouse gas emissions associated with energy production are not factored into decisions about the cost-effectiveness of desalination projects.

Life-cycle analysis (LCA) is a starting tool that allows the impact of a project or activity to be addressed over the three phases of its lifecycle: construction, operation, and decommission. Life-cycle assessment is a methodology that allows environmental aspects and the impacts of a product (watershed management, storage, transmission, treatment, and water-use efficiency) to be quantitatively addressed. An inventory of system inputs and outputs is developed on three phases of the product life: construction, operation, and decommissioning. The energy and material consumption are assessed for all three phases, and an environmental profile is developed.

Based on the LCA results, subsequent economic, environmental, and social analysis can be carried out. The economic analytical framework is probably most developed and can be applied to provide estimates of value and worth of water protection (e.g., per mass of pollutant removed). Environmental and social sustainability analysis is less advanced and will require a more creative approach. For the environmental component, an analysis based on the energy-entropy relationship might be followed. Social analysis should recognize that water-related projects can often produce significant social changes the impact of which is not easily apparent. A methodology to forecast and respond to these changes should be further advanced.

In all three analytical components, the time-value relationship should be explicitly recognized. Depending on the time frame of an analysis, certain actions/investments may appear more or less

favorable. Certain benefits (or avoided impacts) could be discounted as the evaluation period is shortened. For example, water treatment technology is discrete and yields immediate and measurable impacts, whereas some source protection alternatives take longer time-scales to implement and see impacts (or, in many cases, prevent increased adverse impacts).

Sustainable resource development in the future will require new methodologies. This project team recommends new methodologies be partially tested and used during their development. One suggested methodology is a communication looping technique instead of a conventional back-and-forth process. Traditional project development involves problem definition, identification of suitable solutions, and attempting to mitigate technical, institutional, and social impacts with the parallel goal of uncertainty. The problem with the current approach is that the solution proponents may invest so much intellectually and emotionally in their approach that they become committed to a solution before examining other alternatives. The proposed remedy is to develop an open assessment and learning “looping” process where uncertainty is managed more carefully by exposing the ultimate stakeholders representing the “diverse element of the public” to the new methodology. The resulting methodology can then reduce over-commitment, ownership, or entrenchment in the solutions obtained in the current process. The methodology can also bring to fruition much sooner the type of the projects that are often called the “low-hanging fruit” because the audience and the “loop” partners can be more quickly brought to accept risk and uncertainty. Greater risk and uncertainty would demand a longer process of “looping” and discussions, perhaps even divergence and isolation of some subjects with separate decision-making process. Separate loops would be conducted until they meet a threshold of acceptance or fatal flaws followed by reconvergence or abandoning the original proposal.

Importance:

Water resources development is, by necessity, a long-term commitment of resources. Many projects will require making decisions in face of substantial uncertainty. The sources of uncertainty may include lack of scientific knowledge about the project and its impacts, changing regulatory environment, unpredictable environmental changes (e.g., climatic variations) or insufficient description of project boundaries. Decision making under such conditions is very difficult, and a systematic methodology to alleviate the uncertainty would be extremely helpful.

The calculation of the costs associated with water management alternatives is rarely comprehensive and fails to pass the test of an LCA of sustainability. Cost estimates fail to fully account for energy costs and the associated impacts of energy supply on the environment. For example, greenhouse gas emissions associated with energy production are not factored into decisions about the cost-effectiveness of desalination projects. There should be a quantitative assessment of the sustainability of different alternatives based on solid science and engineering.

Pervasive uncertainty about the interaction between environmental, social, and economic factors fundamentally affects the definition of water problems, the assessment of effects, and the range of potential solutions.

Culturally diverse stakeholders with different knowledge and value orientations still need to be meaningfully involved in water resource planning and decision making. Culturally diverse populations may require using nontraditional approaches for outreach, knowledge sharing, and participatory decision making. This adds to uncertainty.

Finally, the landscape of institutions and jurisdictions dealing with sustainable water development is extremely fragmented and complex at the local, regional, state, and federal levels. Agency and governmental water resource planners and regulators have different decision-making processes, decision-making timeframes, decision-making roles, and may have conflicting mandates.

How Do You Propose Meeting or Complying with This Issue?

We propose to establish a pilot project with the objective of developing the new methodology for sustainability assessment according to the principles described in the previous sections. Ideally, the developed methodology could be tested on existing cases where a decision was reached or would occur in a timely manner so the outcome of the current process and the new methodology could be compared.

Some potential suggestions of cases to be tested include:

- Water treatment residual management.
- Effects of climate changes on water supply reliability.
- Assessing source water protection in ungaged wildland watersheds.

Who Are the Individuals Best Able to Address, Illuminate, Refine and Focus This Issue?

We propose that the project team consists of scientists representing social, political, and natural scientists, environmental engineers, economists, governmental agency decision makers, public involvement professionals, and non-governmental organizations (NGOs). It is important that the team adopts a “hands-on” approach, where incremental methodology developments can be tested in practice against real-life cases and modified as necessary.

Budget:

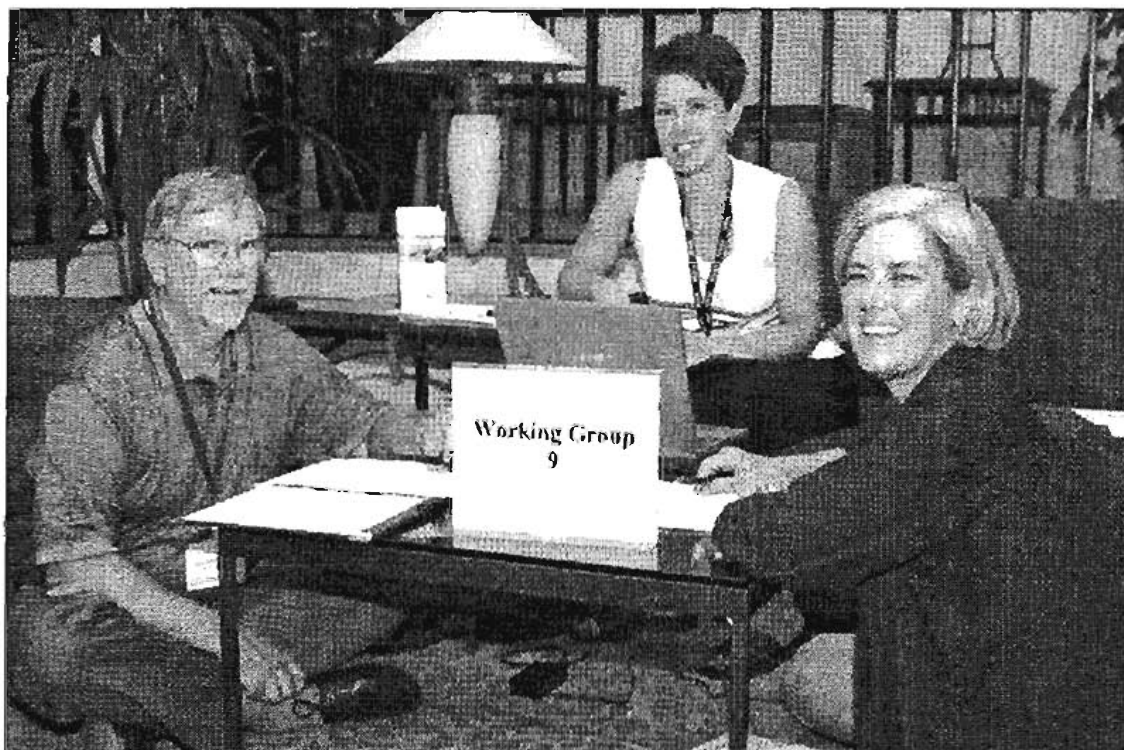
Approximately \$200,000 per case.

Comments:

"I would like to see a broader cross-section of attendees at future CALFED meetings – agricultural representatives (e.g., cattleman, row-crop, etc.), more wastewater dischargers (e.g., municipal and industrial), and perhaps a representative from the California Chamber of Commerce. In scanning the list of attendees, I believe that some of these groups were under-represented and some were not represented at all." – *Harvey Collins*

"Conjunctive use: By using Delta water to recharge groundwater basins, that water could be made available for water supply needs during a drought. Furthermore, based on recharge studies in southern California, I would expect approximately 50 percent of the DOC to be removed (e.g., physically or oxidized) during the recharge process. This removal would occur in a very short period of time (i.e., days, not months or years). This conjunctive use would therefore fit will into the CALFED objective of limiting the concentration of organic carbon in water used for drinking water and would provide additional water during emergencies." – *Harvey Collins*

"The State Water Plan (Bulletin 160) is a good place to explore and develop the pilot project and real-life cases." – *Frances Spivy-Weber*



PRIORITY 9

Maximize the Use of the Basin Planning Process to Integrate Implementation of the CWA, SDWA, Porter-Cologne Water Pollution Control Act, and CALFED Water Quality Program Plan

Working Group Members:

Larsen, Lindstrom, and Spivy-Weber

Issue Description:

DHS has jurisdiction over treated drinking water while the RWQCB has jurisdiction over surface/source water quality. While these are distinct functions, overlap exists, which begs cooperation between the two agencies. Neither DHS nor the RWQCB has dedicated resources for cooperating to control constituents in source waters that may threaten municipal water supplies. To some extent, CALFED provides a forum for such coordination to occur; however, a lack of resources precludes full collaborative efforts.

This lack of coordination is evident in the RWQCB basin plan, which does not adequately address the mutual source protection goals of the CWA, SDWA, Porter Cologne, and CALFED water quality program plan. Specifically, the basin plan does not address the full range of issues (including known, unknown, and emerging contaminants) identified in the CALFED water quality program plan. In addition, the lack of resources for basin planning activities exacerbates the problem.

Importance:

The lack of coordination among the agencies precludes them from considering each other's priorities and functions when developing water quality regulations, causing inefficiency and, ultimately, inadequate results. Multiple water quality and drinking water quality issues must be addressed in a comprehensive manner to provide a tailored regulatory approach for protecting beneficial uses, including municipal supplies. The basin planning process is the most appropriate venue for incorporating all water quality regulatory goals because it includes stakeholder involvement and plans for implementing the objectives.

How Do You Propose Meeting or Complying with This Issue?

The RWQCB and DHS must work together to establish basin plan objectives and implementation plans to protect drinking water sources. A working group, possibly coordinated by CALFED, must be formally established and adequately funded to encourage coordination among the RWQCB, DHS, and the other CALFED implementing agencies.

The strategic plan for the drinking water program must address water quality improvement in a holistic manner. Actions that will have multiple benefits or will control multiple contaminants must be given priority for funding and implementation. Regional ELPH strategies must be developed and then aggregated to determine which actions will have the most benefit for the most water suppliers and control the most contaminants.

Funding sources for this collaborative effort and overall continuous basin planning activities need to be identified.

Who Are the Individuals Best Able to Address, Illuminate, Refine and Focus This Issue?

- Bob Schneider, Board Chair, Central Valley Regional Board
- Ken Landau, Assistant Executive Officer, Central Valley Regional Board
- Dave Spath, DHS
- Bob Hultquist, DHS
- Elaine Archibald, CUWA
- Lynn Barris, Butte Environmental Council
- Farm Bureau representative
- Stormwater agency representative
- Publicly owned treatment works (POTW) representative

Budget:

Approximately \$500,000 – This funding will support coordination between DHS and the Central Valley Regional Board. This initial effort will serve as a model for expanding to the other eight regional boards in a statewide, consistent manner.

This budget number needs to be linked to the long-term funding plan developed under Priority 2.

Comments:

“I would like to see a broader cross-section of attendees at future CALFED meetings – agricultural representatives (e.g., cattleman, row-crop, etc.), more wastewater dischargers (e.g., municipal and industrial), and perhaps a representative from the California Chamber of Commerce. In scanning the list of attendees, I believe that some of these groups were under-represented and some were not represented at all.” – ***Harvey Collins***

“Conjunctive use: By using Delta water to recharge groundwater basins, that water could be made available for water supply needs during a drought. Furthermore, based on recharge studies in southern California, I would expect approximately 50 percent of the DOC carbon to be removed (e.g., physically or oxidized) during the recharge process. This removal would occur in a very short period of time (i.e., days, not months or years). This conjunctive use would therefore fit well into the CALFED objective of limiting the concentration of organic carbon in water used for drinking water and would provide additional water during emergencies.” – ***Harvey Collins***

“Key to the basin plan updates is inclusion of new beneficial uses crafted to address source water protection, such as currently underway in Region 2 (San Francisco Bay Region). Does the new State Watershed Council have a strong role to play in bringing CWA and SDWA implementing agencies together?” – ***Michael Stanley-Jones***

“To get the job done and to get basin plans developed with adequate scope and detail to address drinking water quality problems, a dedicated team at the CVWQCB is necessary. What resources— money, bodies, and managerial support – are necessary for this? – ***Bruce Macler***



PRIORITY 10

Encourage Collaboration among Staff and Managers at State and Federal Agencies to Meet CALFED Drinking Water Quality Goals

Working Group Members:

Barris, Schwinn, and Ward

Issue Description:

Tools, funding, and skills to protect drinking water quality are spread among a number of state and federal agency programs. CALFED has been somewhat successful as a centralized forum to bring agencies together, but it is still “hit or miss” depending on each individual’s time, interest, and commitment.

Many drinking water problems can be mitigated or exacerbated by actions in other CALFED Programs. The CALFED Drinking Water Quality Program would benefit from additional coordination and integration between the different parts of CALFED.

In particular, coordination with those working on operations, ecosystem restoration, conveyance, storage, and watersheds is critical.

Importance:

Teamwork and coordination of efforts are essential to achieve CALFED’s goals most cost-effectively, especially since the CBDA has no funding or authority.

How Do You Propose to Resolve This Issue?

- The recruitment and selection process for CALFED’s Drinking Water Quality Program Manager must include input from the relevant agencies and key stakeholder representatives. Recruitment should specifically include outreach to ethnically diverse professionals.
- CALFED should use a trained and/or professional facilitator to improve the collaboration among the state and federal agencies, in implementing the drinking water quality program.
- CALFED program managers should convene a facilitated process to help integrate and coordinate the mission, function, and objectives of the various CALFED programs.

- Workshops with all the CALFED agencies and CALFED program managers on the draft CALFED Drinking Water Quality Strategy should be conducted to orient all staff and managers with the program's mission, vision, and integration with other CALFED programs. Follow-up workshops should be conducted on a periodic basis to monitor progress and discuss improved integration.
- Accountability and reporting measures must be established to ensure that CALFED Drinking Water Quality Program goals are being met, continuously reviewed, and updated, as necessary.
- Policy needs to be developed that incorporates Drinking Water Quality Program elements into all parts of CALFED program planning and implementation.
- Agencies with Proposition 50 funding should consider the CALFED Drinking Water Quality Strategy in their RFPs and final selection process.

Who Are the Individuals Best Able to Address, Illuminate, Refine, and Focus This Issue?

CALFED staff, agency staff, and Drinking Water Subcommittee co-chairs.

Budget:

Facilitate CALFED Drinking Water Quality Program – \$25,000 (costs to be born either by CALFED and/or the state and federal agencies).

Facilitate CALFED program integration - \$25,000 (costs to be shared by all CALFED programs).

Comments:

“Did the work group consider moving the DHS drinking water program into Cal EPA for better coordination with other agencies who have jurisdiction over water quality?” – ***Elaine Archibald***

“I would like to see a broader cross-section of attendees at future CALFED meetings – agricultural representatives (e.g., cattleman, row-crop, etc.), more wastewater dischargers (e.g., municipal and industrial), and perhaps a representative from the California Chamber of Commerce. In scanning the list of attendees, I believe that some of these groups were under-represented and some were not represented at all.” – ***Harvey Collins***

“Conjunctive use: By using Delta water to recharge groundwater basins, that water could be made available for water supply needs during a drought. Furthermore, based on recharge studies in southern California, I would expect approximately 50 percent of the DOC to be removed (e.g.,

physically or oxidized) during the recharge process. This removal would occur in a very short period of time (i.e., days, not months or years). This conjunctive use would therefore fit will into the CALFED objective of limiting the concentration of organic carbon in water used for drinking water and would provide additional water during emergencies.” – **Harvey Collins**

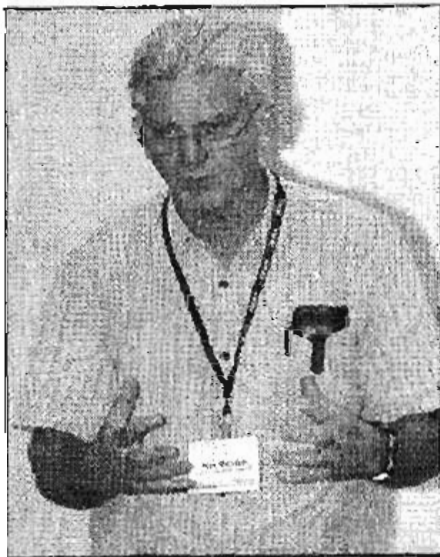
“Encouraging collaboration often is helped by there being rewards at some level for cooperating, and consequences for us cooperating. Facilitation budget seems quite low. Suggest \$150,000-250,000 per year. –**Phillippe Daniel**

“Excellent strategy. It will help agencies to focus on attaining specific goals (not abstract CALFED programs). Also it will help in getting managers to think in terms of how they can achieve their goals through the water quality objectives.” –**Martha Davis**

“Focus the facilitated process on guidelines for local agencies on how to develop a local ELPH plan. Involve a few local agencies in a workshop with CALFED state/federal agencies to develop an ELPH plan.” –**Frances Spivy-Weber**

“Even if it is outside the scope of the presentation, public engagement, and public outreach will be necessary, and further development and budgeting should include this component.” –**Leah Wills**





PRIORITY 1

Develop Integrated Water Quality Improvement Strategies and Management Options to Achieve Receiving Delta/SWP Water

Originators:

Davis on behalf of herself, Harader, Holm, Levin, Parekh, Smith, and Stanley-Jones

The following issues were consolidated under the above title:

Title: Develop Integrated Water Quality Improvement Strategies by Agencies Receiving Delta/SWP Water

Originator: Davis

Issue Description:

Each agency needs to identify and assess the mix of water supplies and management options to achieve CALFED goals. Needs and options should be assessed at the local and regional scales.

Importance:

Each agency/region has a different mix of water quality issues and options for addressing the water quality of the water they deliver. Without an understanding of these individual strategies, there is no context for deciding what the most cost-effective investments are.

How Do You Propose Meeting or Complying with This Issue?

Each agency that delivers Delta or SWP water should prepare an integrated plan.

Title: High-Impact Source Water Improvement Actions That the Program Supports— Do We Need Good Science?

Originator: Harader

Issue Description:

Until current research identifies sources and implementation actions that will provide quantifiable water quality improvements, are there actions that we can implement with a reasonably high probability of success? The available tools to improve water quality are somewhat limited. We know which land uses contribute the greatest pollutant loads. What can we do about these now?

Importance:

The process of developing detailed information about loads from each of the myriad pollutant sources in the CALFED source area will take many more years. We may never determine loads and actions to a high degree of certainty. Can we now identify doable, low-cost actions in an adoptive management approach? Good management practices will have benefits for multiple beneficial uses of surface water.

How Do You Propose Meeting or Complying with This Issue?

- Identify low-cost, high-impact BMPs for non-point sources and best predictable control technologies for point sources with existing information.
 - Develop a work team, including point and non-point source pollution control experts.
-

Title: Need to Prioritize Implementation Based on Effectiveness in Improving Water Quality and Cost

Originator: Holm

Issue Description:

The Drinking Water Quality Program does not have a prioritized list of projects to be implemented or a method to evaluate specific water quality improvements related to CALFED goals and costs when funding individual projects.

Importance:

We need to have a good, shared understanding of which projects or project types are most likely to improve water quality at the lowest cost (so that money is not spent on projects that may never measurably improve water quality). The methodology should consider water quality improvements based on several parameters (e.g., costs and risks) and should ensure multiple-barrier protection for drinking water.

How Do You Propose Meeting or Complying with This Issue?

- List the obvious projects for early implementation by using the following criteria:
 - not difficult to implement
 - do not require lengthy, in-depth studies to determine value
 - result in measurable progress toward the 50/3 CALFED goals
 - cover a spectrum of water quality improvements (e.g., watershed, source improvement, intake protection, intake location, blending/exchanges, advanced treatment technology, distribution system protection and education)
 - Fund these projects.
 - Identify how far you expect these projects to get you.
 - Establish a scientifically based program plan on meeting program goals.
-

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **The Water Quality Program Is Not Isolated**

Originator: **Levin**

Issue Description:

In pursuing improved drinking water quality in the Delta, existing rights and obligations under other regulatory and non-regulatory programs need to be recognized. There are multiple/diverse interests in using the same increment of water to meet multiple needs (e.g., harmonizing between ecosystem restoration water quality and drinking water quality/water use efficiency for supply reliability and water quality).

Importance:

The issue is important to water suppliers who are trying to meet multiple objectives under multiple regulatory requirements and non-regulatory actions.

For example, preserving high-quality water sources should be recognized within the water quality program. The need to improve “in-stream” water quality must be balanced between often-competing regulatory programs.

How Do You Propose Meeting or Complying with This Issue?

The CALFED Drinking Water Program needs to develop a framework that recognizes multiple actions being taken by local, state, and federal agencies, as well as other CALFED programs. DHS should be moved to CalEPA so that all state water quality programs are under the same state department “umbrella.”

Title: **Mange Dynamic Consumer/Social/Regulatory Requirements within a Relatively Static CALFED Process**

Originator: **Parekh**

Issue Description:

- Changing expectations of consumers about water quality.
- New science promotes more stringent expectations.
- Alternative drinking water lifestyles indulge expenditures and investments that are disconnected with regulatory investment.

Importance:

It is very important to garner public support for funding, and to promote the continued interest of stakeholders by being current on problems facing them.

How Do You Propose Meeting or Complying with This Issue?

- Develop a new model within CALFED that captures and keeps apace with consumer trends and expectations.
 - Organize a workgroup and expert panel to address and develop this need.
-

Title: **Develop Technical Feasibility and Cost-Effectiveness Information for Individual Projects to Support the Development of a Long-Term Water Quality Strategy**

Originator: **Smith**

Issue Description:

The CALFED Drinking Water Quality Conceptual Framework envisions a diversified and integrated strategy to meet CALFED drinking water quality goals. The Framework includes

many project alternatives for water quality improvement from the water source to the consumer's tap, but for many projects, information on technical feasibility and cost are not available. As a result, it is not possible to make long-term implementation and investment decisions to meet CALFED drinking water quality goals.

Importance:

The Drinking Water Quality Program currently lacks a long-term strategic plan and investment strategy for implementation. As a result, there is no assurance that CALFED drinking water quality goals can be achieved. Also, without a clear water quality strategy, it is difficult for the CALFED Drinking Water Quality Program to justify the need for funding. This situation results in a lack of commitment to the Drinking Water Quality Program. There is a critical need to develop technical feasibility and cost-effectiveness information for potential water quality projects. This information will allow comparisons of individual projects and integrated approaches that could be implemented to achieve water quality goals. Ultimately, this information will enable informed investment decisions on integrated strategies to meet CALFED drinking water quality goals.

How Do You Propose Meeting or Complying with This Issue?

The CALFED state (e.g., DWR, SWRCB) and federal (USBR, USEPA) implementing agencies could form partnerships with interested stakeholders (e.g., MWD, CCWD, etc.) to plan and conduct the needed technical studies and to develop project cost-estimates. This approach would help ensure consistent study approaches and the more timely development of technical and cost information. A discussion of this approach could be initiated in the Bay-Delta Public Advisory Committee Drinking Water Subcommittee and other subcommittees.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

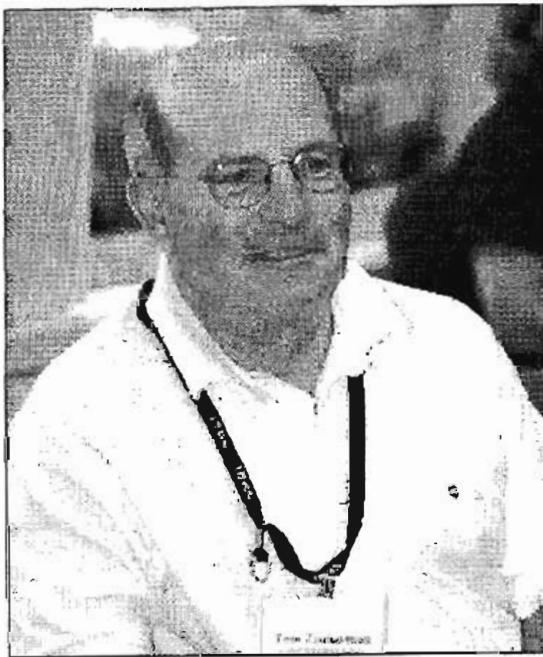
California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 2

Long-Term Financing for Water Quality Improvement

Originators:

Young on behalf of herself, Davis, Holm, Schwinn, Stanley-Jones, Wills, and Zuckerman

The following issues were consolidated under the above title:

Title: Long-Term Financing for Water Quality Improvement

Originator: Young

Issue Description:

Bond financing and revolving fund loans/grants are the principal funds (outside of water rates) to improve or meet water quality objectives. This tends to concentrate investments in large coastal cities for treatment, but not for source improvement or for small communities. Bond financing is uncertain and uneven in its implementation.

Importance:

A statewide approach to long-term funding will help target investments where they will do the most good, so that improvements that are not locally cost-effective (but are effective at the regional or statewide level) can be implemented. This would also include adequate funding for science and assessment.

How Do You Propose Meeting or Complying with This Issue?

Establish a broad-based fee on water use for water quality improvement, and coordinate implementation with the State Board, DHS, and DWR. The distribution of the fee would need to complement and leverage local and regional investments. This solution would go beyond CALFED and provide the flexibility needed to address water quality issues across the state. It should also build in a "lifeline" type mechanism.

Title: **Need to Leverage Local/Regional Investments in Water Quality Improvements As Part of Achieving CALFED's Water Quality Goals**

Originator: **Davis**

Issue Description:

Reducing source pollution in water supplies is a vital factor in achieving the CALFED goals. At the same time, agencies are making investments every day to address water quality issues within their service areas. It is in this context that options for projects that would meet CALFED's goals need to be factored into the prioritization process. Part of the evaluation process needs to assess the multiple benefits and different scales (e.g., local, regional, statewide) of the benefits.

Salinity provides an interesting example. Salinity management is one of the critical issues facing Southern California. About 50 percent of the salinity problem comes from "imported" supplies; the other 50 percent comes from local sources. To manage the problem, we need to develop strategies that will reduce the amount of salt in source waters, reduce the contribution of salts locally (e.g., from water softeners) and, ultimately, invest hundreds of millions of dollars into the development of brine lines and desalinization plants to clean up and address the existing constraints on our water systems.

Importance:

All three strategies are needed as part of a comprehensive long-term water supply strategy that will enable Southern California to maximize the development of local resources (e.g., groundwater and recycled water) and minimize its need for imported water supplies.

How Do You Propose Meeting or Complying with This Issue?

CALFED needs to collect data on regional strategies so that investments in water quality projects will complement/leverage existing investments and strategies by local agencies.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: **How to Justify Additional Funds for the Drinking Water Problems That CALFED Needs to Address**

Originator: **Schwinn**

Issue Description:

Though some funds are currently available for drinking water improvements, prospects for additional funding are currently dismal. A compelling argument will need to be made before legislators and/or the public will support more funding. This necessitates setting clear goals; developing performance measures and indicators of program progress; maintaining a comprehensive monitoring and assessment program; and, most critically, translating this information into a compelling story for decision-makers and the public. In addition, it will also

entail having a credible finance plan that ensures funds are spent most cost-effectively; costs are appropriately shared by federal, state, local government, users, and/or polluters; and the results of funded projects are measured and communicated.

Importance:

Without additional funding, CALFED drinking water goals will not be met. The public and legislators need to be convinced that drinking water must and will be improved if additional funding is provided.

How Do You Propose Meeting or Complying with This Issue?

Continue supporting the Central Valley Drinking Water Policy Workgroup and the development of the CALFED finance plan.

Title: **Ensure That Drinking Water Quality Is Health Protective for Every California Community**

Originator: **Stanley-Jones**

Issue Description:

Surface, groundwater, and treatment byproduct contaminants, such as arsenic, perchlorate, and trihalomethane, are impacting the drinking water of millions of Californians. These contaminants place the health of Californians — especially of vulnerable populations such as infants, young children, and the immune-impaired — at heightened risk. To address these risks, it is expected that California will introduce new drinking water or treatment standards that will require significant new investments to be made in source water protection, monitoring, treatment systems, and alternative supplies (including recycling and desalination technologies). Many of California's community water systems lack the financial resources to make the needed investments in protecting drinking water.

Importance:

The provision of clean water is a primary preventive health strategy. Developmental disorders in infants and children may result in major health problems soon after exposure or in later years. Communities that fail to make needed investments will suffer from poorer health among their population and increased health service costs. Alternatively, small communities that do make investments may face high water rates that hinder economic development and result in the out-migration of residents and in long-term population decline. Mobility between regions means that

health problems associated with poor water quality in one region will impact other regions of the State.

How Do You Propose Meeting or Complying with This Issue?

California needs to establish a baseline system to ensure that safe and affordable drinking water is available for every community. To ensure that adequate infrastructure investments are made, the State Revolving Fund should be relaxed to support the O&M and disposal costs of treatment systems servicing disadvantaged communities. A *lifeline account* similar to those used in electricity rates could be devised to ensure high-quality, affordable water to low-income households and small businesses.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.

Title: **What Are the Criteria and Measurement Protocols That Need to Underline the ELPH Investment Strategy?**

Originator: **Wills**

Issue Description:

Economics quantifies values, and values need to be expressed as criteria. There is no investment without assessment. Small solutions do not count. Uncertainty, reliability, and adaptability need to be factored into investments to avoid over-committing resources to overly narrow or rigid strategies or shifting the burden of proof from project proponents to vulnerable third parties.

Importance:

Some examples of investment criteria and measurement identification are:

- Degree of harmony or conflict with CALFED solutions and principles.
- Degree of harmony or conflict with other beneficial uses of water.
- Percentage of water supplies from local and imported sources (e.g., flexibility).
- Real-time demands for high-quality water (i.e., drought- and flood-related, pollution spikes, and demand spikes).
- Treatment costs per acre-foot (i.e., installation costs and O&M).
- Water quality “option rich” regions and districts versus “option poor” regions and districts that are primarily dependent upon imported water.
- Risk assessment issues, such as stranded assets/externalized costs/burden of proof (e.g., half-full aqueducts, including the Peripheral Canal panacea).

How Do You Propose Meeting or Complying with This Issue?

- Think “outside the box” (e.g., internationally).
- Design physically based public domain models that address:
 - scale (temporal and spatial)
 - land use and water use

- the lack of funding for monitoring and data management
 - surface and groundwater use in the watershed with rivers shared by multiple downstream users (e.g., international approaches to transboundary waters)
-

Title: **Cost Sharing Equity in a Water Rights Setting**

Originator: **Zuckerman**

Issue Description:

Given traditional subsidies and water rights, how do we make some sense out of financing?

The need to reduce demands on regional transfers (which are junior), especially in dry periods, and the need to meet growing urban needs without destroying the agricultural base and environmental resources, suggest that the financial burden should fall heaviest on urban users. This may be the only practical and equitable approach.

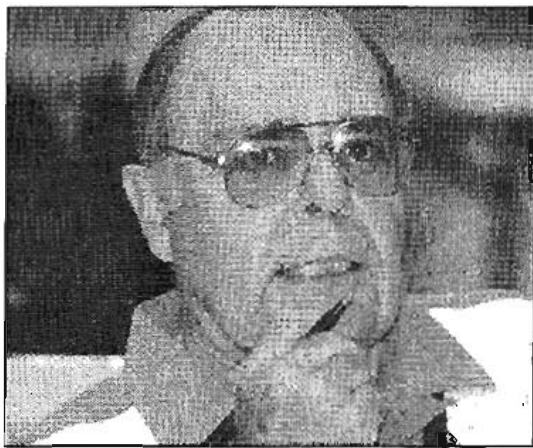
Importance:

We are going to end up with sophisticated drinking water treatment anyway due to the growing awareness of contaminants, threats of terrorism, and demand for dry-period reliability.

Start implementing sophisticated technologies now in the “neediest” areas and watch them cheapen and spread.

How Do You Propose Meeting or Complying with This Issue?

Institute “give-backs” of dry-period regional imports in exchange for public financing.



PRIORITY 3

Impact of Population Growth and Various Land-Use Practices on Water Quality

Originators:

Archibald on behalf of herself, Breuer, Collins, Holm, Robles, Stanley-Jones, Wallace, and Woodard

The following issues were consolidated under the above title:

Title: Impact on Water Quality of the Population Growth in the Central Valley

Originator: Archibald

Issue Description:

The Central Valley, which is the watershed for the Delta, is one of the fastest growing regions in California. Increased population growth leads to the increased development of natural and agricultural lands, increased volumes of wastewater discharged to waterways, and increased discharges of dry and wet weather urban runoff. The South Delta area near the Banks Pumping Plant and the area near the Contra Costa Water District (CCWD) intake are experiencing tremendous population growth. The impacts on water quality of converting undeveloped and agricultural land to urban development need to be understood.

Importance:

The goal of the CALFED Drinking Water Program is to continuously improve water quality conditions in the Delta. This is a tremendous challenge when there is the potential for an increasing load of contaminants from urban areas. CALFED and stakeholders may expend substantial sums of money to improve water quality only to find that the improvements maintain existing water quality or reduce degradation in water quality that would occur without the program. This issue is also important in evaluating potential control alternatives. Alternatives may not appear cost-effective based on existing conditions; however, when projected growth is factored into the equation, the outcome may be different.

How Do You Propose Meeting or Complying with This Issue?

CALFED should work with DWR and interested stakeholders to model projected changes in water quality as a result of population growth in the Central Valley. The results of this analysis should be incorporated into the evaluation of alternatives for improving drinking water quality.

Title: **Existing and Proposed Land-Use Impacts on the Quality of Drinking Water Delivered to Municipal Water Utilities**

Originator: **Breuer**

Issue Description:

The current degradation of Delta drinking water sources comes from urban, agricultural, and natural sources and processes from within the Delta and upstream watersheds. Released water from storage, natural runoff, and tidal actions create a complex hydrodynamic environment where sources are blended before export from the Delta. Utilities using Delta water range geographically from northwest of the Delta (Napa) to 500 miles to the south (San Diego), creating additional opportunities for contamination and transformation during transport. Degradation follows seasonal patterns based on rainfall and runoff intensity, runoff from irrigation and urban sources, and water storage releases. The seasonal loading of contaminants from each of these sources, and the relative contributions of constituents of concern such as organics, DBP precursors, salts, turbidity, pathogens, and nutrients at each utility intake, need to be quantified.

Importance:

Quantifying the sources and loads of drinking water quality constituents of concern and developing the tools to assess the relative impacts of each source in the Delta will allow CALFED to:

- Focus watershed protection efforts on point and non-point sources of contamination that have the most impact on drinking water quality.
- Establish a drinking water quality baseline against which to assess the impacts of proposed CALFED actions, such as restoring tidal wetlands, on drinking water quality. This would allow the assessment of different options, such as the geographical placement of proposed projects in the Delta and its source waters.
- Assess non-CALFED directed land-use changes, such as urban growth, and its relative impact on drinking water quality in Delta waters.

How Do You Propose Meeting or Complying with This Issue?

- Continuous (and synoptic) monitoring and assessment of different land uses will provide the discharge profile for each type of land use.
- The current and future establishment of continuous, real-time drinking water quality monitoring stations will provide hydrologic and tributary water quality data to feed into computer models.
- The creation and refinement of contamination transport models within the Delta, its tributaries, and throughout the SWP system, will provide the estimated relative contribution of various upstream sources.

CALFED funds have been awarded to USGS and DWR to answer the loading of organic carbon from wetlands and agricultural land-use sources in the Delta. In addition, DWR's MWQI program has spent 20 years collecting Delta drinking water quality data and conducting research in the Delta. The MWQI Real Time Data and Forecasting program element blends SWP funds with CALFED grants to continue the expanded development of continuous drinking water quality monitoring and models for forecasting water quality throughout the system.

Title: **Improve Source Water Quality to Reduce Contaminants That Impair Delta Water**

Originator: **Collins**

Issue Description:

As pointed out in the CALFED Drinking Water Quality Conceptual Framework document, Delta water quality can be improved through three groups of tools:

- Source improvement.
- Conveyance/Delta operations.
- Storage.

Source improvements to reduce the discharge of pollutants from non-point sources in rural areas will be the most difficult. Agricultural runoff may contain pesticides and fertilizers applied by farmers, as well as animal manures and constituents leached from the soil (e.g., selenium). Although runoff from some farms discharges to agricultural return ditches that can be monitored, much of the farm runoff is discharged via overland flow during heavy rainfall. Developing cost-effective and equitable regulations to govern these non-point sources, monitoring these diverse

flows, and enforcing the regulations will challenge everyone involved – the Regional Water Quality Control Boards, farmers throughout the Central Valley, various environmental groups, politicians, and even the courts.

Importance:

Control of non-point sources of pollution is important because many pollutants that reach the waterways of the Delta are from these sources. Control methods (e.g., establishing “no-spray buffer zones” for pesticides near sensitive waterways) will have a huge impact on California agriculture. This issue is already facing legal challenges in the State of Washington. One farm spokesperson argues that these no-spray zones “create zones for insects and diseases, as well as noxious weeds.” And that “invasive weeds can establish in buffers and spread across farmlands.” One writer in the July 25, 2003, edition of the *Capital Press* stated that, “The rancorous debate of how farmers should monitor and then reduce any potential runoff of contaminants is far from over.”

How Do You Propose Meeting or Complying with This Issue?

The issue of non-point source control, rural as well as urban, can only be solved by all interested parties working together. Unless the various interested parties (i.e., agricultural groups, environmental groups, and regulators) work together to develop a program that everyone can “buy into,” the issue will be in litigation for years with little, if any, improvement in water quality resulting from efforts to control non-point sources.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program’s implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **Will Increasingly Stringent Source Water Regulations Drive Population Growth Patterns from Urban Areas to Agricultural or Environmentally Sensitive Areas?**

Originator: **Robles**

Issue Description:

The increasing cost of meeting source water regulations could force urban communities to limit growth or significantly increase ratepayer fees. This could drive development into more rural areas and away from urban areas.

Importance:

This could cause more environmental damage than the benefit provided from the more stringent regulations.

How Do You Propose Meeting or Complying with This Issue?

CALFED should select improvement projects, and regulators should develop regulations that have cost-effective, measurable benefits to the State's waters.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.

Title: **Where Are We Headed With Drinking Water Regulations?
Point-of-Use Treatment As an Alternative to Centralized Treatment**

Originator: **Wallace**

Issue Description:

Advances in technology are allowing us to detect contaminants in increasingly minute concentrations, even as we identify more substances that should be regulated. The current trajectory suggests an ultimate collision between the costs of compliance and meeting public health goals and expectations.

Importance:

The more we know about drinking water risks, the more the public demands accountability by water service providers. It can be reduced to an issue of cost. Also, the public may not be well-served by the marketing successes of bottled water.

How Do You Propose Meeting or Complying with This Issue?

Expand point-of-use treatment pilot studies, accompanied by monitoring for a broad array of contaminants at the tap and an assessment of customer perceptions/satisfaction.

Title: **How to Meet Future Drinking Water Standards for DBPs, Given the Inability to Control TOC and Bromide in Delta Waters**

Originator: **Woodard**

Issue Description:

Improved source water quality would certainly enable agencies that take their drinking water supplies from the Delta to more easily meet DBP standards. Improved treatment technology may or may not enable DBP standards to be met, depending on future drinking water standards and on the ability of drinking water purveyors to afford advanced drinking water treatment techniques. Smaller agencies are at a distinct disadvantage in the latter regard.

Importance:

CALFED is committed to the equitable distribution of program benefits. Equitable treatment of smaller agencies, and their customers, depends significantly on robust and effective source control, especially of TOC and bromide.

How Do You Propose Meeting or Complying with This Issue?

- Establish aggressive goals for TOC and bromide control and a program of actions to realize these goals.
- Establish a rigorous water quality assessment program to measure the success of water quality improvement actions.

- Need a “ruthless” evaluation of success.
 - Requires a willingness to implement a comprehensive range of actions that may be capable of controlling TOC and bromide.
-

Title: **How to Meet Drinking Water Standards in Times of Drought,
Given the Exploding California Population**

Originator: **Woodard**

Issue Description:

The population of California was in the low 20-million during the 1976-77 drought, and during that period, agencies were severely challenged to meet drinking water standards then in existence. Now, the Disinfectants and Disinfection By-products Rule and other regulations exist that did not then. With a current population of about 35 million, a return of drought conditions will magnify water quality problems and present great technical challenges for meeting drinking water standards.

Importance:

During drought conditions, some agencies using Delta source water may not be able to meet drinking water standards

How Do You Propose Meeting or Complying with This Issue?

Conduct drought emergency planning and provide funding to meet drought contingencies with regard to drinking water quality.



PRIORITY 4

Identify a Common, Statewide Definition of “Safe” Drinking Water Suitable for Use As the CALFED Drinking Water Quality Goal of “Equivalent Level of Health Protection”

Originators:

Macler on behalf of himself, Holm, Parekh, Stanley-Jones, and Summers

Issue Description:

This definition, which may change over time, will allow for the creation and evaluation of projects and policies to meet the goal. It must consider both SDWA and CWA public health goals, as well as other criteria and views of what constitutes “safe.”

The following issues were consolidated under the above title:

Title: Define the Term “Equivalent Level of Health Protection” to Make It a Goal That Can Be Addressed by Projects or Policy

Originator: Macler

Issue Description:

CALFED water quality goals include achieving source levels of 3 mg/L TOC and 50 mg/L bromide, or an equivalent level of health protection. But 3 mg/L TOC and 50 mg/L bromide have no health consequences, per se. We need reasonable and agreed-upon health-based goals. Some possibilities include no waterborne-disease outbreaks; compliance with drinking water regulations; total risks that are less than 1/10,000 excess disease.

Importance:

Without specific public health goals, efforts can neither be prioritized, nor the results evaluated.

How Do You Propose Meeting or Complying with This Issue?

Brainstorm possible goals among public health people. Let policy makers select among the choices.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: Need for a Common Denominator for a Statewide Expectation of “Safe” Drinking Water, or a Measure Protective of Drinking Water Use

Originator: Parekh

Issue Description:

- Regions, cities, regulators – all have different expectations of what constitutes “safe” drinking water. For a statewide effort like CALFED, it is essential to have a singular expectation about a minimum protective level necessary for drinking water (it may not necessarily be regulatory based).
- Multiple standards and a variety of interpretations are causing havoc with the California water management arena.

Importance:

- The people of the State need a common goal for their separate programs.
- Action levels, public health goals, MCLs, and criteria in the California Toxics Rule are inconsistent in their definition of risk.
- A common denominator may also help evaluate whether a Bay-Delta solution is feasible or not to achieve that “safe” target.

How Do You Propose Meeting or Complying with This Issue?

- Regulatory cohesion with public buy-in.
- Blue-ribbon evaluation/recommendation to streamline regulatory cross-connects on this issue.

Title: **Ensure That Drinking Water Quality Is Health Protective for Every California Community**

Originator: **Stanley-Jones**

Issue Description:

Surface, groundwater, and treatment byproduct contaminants, such as arsenic, perchlorate, and trihalomethane, are impacting the drinking water of millions of Californians. These contaminants place the health of Californians — especially of vulnerable populations such as infants, young children, and the immune-impaired — at heightened risk. To address these risks, it is expected that California will introduce new drinking water or treatment standards that will require significant new investments to be made in source water protection, monitoring, treatment systems, and alternative supplies (including recycling and desalination technologies). Many of California's community water systems lack the financial resources to make the needed investments in protecting drinking water.

Importance:

The provision of clean water is a primary preventive health strategy. Developmental disorders in infants and children may result in major health problems soon after exposure or in later years. Communities that fail to make needed investments will suffer from poorer health among their population and increased health service costs. Alternatively, small communities that do make investments may face high water rates that hinder economic development and result in the out-migration of residents and in long-term population decline. Mobility between regions means that health problems associated with poor water quality in one region will impact other regions of the State.

How Do You Propose Meeting or Complying with This Issue?

California needs to establish a baseline system to ensure that safe and affordable drinking water is available for every community. To ensure that adequate infrastructure investments are made, the State Revolving Fund should be relaxed to support the O&M and disposal costs of treatment systems servicing disadvantaged communities. A *lifeline account* similar to those used in electricity rates could be devised to ensure high-quality, affordable water to low-income households and small businesses.

Title: Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography

Originator: Stanley-Jones

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.

Title: Address the Stagnant Nature of the CALFED Goals of TOC of 3 mg/L and Bromide of 5 µg/L

Originator: Summers

Issue Description:

Regulations and technologies have changed and will continue to change. The CALFED goals and the concept of an equivalent level of public health protection must reflect those changes.

Importance:

The issue is twofold: How to plan for a moving target and how to allocate short- and long-term capital expenditures.

How Do You Propose Meeting or Complying with This Issue?

Continue to refine and re-evaluate the goals.



PRIORITY 5

Identify and Prioritize – Through Appropriate Acquisition and Science – the Most Significant Sources of Degradation of Delta Water Quality

Originators:

Robles on behalf of himself, Archibald, Holm, Hultquist, and Stanley-Jones

The following issues were consolidated under the above title:

Title: Identify and Prioritize — Through Appropriate Data Acquisition and Science — the Most Significant Sources of Degradation of Delta Water Quality

Originator: Robles

Issue Description:

To cost-effectively and equitably improve Delta water quality, the major sources of degradation must be identified and quantified. This includes quantifying contaminant inputs from manmade and natural sources.

Importance:

Limited federal, state, and local resources will be used ineffectively unless expended in those areas that will, to the greatest extent, improve Delta water quality.

How Do You Propose Meeting or Complying with This Issue?

Data acquisition through a drinking water quality workgroup work plan.

Title: Need to Quantify Risk and Balance the Risk of Competing Activities

Originator: Archibald

Issue Description:

There are many activities that degrade water quality and pose risks to public health, yet those activities have their own benefits (e.g., body contact recreation, animal grazing, etc.).

Importance:

With increasing population growth, there is more pressure to have multiple uses of reservoirs and watershed lands. We need a mechanism to identify and quantify the risks associated with these activities and the risks associated with relying solely on water treatment. In addition, CALFED actions must be evaluated based on risk and not simply on the pounds of pollutants removed per dollar spent.

How Do You Propose Meeting or Complying with This Issue?

- Need to better quantify risks on a local level in watershed sanitary surveys.
- Need a statewide task force to revisit the issue of recreational uses of reservoirs.
- Need a task force to address grazing and acceptable BMPs.
- Model and consider public health risk when alternative CALFED actions are evaluated.

Title: Need an Active Stakeholder Buy-In Process for Success

Originator: Holm

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **Minimizing the Level of Pathogenic Microorganisms in Delta Water May Be the Most Cost-Effective Means of Ensuring Safe, Affordable Water**

Originator: **Hultquist**

Issue Description:

For any given water treatment technology, a fraction of the raw water organisms will find its way to the distribution system, increasing the risk of illness.

Importance:

Protecting Delta water from pathogenic microorganisms may be the most cost-effective option, given that the highest risk is from microbial disease.

How Do You Propose Meeting or Complying with This Issue?

- Identify the sources of pathogens and their relative importance.
- Identify effective means of reducing pathogen densities for various sources.
- Implement the most cost-effective methods.
- Determine the reduction in health risk.
- Identify opportunities to offset benchmark disinfection levels and redundant log reductions with source protection.

Title: Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography

Originator: Stanley-Jones

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 6

How Shall Regionally Developed Drinking Water Be Coordinated, Approved, and Funded, and by Whom?

Originators:

Zuckerman on behalf of himself, Davis, Grindstaff, Harader, Holm, and Stanley-Jones

The following issues were consolidated under the above title:

Title: **How Shall Regionally Developed Drinking Water Strategies Be Coordinated, Approved, and Funded, and by Whom?**

Originator: **Zuckerman**

Issue Description:

At least two state agencies (i.e., DHS and SWRCB) and two federal agencies (i.e., USEPA and USBR) are now involved in regulating and/or funding drinking water. How do we get them all “on the same page,” especially if the goal is to have regions of the state initiate and implement their own drinking water strategies, which may not be consistent with one another at first?

Importance:

There is a need for a single blueprint, and for a funding source that will level the playing field versus “traditional” dam and canal approaches.

How Do You Propose Meeting or Complying with This Issue?

The CWA provisionally delegates water quality planning and grant-making authority to SWRCB. This might establish a pattern for drinking water planning, regulation, and funding, but SWRCB may not be the appropriate state agency, given its quasi-judicial responsibility for water rights. In any event, there should be a single authority responsible for regulating and funding drinking water programs.

Title: Need to Leverage Local/Regional Investments in Water Quality Improvements As Part of Achieving CALFED's Water Quality Goals

Originator: Davis

Issue Description:

Reducing source pollution in water supplies is a vital factor in achieving the CALFED goals. At the same time, agencies are making investments every day to address water quality issues within their service areas. It is in this context that options for projects that would meet CALFED's goals need to be factored into the prioritization process. Part of the evaluation process needs to assess the multiple benefits and different scales (e.g., local, regional, statewide) of the benefits.

Salinity provides an interesting example. Salinity management is one of the critical issues facing Southern California. About 50 percent of the salinity problem comes from "imported" supplies; the other 50 percent comes from local sources. To manage the problem, we need to develop strategies that will reduce the amount of salt in source waters, reduce the contribution of salts locally (e.g., from water softeners) and, ultimately, invest hundreds of millions of dollars into the development of brine lines and desalinization plants to clean up and address the existing constraints on our water systems.

Importance:

All three strategies are needed as part of a comprehensive long-term water supply strategy that will enable Southern California to maximize the development of local resources (e.g., groundwater and recycled water) and minimize its need for imported water supplies.

How Do You Propose Meeting or Complying with This Issue?

CALFED needs to collect data on regional strategies so that investments in water quality projects will complement/leverage existing investments and strategies by local agencies.

Title: **Develop Flexible and Sustainable Strategies and Institutions**

Originator: **Grindstaff**

Issue Description:

New issues arise constantly. How can we continue to have authority and financing to address those issues?

Importance:

Without a long-term strategy, we will lurch from crisis to crisis.

How Do You Propose Meeting or Complying with This Issue?

The CBDA must legislatively be given the power to make decisions both in regulatory and financial arenas that allow for the planning and implementation of programs addressing these problems.

Title: **Define the CALFED Drinking Water Quality Program
Solution Areas**

Originator: **Harader**

Issue Description:

The program solution area has been variously described in different documents but has not been explicitly defined. The broadest scope of the program could include actions ranging from Oregon to Colorado. Defining the program solution area will help stakeholders and grant applicants understand what projects fall within the program.

Importance:

This will clarify the scope of the program, both in identifying acceptable projects and in identifying funding needs. This will most likely require a matrix of geographic areas and types

of actions to be included. The focus needs to remain on top water quality benefits, and not stray too far into the water supply arena.

How Do You Propose Meeting or Complying with This Issue?

With the help of the Drinking Water Subcommittee, implementing agencies and participating agencies can develop an explicit description of the solution area.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

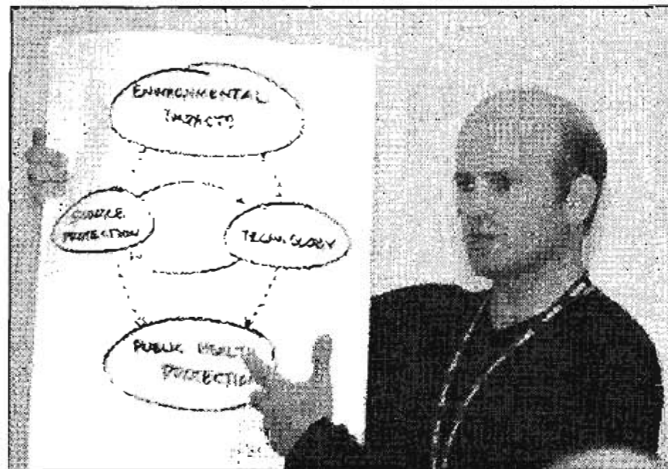
California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 7

Quantify the Level of Public Health Risk Associated with Achieving the Suggested Water Quality Objectives for Each Water System Situation

Originators:

Hultquist on behalf of himself, Archibald, Daniel, Harader, Holm, and Stanely-Jones

The following issues were consolidated under the above title:

Title: Quantify the Level of Public Health Risk Associated with Achieving the Suggested Water Quality Objectives for Each Water System Situation

Originator: Hultquist

Issue Description:

Equivalent protection cannot be recognized unless there is a method for measuring the effectiveness of alternative protection approaches and a standard for comparison.

Importance:

Providing an equivalent level of protection may be the only practical method to meet the goal of safe, reliable, and affordable drinking water. This requires a means of determining equivalence.

How Do You Propose Meeting or Complying with This Issue?

The level of DBP and microorganism reduction could be determined for water systems receiving water meeting the objectives. The health risk associated with contaminant levels could be determined. This could be done by the system or by the type of treatment and source.

Title: Need to Quantify Risk and Balance the Risk of Competing Activities

Originator: Archibald

Issue Description:

There are many activities that degrade water quality and pose risks to public health, yet those activities have their own benefits (e.g., body contact recreation, animal grazing, etc.).

Importance:

With increasing population growth, there is more pressure to have multiple uses of reservoirs and watershed lands. We need a mechanism to identify and quantify the risks associated with these activities and the risks associated with relying solely on water treatment. In addition, CALFED actions must be evaluated based on risk and not simply on the pounds of pollutants removed per dollar spent.

How Do You Propose Meeting or Complying with This Issue?

- Need to better quantify risks on a local level in watershed sanitary surveys.
- Need a statewide task force to revisit the issue of recreational uses of reservoirs.
- Need a task force to address grazing and acceptable BMPs.
- Model and consider public health risk when alternative CALFED actions are evaluated.

Title: Comprehensive Mixture Assessment and Interpretation Tools

Originator: Daniel

Issue Description:

The level of public health protection may be inadequately determined when measuring a few DBPs, as a complex mixture of compounds are being both removed and formed. Drinking water contains numerous constituents, some of which are analytically detectable, but many of which

are uncharacterized (and uninterpretable) toxicologically. Simply detecting more contaminants will not necessarily lead to better actions, since there may be tradeoffs in controlling different constituents. A tool is needed to measure the aggregate risks present in water.

Importance:

Risk management alternatives may be more accurately assessed when risks are better characterized (i.e., beyond the measurements of select individual constituents).

How Do You Propose Meeting or Complying with This Issue?

- Consider several dimensions of risk: acute and chronic; chemical and microbial; and actual and perceived
 - Survey the current battery of toxicology tests.
 - Evaluate possible interpretations of results.
 - Determine if emerging contaminants are adequately captured.
 - Assess the feasibility for characterized unconcentrated samples.
-

Title: **Technology Evaluations of Mixtures over a Range of Source Water Conditions**

Originator: **Daniel**

Issue Description:

Determining the suitability and associated costs of alternate water quality targets requires the evaluation of alternate technologies and optimization of existing technologies. This should be done looking at conventional constituents, emerging contaminants, and an overall risk-based approach.

Importance:

Output of these evaluations would help determine the tradeoffs between source water protection and treatment technology investments.

How Do You Propose Meeting or Complying with This Issue?

Based on which mixture assessment tools (plus other measures) are used, conduct treatment studies that systematically evaluate a matrix of bromide and TOC both upstream¹ and downstream of the Delta that:

- Identify the source water quality matrix.
- Develop a list of technologies to be evaluated.
- Prepare an experimental plan.
- Conduct evaluations.

¹Note: using whole mixture bioassays and other toxicology batteries upstream and downstream of the Delta will help determine what other measurable risks (i.e., non-measured constituents) will result from water quality transformations in the Delta.

Title: **How Do We Measure the Benefits of CALFED Drinking Water Quality Program Actions?**

Originator: **Harader**

Issue Description:

CALFED actions, particularly source-improvement actions, are often far-removed from public-health impacts targeted by program goals of 50µg/L bromide and 3mg/L carbon. Should we measure organic carbon at the source? Organic carbon at the pumps? Equivalent DBP formation? Or equivalent health risks?

Importance:

This is the “effective” part of “cost-effective.” Projects are selected based on costs and benefits. Ultimately, the program will be evaluated based on how effective it has been at achieving program goals.

How Do You Propose Meeting or Complying with This Issue?

Develop a methodology for estimating the equivalent mass of a pollutant removed at the pumps. USGS, DWR modeling, and MWQI could quickly develop a rough methodology, which could be refined as new information and methods are developed.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 8

Methodology for the Sustainable Development Assessment of California Water Resources

Originators:

Hermanowicz on behalf of himself, Daniel, Holm, Stanley-Jones, Summers, Wills, and Young

The following issues were consolidated under the above title:

Title: **Methodology for the Sustainable Development Assessment of California Water Resources**

Originator: **Hermanowicz**

Issue Description:

Different alternatives of water resources development should be compared in terms of their ability to be self-sustaining over a long period of time. The methodology for such assessment is lacking.

Importance:

Water resources development is, by necessity, a long-term commitment of resources. There should be a quantitative assessment of the sustainability of different alternatives based on solid science and engineering.

How Do You Propose Meeting or Complying with This Issue?

Provide funds for collaborative research projects with water agencies, universities, and NGOs.

Title: **Problem of Time: Explicit and Systematic Consideration of Trade-offs between Short-Term and Immediate Versus Long-Term and Gradually Realized Approaches**

Originator: **Daniel**

Issue Description:

Uncertainty about the future, plus political, institutional, and economic realities, limit the ability (and prudence) of long-term strategic planning.

Yet, any investment strategy will be pursued over time. Depending on the time frame of an analysis, certain actions/investments may appear more or less favorable. Certain benefits (or avoided impacts) could be discounted as the evaluation period is shortened. For example, water treatment technology is discrete and yields immediate and measurable impacts, whereas some source protection alternatives take longer time-scales to implement and see impacts (or, in many cases, prevent increased adverse impacts).

Importance:

The challenge is not to bias an investment strategy to short-term gains at the expense of more sustainable strategies.

How Do You Propose Meeting or Complying with This Issue?

- Evaluate program comprehensively with costs and benefits projected over 10-, 20-, and 50-year timeframes.
- Determine how investment decisions change depending on time frame.
- Analyze implementation in view of various political, institutional, and economic scenarios.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: **Promote a Sustainable Drinking Water Supply through LCA and Public Right-to-Know Reporting**

Originator: **Stanley-Jones**

Issue Description:

The calculation of the costs associated with drinking water supply alternatives are rarely comprehensive and fail to pass the test of an LCA of sustainability. Cost estimates fail to fully account for energy costs and the associated impacts of energy supply on the environment. For example, greenhouse gas emissions associated with energy production are not factored into decisions about the cost effectiveness of desalination projects.

Importance:

True-cost, LCA provides a metric for weighing the costs and benefits of alternative supply options. This is essential to guide future state investments.

How Do You Propose Meeting or Complying with This Issue?

- CALFED should seek to develop a true-cost, life-cycle sustainability model and apply it to the analyses of water supply, quality, and use-efficiency projects. This approach could be refined by working with *Sustainable Silicon Valley* (a project of CalEPA), *Sustainable Sonoma*, Pacific Institute (Oakland, California), Department of Civil and Environmental Engineering at the University of California, Berkeley, and the Clean Water Fund.
 - Include LCAs in consumer confidence reports issued annually by water utilities and CALFED annual program reports.
-

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.

Title: The Use of Life-Cycle Assessment for CALFED Decision Making

Originator: Summers

Issue Description:

In addition to drinking water risks, agricultural water quality, and aquatic life protection, CALFED decisions with respect to watershed management, storage, transmission, treatment, and water-use efficiency have larger implications. Life-cycle thinking and, specifically, life-cycle assessment provide tools to assess the overall environment burden.

Importance:

Life-cycle assessment is a methodology that allows environmental aspects and the impacts of a product (watershed management, storage, transmission, treatment, and water-use efficiency) to be quantitatively addressed. An inventory of system inputs and outputs is developed on three phases of the product life: construction, operation, and decommissioning. The energy and material consumption are assessed for all three phases, and an environmental profile is developed.

How Do You Propose Meeting or Complying with This Issue?

Life-cycle assessment is still developing and has been applied to drinking water treatment in South Africa and Europe. International Standards Organization standards exist. The life-cycle assessment must be embraced by CALFED decision-making groups for it to be useful in achieving sustainable development.

Title: Inadequate Science for Developing a Cost-Effective and Equitable Water Quality Investment Portfolio to Protect Source Water Supplies

Originator: Wills

Issue Description:

Source water case: Ungaged source watersheds and over-allocated water supplies in receiving areas, combined with the rapid urbanization of wildland areas, are leading to the loss of source

watershed function and water quality. Mechanisms for prevention and remediation are not available.

Importance:

- Over 50 percent of California's drinking water supply is runoff from both imported and local source watersheds.
- There is no coherent assessment and investment program of incentives and regulations to achieve source-water protection and watershed function through open-space protection and BMP implementation.
- Equity. Rural water users are groundwater users. Imported water to urban areas is surface water. Who is responsible for cleaning up unsafe water?

How Do You Propose Meeting or Complying with This Issue?

- Develop investment criteria that recognizes the time value of water quality (e.g., pollution spikes).
 - Develop criteria that measures and avoids stranding assets and externalizing costs to other regions and users, including the environment.
 - Map and protect the state's natural water recharge, filtration, and riverine transport systems.
 - Support the non-point source encyclopedia in draft TMDL implementation guidance.
-

Title: **Changing Climate Conditions Provide a New Opportunity to Rethink the Achievement of Multiple Objectives**

Originator: **Young**

Issue Description:

The potential rise in sea level and the changes in precipitation, location, and timing will have dramatic impacts on water quality. This challenge puts us all in the same lifeboat to figure out an optimal response, unconstrained by current conditions.

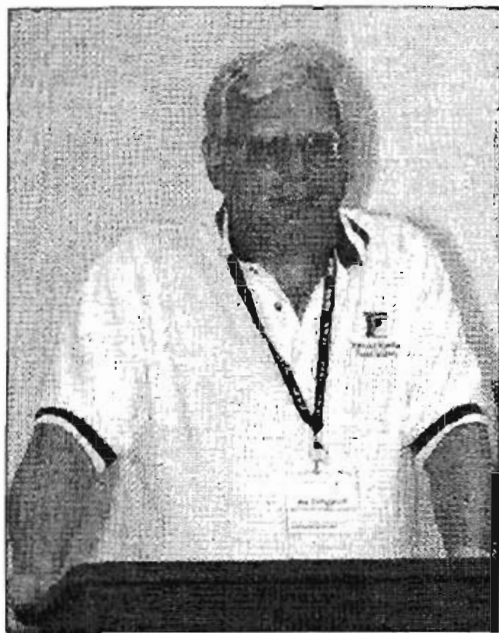
Importance:

Delta supplies may become unusable, and current operation assumptions may need to be altered dramatically. In this, we have an opportunity to rethink the way we manage surface and

groundwater in California to better achieve goals in all areas. Local and regional options may increase or decrease.

How Do You Propose Meeting or Complying with This Issue?

- Model various scenarios to understand the range of potential solutions to identify “no regrets” strategies.
- Use the B-160 process to map this change.



PRIORITY 9

Implementation of the CWA and SDWA Must Fit Together to Address Delta-Specific Water Source Problems

Originators:

Hultquist on behalf of himself, Archibald, Grindstaff, Holm, and Stanley Jones

The following issues were consolidated under the above title:

Title: Implementation of the CWA and SDWA Must Fit Together to Address Delta-Specific Water Source Problems

Originator: Hultquist

Issue Description:

Drinking water standards are based on nationwide (or statewide) needs and compliance feasibility. California drinking water source approval policies have not been reviewed with CALFED goals in mind. The Central Valley Basin plan does not address all the contaminants that promote microbial disease and DBPs. It is, therefore, not possible to optimize multiple barriers.

Importance:

A drinking water source as important as the Delta deserves a tailored regulatory approach, which could facilitate the goal of safe, reliable, and affordable water.

How Do You Propose Meeting or Complying with This Issue?

- Together, DHS and CVRWQCB should look for ways to best ensure safe drinking water.
- The basin plan needs a drinking water source protection policy.

Title: Other Contaminants (e.g., Pathogens, Salinity, Nutrients, Emerging Contaminants) Must Be Considered to Improve Water Quality

Originator: Archibald

Issue Description:

TOC and bromide have received a great deal of attention because goals were established in the CALFED Record of Decision. The CALFED Water Quality Program Plan recognizes that there are multiple known contaminants (e.g., pathogens, salinity, nutrients, turbidity) that are of concern to drinking water suppliers and that there are many emerging (e.g., pharmaceuticals, endocrine disruptors) and unknown contaminants that may be regulated in the next few decades.

Importance:

A large number of water suppliers divert or export water from the Delta at a number of locations. The location of the intake, the types of treatment processes at the treatment plants, and the presence or absence of storage reservoirs that modulate fluctuations in water quality dictate the types of contaminants that are of concern. For example, the North Bay Aqueduct Contractors are faced with highly fluctuating concentrations of TOC, turbidity, and coliforms. The South Bay Aqueduct Contractors must manage algal blooms and associated fluctuations in pH during the summer months. Managing bromide may not result in reduced salinity, which is important for water agencies that recharge groundwater or blend with more saline sources. Focusing solely on TOC and bromide will not solve all the treatment problems associated with treating water from the Delta.

How Do You Propose Meeting or Complying with This Issue?

The strategic plan for the drinking water program must address water quality improvement in a holistic manner. Actions that will have multiple benefits or will control multiple contaminants must be given priority for funding and implementation. Regional ELPH strategies must be developed and then aggregated to determine which actions will have the most benefit for the most water suppliers and control the most contaminants.

Title: Is It Legally Possible to Do Anything Except Meet Source Water Standards Ultimately Using the TMDL Process?

Originator: Grindstaff

Issue Description:

If water in the Delta is formally identified as a potential drinking water supply and regulatory standards must be set to meet that use, do we have any choice about choosing other strategies?

Importance:

For example, might a downstream user sue in federal court — alleging failure to comply with CWA — and force uneconomic (at least, in the view of some parties) and inequitable solutions?

How Do You Propose Meeting or Complying with This Issue?

Ultimately, this begs for a legislative solution.

Title: Need an Active Stakeholder Buy-In Process for Success

Originator: Holm

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 10

How to Encourage Collaboration among Staff and Managers at State and Federal Agencies (Including Operators of the CVP and SWP) to Meet CALFED Drinking Water Goals

Originators:

Schwinn on behalf of herself, Barris, Holm, Larsen, and Stanley-Jones

The following issues were consolidated under the above title:

Title: **How to Encourage Collaboration among Staff and Managers at State and Federal Agencies (Including Operators of the CVP and SWP) to Meet CALFED Drinking Water Goals**

Originator: Schwinn

Issue Description:

Tools, funding, and skills to protect drinking water are spread among a number of state and federal agencies. CALFED has been somewhat successful as a forum to bring agencies together, but it is still "hit or miss" depending on the individual's time and interest. Participation is needed from operators, ecosystem restoration program staff, and others working to implement Porter-Cologne and CWA.

Importance:

Teamwork is essential to achieve CALFED's goals most cost-effectively, especially since the CBDA has no funding or authority itself.

How Do You Propose Meeting or Complying with This Issue?

This will require leadership at the CBDA, good relationships between state agencies and the state and federal government, and pressure from stakeholders. Perhaps, once a clear strategy is produced, agencies will better understand how they can contribute.

Title: Water Rights Versus Water Quality

Originator: Barris

Issue Description:

Maybe it is time for SWRCB to relinquish water quality authority to the Regional Boards.

Importance:

The State is too big for a central decision-making body that often concentrates on coastal issues regarding water quality.

How Do You Propose Meeting or Complying with This Issue?

The Regional Water Quality Control Boards should have jurisdiction over water quality. This would also provide a savings to the State.

Title: Need an Active Stakeholder Buy-In Process for Success

Originator: Holm

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **Statewide Consistency in Surface/Source Water Quality Program Implementation**

Originator: **Larsen**

Issue Description:

Nine Regional Boards and an umbrella State Board regulate California's surface water quality. While this autonomy is important because each region has its own issues and priorities, a certain level of consistency is required to improve water quality and measure that improvement statewide.

Importance:

Any statewide improvement in water quality will require coordination among surface water quality regulators and other water resource agencies.

How Do You Propose Meeting or Complying with This Issue?

- Provide detailed statewide guidance as part of a public rulemaking process developed by consensus among Regional Boards, State Boards, and other water resource agencies.
- Document how drinking water quality is considered for all Regional Board actions.
- Elicit Regional Board accountability for consistency.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 11

Develop an Economic Balance Sheet for the Entire Process That Identifies the Value of the Targets

Originators:

Parekh on behalf of himself, Holm, Macler, Robles, and Stanley-Jones

The following issues were consolidated under the above title:

Title: **Develop an Economic Balance Sheet for the Entire Process That Identifies the Value of the Targets**

Originator: **Parekh**

Issue Description:

- The fundamental driver for investment is “return.”
- Returns must be understandable and defensible.
- The challenge is in translating improvements into tangible numbers.
- It will challenge “feel good” targets to be better enumerated.
- It will be unpopular, but will finally allow for a common language among stakeholders.
- There is a need for the balance sheet to tie into existing state economic indicators.

Importance:

This is a “bottom-line” matter.

How Do You Propose Meeting or Complying with This Issue?

Economists unite!

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **Determine the Worth (Monetary Value) of Water for All Uses and Ensure That This Is Used in Making Decisions**

Originator: **Macler**

Issue Description:

Waters of different qualities have values relative to their uses. Computer chip manufacturing, for example, requires high-quality water. This water is worth more than water for fire fighting, which may be of substantially lower quality. All beneficial uses of water can have their worth (monetary value) estimated within reasonable bounds. This estimate will include a range of elements. If this were done, economic analyses could be determined for various water-use

options. These would include the value of water for different ecological benefits, as well as agricultural, municipal, and industrial uses.

Importance:

This will assist decision-makers and the public in their understanding of the consequences of different actions. It will provide an understandable metric for discussion.

How Do You Propose Meeting or Complying with This Issue?

This can be done via a funded project. It will have to be planned and described very carefully to encompass all relevant components and to be adequately peer reviewed.

Title: **Based on the Four Drinking Water Quality Program Improvement Categories, Determine the Cost Per Pound of Contaminants Removed or Reduced**

Originator: **Robles**

Issue Description:

The four improvement categories are source water quality, storage, exchanges, and treatment at the water plant. Developing the cost-per-pound of contaminants removed will allow for optimal resource investments. For example, is it more effective to institute agricultural BMPs or other source-control alternatives when we try to improve the water quality of the entire Delta? Or, is it more cost-effective to treat at the water treatment plants, or a combination of the above?

Importance:

By developing a consistent metric or measure from which to compare the alternatives, decisions will be made that are in the best interest of the State.

How Do You Propose Meeting or Complying with This Issue?

CALFED should continue to work with various agencies or parties to gather information and develop a project-effectiveness measurement program.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 12

Public Awareness of Water Issues

Originators:

Hermanowicz on behalf of himself, Barris, Holm, Moran, Smith, and Stanley-Jones

The following issues were consolidated under the above title:

Title: **Public Awareness of Water Issues**

Originator: **Hermanowicz**

Issue Description:

Organize a campaign and ongoing efforts to educate the public about the infrastructure of water projects, political and institutional arrangements, and the economics of water supply.

Importance:

Most people take for granted the availability of water (even to the point of asserting a “right to water”). There is need for the general public to become aware of the complexity of the system to generate support for the debate and any solution devised within the CALFED framework.

How Do You Propose Meeting or Complying with This Issue?

- Water Education Foundation.
- A balanced stakeholder group can be formed to agree on basic facts about water in California and to provide news organizations with material, sources for articles, and interviews.
- NGOs.

Title: Water Transfers – Your Dilution Can Be Others’ Pollution

Originator: Barris

Issue Description:

Example from the 1994 water sales out of Butte County:

- 10 percent of domestic water supply was with private wells that were affected by the agricultural water districts selling water.
- Agricultural water districts comprised only 1 to 2 percent of the population.
- Board members were elected based on land ownership.
- Municipal well water was rationed due to water sales.
- Domestic wells had problems or failed.
- Chico plumes were pulled.
- Third-party impacts were not abstract.
- There was no public review.

Importance:

- What is healthy for communities is healthy for the environment.
- What creates high-quality water for other places can directly impact our water quality.
- It is inequitable to create water quality problems for others.

How Do You Propose Meeting or Complying with This Issue?

This is a preventable issue. We need science and modeling (Dr. Lev Kavvas, University of California, Davis). When water sales are private, buyers and sellers are the only beneficiaries, and there is no science to debate. The communities suffer, and the true price of water transfers is never on the table.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: **Educate Consumers of Public Drinking Water Supplies in the Subject Areas of Relative Risk and Uncertainty Analysis**

Originator: **Moran**

Issue Description:

The title is deliberately worded for members of the public who, rather than relying on bottled water from the grocery store, actually drink tap water on a regular basis.

Importance:

Perception is reality when it comes to spending money on water quality improvements. Money spent on home treatment options (that may provide fictional benefits) could be invested in treatment technologies proven to address the most relevant water quality problems. An educated assessment of risk will give proper emphasis to pathogens, arsenic, and DBPs, and would hopefully de-emphasize areas where risk is poorly known (e.g., endocrine-disrupting compounds).

How Do You Propose Meeting or Complying with This Issue?

Conduct an intense educational campaign (e.g., via the Internet and, perhaps, television) that spells out health risks and their relative importance for different water sources, as well as conveyance and distribution systems. There is hope for this approach, based on polls showing that compared to 20 years ago, people are much better able to rank risks to their health (not in terms of drinking water, though). This would be led by agencies with the expertise (i.e., USEPA and DHS).

Title: **How Much Effort Should Be Placed on Aesthetic Water Quality Improvement in the CALFED Drinking Water Quality Program?**

Originator: **Smith**

Issue Description:

Aesthetic water quality characteristics (taste and odor) are an important factor that consumers use to judge the quality and healthfulness of their water. While consumers now receive annual water quality reports with detailed information on the quality of their drinking water, the aesthetic quality of their water is the day-to-day factor they have to judge their drinking water.

Importance:

If consumers support investments to improve water quality, yet do not notice improvements in taste and odor, will their willingness to support water quality efforts be diminished? Consumer confidence and support for water quality investments is critical to the success in achieving CALFED water quality goals.

How Do You Propose Meeting or Complying with This Issue?

Not sure. Need to use social science tools to assess this issue. This will be very region-specific. Focus groups could possibly be used to better understand consumer confidence issues and consumer willingness to support water quality projects that address both public health risk and aesthetic quality.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 13

Prioritize Fully Funded Continuous Basin Planning Activities to Improve Implementation of All Water Quality Protection Programs

Originators:

Larsen on behalf of herself, Holm, Lindstrom, Spivy-Weber, and Stanley-Jones

The following issues were consolidated under the above title:

Title: **Prioritize Continuous Basin Planning Activities to Improve Implementation of All Water Quality Protection Programs**

Originator: **Larsen**

Issue Description:

Currently, each Regional Board receives minimal funding for basin planning activities. These resources are expended in the triennial review and program-specific basin planning activities (e.g., basin plan amendments associated with TMDLs). Any other basin planning priorities are defined by the amount of outside funding available for that activity.

Importance:

Basin planning should be driven by problem identification and prioritization rather than by outside funding availability. This issue has implications for environmental justice as well.

Almost all appeals of Regional Board actions to the State Board are related to outdated basin plans.

How Do You Propose Meeting or Complying with This Issue?

Prioritize basin planning for funding at the legislative level.

Title: Need an Active Stakeholder Buy-In Process for Success

Originator: Holm

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: Implement More Restrictions on Animal Grazing in Watersheds

Originator: Lindstrom

Issue Description:

Animal grazing in watersheds contributes to *Cryptosporidium* counts and health risks for downstream users and purveyors.

Importance:

Cryptosporidium poses a health risk, particularly for surface water supplies located downstream of confined animal facilities that do not adequately contain stormwater runoff.

How Do You Propose Meeting or Complying with This Issue?

- Develop tighter regulations and provide financial incentives for improved BMPs.
 - USEPA, SWRCB, United States Forest Service, Bureau of Land Management, dairies, cattle associations, etc.
-

Title: Harmonize State, Regional, and Local Water Planning Processes

Originator: Spivy-Weber

Issue Description:

There are many state and local planning processes. Drinking water quality is often not a high priority vis-à-vis supply reliability or meeting local economic needs.

Importance:

Since there is less money available for planning and monitoring, we must ensure that the funds we have are wisely invested. Harmonizing planning processes should improve comprehensive planning and programs and reduce redundancy or conflict, while increasing the integration of drinking water quality projects into other plans.

How Do You Propose Meeting or Complying with This Issue?

- Assess/determine all important planning processes.
- Develop a memorandum of understanding among agencies, as needed or as appropriate.
- Where possible, eliminate or combine planning processes.

Title: Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography

Originator: Stanley Jones

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 14

Meeting Drinking Water Quality Objectives at the Tap and Fish and Wildlife Objectives in the Delta

Originators:

Mills on behalf of himself Collins, Holm, Hultquist, and Stanley-Jones

The following issues were consolidated under the above title:

Title: Meeting Water Quality Objectives at the Tap, Not at the Export Pumps or Local Water Treatment Plant

Originator: Mills

Issue Description:

Enormous costs and millions of hours devoted by our finest scientists and engineers will be spent on structuring strategies, programs, and projects to meet Bay-Delta water quality objectives at the export pumps, while at the same time more stringent water quality standards will be issued by the federal government. These latter regulations may be most cost-effectively met with home treatment devices (i.e., treating only drinking water in the home), while simultaneously meeting Bay-Delta water quality objectives.

Importance:

Our State's financial and technical resources could be focused on other important issues and, simultaneously, a home-treatment system could implement public health benefits earlier than with a multi-faceted CALFED program. Why treat enormous quantities of water for agriculture, landscape, or lawn watering?

How Do You Propose Meeting or Complying with This Issue?

- This would require rethinking how we supply drinking water and the development of an extensive public outreach program.
- The State and CALFED would need to provide free home-treatment devices, including a periodic maintenance program.

Title: Should We Limit the Control of Source Water Quality to TDS and Constituents Required to Protect Fish and Wildlife?

Originator: Collins

Issue Description:

In spite of our best efforts to control point and non-point sources of contaminants, there are numerous sources of contaminants in nature – peat soil, wildlife, etc. Thus, in spite of our best efforts to control source waters, questions will still be asked about the safety of drinking water produced by conventional water treatment processes.

Importance:

Money that would have been spent in improving the quality of point and non-point discharges could be directed toward providing advanced water treatment at all drinking water treatment facilities. This would require legislation to assess fees on all point and non-point discharges, including agricultural discharges.

How Do You Propose Meeting or Complying with This Issue?

Sponsor legislation to establish fees, and use that money to construct advanced water treatment facilities at all surface water treatment plants. Treatment processes are available (e.g., microfiltration and reverse osmosis) that can produce a water of superb quality in spite of poor-quality source water.

Title: Need an Active Stakeholder Buy-In Process for Success

Originator: Holm

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **Study and Encourage Treatment Technologies That Minimize the Need to Manage Source Water Quality**

Originator: **Hultquist**

Issue Description:

Treatment technologies that provide a large log removal of organisms reduce the need for disinfection and, therefore, the potential for DBPs. Some disinfection technologies do not create byproducts.

Importance:

It may not be feasible to provide a source water that enables the production of safe water with conventional technologies.

How Do You Propose Meeting or Complying with This Issue?

Provide funds for the research, development, and promotion of technologies.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: Stanley-Jones

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 15

Require the Use of BMPs in County and City General Plans

Originators:

Lindstrom on behalf of himself, Green, Holm, Spivy-Weber, and Stanley-Jones

The following issues were consolidated under the above title:

Title: **Require the Use of BMPs in County and City General Plans**

Originator: **Lindstrom**

Issue Description:

Require that general plans include BMPs as a condition of approval. This will have a ripple effect on land-use development practices and improve water quality.

Importance:

The state can develop and require the implementation of BMPs as part of the general planning process.

How Do You Propose Meeting or Complying with This Issue?

- Office of planning and research.
- State legislation.
- Water quality element of the general plan.

Title: Do Our Land-Use Agency Partners Have Enough Policies and Tools to Optimize Conjunctive Use and Sustain the Highest Quality Possible?

Originator: Green

Issue Description:

Many good recharge areas are paved over or used inappropriately. Can we get land-use authorities to universally recognize the need to protect such areas in the future and, in fact, reclaim some of the better locations?

Importance:

Groundwater recharge is very expensive and most effective when the broadest areas possible can be used. Prioritizing land areas that have the highest potential for economical recharge would be useful. Even if they have a long history of inappropriate use, they could be reclaimed.

How Do You Propose Meeting or Complying with This Issue?

Every county should have land-use maps that display high infiltration areas, adopt policies to help optimize recharge in those areas, and limit uses that will undoubtedly contaminate drinking water supplies.

Title: Need an Active Stakeholder Buy-In Process for Success

Originator: Holm

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **Harmonize State, Regional, and Local Water Planning Processes**

Originator: **Spivy-Weber**

Issue Description:

There are many state and local planning processes. Drinking water quality is often not a high priority vis-à-vis supply reliability or meeting local economic needs.

Importance:

Since there is less money available for planning and monitoring, we must ensure that the funds we have are wisely invested. Harmonizing planning processes should improve comprehensive planning and programs and reduce redundancy or conflict, while increasing the integration of drinking water quality projects into other plans.

How Do You Propose Meeting or Complying with This Issue?

- Assess/determine all important planning processes.
- Develop a memorandum of understanding among agencies, as needed or as appropriate.
- Where possible, eliminate or combine planning processes.

Title: Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography

Originator: Stanley-Jones

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 16

Make Achieving Multiple Benefits a Top Priority in Funding Projects to Attain CALFED Drinking Water Quality Goals

Originators:

Davis on behalf of herself, Holm, Spivy-Weber, Stanley-Jones, and Wallace

The following issues were consolidated under the above title:

Title: **Make Achieving Multiple Benefits a Top Priority in Funding Projects to Attain CALFED Drinking Water Quality Goals**

Originator: **Davis**

Issue Description:

An assessment of cost-effective actions needs to consider the multiple benefits that will be attained, as well as the potential for achieving multiple CALFED goals.

Importance:

Few, if any, agencies can afford to fund projects that only address a single issue. Proposed actions considered for CALFED funding need to be evaluated in terms of the multiple benefits that can be attained.

How Do You Propose Meeting or Complying with This Issue?

CALFED needs to delineate of the multiple benefits attained by a proposed action as a formal requirement for projects submitted for CALFED funding.

CALFED needs to establish multiple benefits as a primary criteria for ranking proposed actions for CALFED funding.

Title: Need an Active Stakeholder Buy-In Process for Success

Originator: Holm

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: Water Use Efficiency Is a Cost-Effective and High-Priority Investment in Meeting Drinking Water Quality Goals

Originator: Spivy-Weber

Issue Description:

Reducing demand through conservation, as well as expanding local sources of water through recycling, desalination, etc., gives water agencies greater flexibility in meeting drinking water quality goals.

Importance:

- Increases the flexibility of water agencies to address water quality priorities.
- Debunks the assumption that more people and a larger economy means there is a need for more water.
- Leverages limited dollars from other sources of funding to support meeting drinking water quality goals.

How Do You Propose Meeting or Complying with This Issue?

Promote the greater integration of water-use efficiency and water quality programs/funding at state and local levels to achieve maximum flexibility for drinking water quality.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.

Title: What Is the Impact of Water-Use Efficiency on Improving Downstream Water Quality?

Originator: Wallace

Issue Description:

It is intuitive that more efficient water use will reduce urban runoff and wastewater flows, thereby reducing pollutant loadings; however, until such benefits are measured, we do not know whether they could justify additional investments in conservation and recycling beyond the level of local cost-effectiveness.

Importance:

Water-use efficiency is a potentially important element in a portfolio of cost-effective water quality improvement measures.

How Do You Propose Meeting or Complying with This Issue?

Conduct research into the relationship between per capita consumption (municipal and industrial) or acre-feet applied per acre, and water quality upstream/downstream of the city or irrigated areas.



PRIORITY 17

Competing Beneficial Uses – Municipal Drinking Water Versus Aquatic Life Protection

Originators:

Larsen on behalf of herself, Holm, Levin, Stanley-Jones, and Woodard

Title: Competing Beneficial Uses – Municipal Drinking Water Versus Aquatic Life Protection

Originator: Larsen

Issue Description:

TOC is one among a suite of DBP precursors that form carcinogens once source water is treated for drinking water supply; however, TOC is also a necessary component of the food chain. Although studies identify a target of 3 mg/L TOC in source water to meet drinking water standards, the amount and types of TOC required for a healthy ecosystem is not known.

Importance:

The Regional Board is mandated to protect surface water and groundwater for municipal and domestic supply (MUN). TOC impairs MUN-designated waterbodies.

In addition, excess TOC is a factor in the mercury and dissolved oxygen TMDLs being developed by the Regional Board. TOC increases the rate of mercury methylation, which is the form of mercury that bioaccumulates. TOC in the form of excess phytoplankton also depletes oxygen supplies in the Stockton deep-water ship channel.

How Do You Propose Meeting or Complying with This Issue?

Studies to identify the amount and types of TOC necessary for ecosystem functions need to be conducted. Additional studies are needed to identify which types of TOC form carcinogenic DBPs. This data gap must be filled to develop a balanced objective and implementation plan (in the form of a Regional Board basin plan amendment) that considers the needs of the drinking water community and ecosystem; however, the Regional Board only has jurisdiction over surface water quality (as opposed to treated drinking water, conveyance, water rights, etc.), so

coordination among all agencies (DHS, DWR, SWRCB, etc.) must accompany any action taken by the Regional Board.

Implementing source protection is best done through establishing basin plan objectives.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **The Water Quality Program Is Not Isolated**

Originator: **Levin**

Issue Description:

In pursuing improved drinking water quality in the Delta, existing rights and obligations under other regulatory and non-regulatory programs need to be recognized. There are multiple/diverse

interests in using the same increment of water to meet multiple needs (e.g., harmonizing between ecosystem restoration water quality and drinking water quality/water use efficiency for supply reliability and water quality).

Importance:

The issue is important to water suppliers who are trying to meet multiple objectives under multiple regulatory requirements and non-regulatory actions.

For example, preserving high-quality water sources should be recognized within the water quality program. The need to improve “in-stream” water quality must be balanced between often-competing regulatory programs.

How Do You Propose Meeting or Complying with This Issue?

The CALFED Drinking Water Program needs to develop a framework that recognizes multiple actions being taken by local, state, and federal agencies, as well as other CALFED programs. DHS should be moved to CalEPA so that all state water quality programs are under the same state department “umbrella.”

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California’s Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California’s majority population is no longer white (“Anglo”), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.

Title: **Balance the Need for Drinking Water Supplies Low in Nutrients, TOC, Taste and Odor, and Turbidity with the Need for Greater Delta Ecosystem Enhancements**

Originator: **Woodard**

Issue Description:

Water quality requirements for drinking water are often opposite those that are believed to enhance the Delta's ecosystem. Because CALFED has the objective of improving both of these beneficial uses, it is unclear how both goals can be simultaneously attained.

Importance:

CALFED's goals to enhance the Delta's ecosystem and to improve the quality of the drinking water source will not be met without a delicate balance of actions to address these competing goals.

How Do You Propose Meeting or Complying with This Issue?

- Identify conflicting water quality parameters, and where and when they conflict.
- Prioritize the importance of those constituents both to drinking water supply and to the ecosystem.
- Develop an "optimal matrix" of Delta water quality objectives that will maximize attaining water quality for drinking water and biosystem beneficial uses.
- Develop a program to rigorously assess attainment of the matrix objectives.

PRIORITY 18

Source Water Improvement Will Be Long Term and Incremental, So Treatment Development Will Relieve CALFED from Source Water Protection Responsibility

Originators:

Breuer on behalf of himself, Holm, Stanley-Jones, and Wallace

The following issues were consolidated under the above title:

Title: Source Water Improvement Will Be Long Term and Incremental, So Treatment Development Will Relieve CALFED from Source Water Protection Responsibility

Originator: Breuer

Issue Description:

The lack of regulations on the parameters of concern provides little impetus for near-term improvements in salt, carbon, and bromide. To date, explored actions have provided little cost-benefit information. The lack of a regulatory mandate for the protection of water quality for these parameters has resulted in low levels of funding and applied expertise in addressing the problem.

Large utilities have provided the expertise and economic stimulus to consultants to create treatment technology solutions. This will create an "end-user-pays" environment that will diminish the impetus for source water protection.

Importance:

There is a fundamental responsibility by CALFED to protect or improve drinking water quality at the source. Restoration should not be elevated over source water protection. Small utilities will not be able to match treatment development. Water-use efficiency will be better applied with low saltwater quantity.

How Do You Propose Meeting or Complying with This Issue?

CALFED policy should dictate that source water improvement be included, even if there is a long timeframe. The State and Regional Boards should continue to require the assessment and improvement of point and non-point sources. Other CALFED programs should be required to assess their impacts on drinking water and include mitigation. One example includes relocating the North Bay Aqueduct (NBA) and then directing ecosystem restoration to the northwest Delta, where the majority of carbon from wetlands would end up in the estuary and not at the intake.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.

Title: **Placing the Burden of Water Quality on the Treatment Side Puts Too Many Eggs in One Basket**

Originator: **Wallace**

Issue Description:

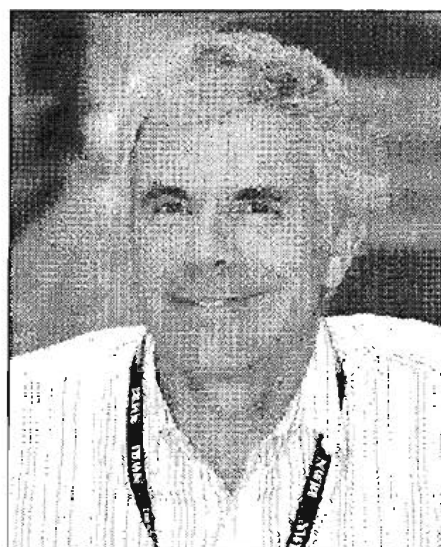
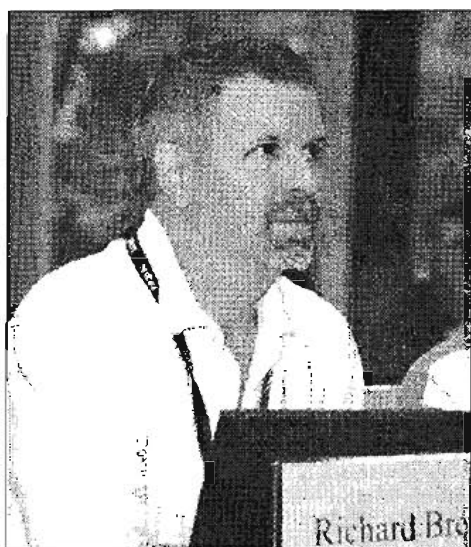
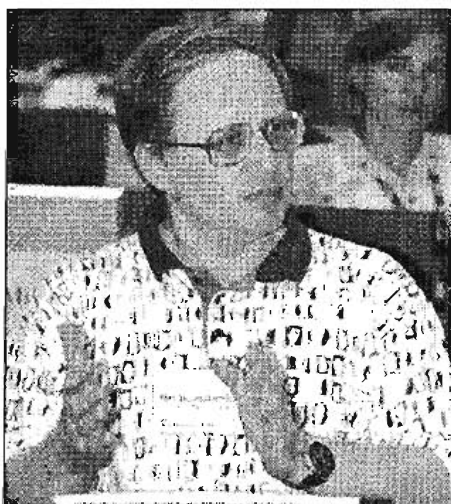
Abandoning efforts to enhance source water quality runs against the grain of Integrated Resources Planning (IRP), which uses the full range of tools available. IRP recognizes cost-effectiveness as one criterion, but not as the sole criterion in determining the mix (i.e., risk management).

Importance:

Excessive reliance on treatment runs several risks. New contaminants could appear for which no treatment method is readily available. The aquatic environment could be impaired. Additional costs are shifted or externalized to drinking water suppliers.

How Do You Propose Meeting or Complying with This Issue?

Implement a broad strategy to enhance source water quality. Specifically, isolate watershed management practices and assess the costs and benefits for downstream water quality.



PRIORITY 19

Rational Plumbing of the Delta-Peripheral Canal

Originators:

Hermanowicz on behalf of himself, Breuer, Holm, Macler, and Stanley-Jones

The following issues were consolidated under the above title:

Title: Rational Plumbing of the Delta-Peripheral Canal

Originator: Hermanowicz

Issue Description:

Bypass the Bay-Delta with water from the Sacramento River to intake points.

Importance:

Prevents the degradation of water quality through the Delta and allows for the independent regulation of flow through the Delta and to other users.

How Do You Propose Meeting or Complying with This Issue?

- DWR can initiate the project and promote its necessity.
- Initiate a discussion on this controversial issue.

Title: Addressing Delta Water Quality and Sustainable Agriculture Needs Would Allow a Realistic Conveyance Reconfiguration Evaluation to Achieve Higher Source Water Quality

Originator: Breuer

Issue Description:

Those who feel that they have the most to lose from a reconfigured Delta configuration (i.e., where the higher water quality of the Sacramento River is moved to the southern exports) include Delta municipal users, such as CCWD, and Delta agricultural users who have gained historical improvements due to the operation of state and federal projects. Current Bay-Delta standards provide some protection within the Delta for salinity, so there is little impetus for this important group of stakeholders to agree to a reconfiguration. Additionally, state-funding assistance to levee protection has been largely driven by the need to maintain levee barriers to saltwater intrusion. Loss of this need might reduce critical levee-funding support, threatening already tenuous efforts to maintain the agricultural economy in the Delta.

Importance:

If water quality can be maintained or improved for in-Delta stakeholders and levee funding is maintained, higher-quality water could be achieved at the exports from a through-Delta or leaky canal approach. Fisheries impacts would be reduced. The cost-benefit analysis would include the improvement of water quality for salt, bromide, and carbon, as well as an ecosystem benefit (e.g., dissolved-oxygen issues in deep-water channel, fish entrainments).

How Do You Propose Meeting or Complying with This Issue?

- Explore the option to fully fund the re-piping of intakes or design system reconfiguration to maintain and improve CCWD's water quality (Clifton Court forebay intake?). Include the operational costs.
- Address NBA and other local diversion concerns. Include the assessment of historical water quality for Delta agricultural use and design system to meet water rights needs and water quality standards.
- Build in-Delta levee funding to meet the goal of sustaining agricultural land use.

Title: Need an Active Stakeholder Buy-In Process for Success

Originator: Holm

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: Determine If We Should Separate Municipal and Industrial Water from Agricultural Water in Export Conveyances

Originator: Macler

Issue Description:

Water for municipal and industrial uses are more valuable and must be of a higher quality than that used for agriculture. Improvements in water quality to benefit municipal and industrial uses are wasted on agriculture. Volumes for municipal and industrial uses are significantly less than those for agriculture, but water for both purposes is transported together in export aqueducts.

Importance:

We may be able to improve the water quality for municipal and industrial use for those volumes in ways that we cannot for the total volume of agricultural/municipal and industrial uses. Separation of these waters would be necessary for this.

How Do You Propose Meeting or Complying with This Issue?

Evaluate the feasibility of separate piping or channels for drinking water sources in aqueducts. The key will be limits on volume.

Title: **Solve the NBA Intake Problem**

Originator: **Macler**

Issue Description:

The NBA intake at Barker Slough draws some of the poorest water in the Delta. Not much can be done to control/improve water quality. It is in a bad location.

Importance:

NBA users will always face difficult treatment/compliance problems unless they gain better source water. CALFED success must include users besides those drawing water from the southern Delta.

How Do You Propose Meeting or Complying with This Issue?

- Two choices have been suggested to solve this. The intake could be relocated to draw higher-quality water elsewhere. Alternatively, Barker Slough water could be traded to agricultural users for their rights to higher-quality water from Lake Bergessa.
- Evaluate moving the intake versus exchanging NBA water for higher-quality water.
- Identify funds to move intake or to exchange NBA water for better water.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

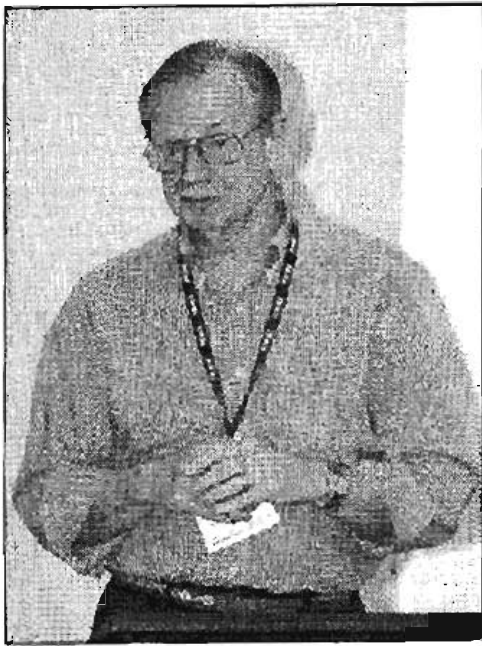
California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 20

Implement Widespread Conjunctive Use between Bay-Delta Water and the State's Groundwater Basins

Originators:

Mills on behalf of himself, Holm, Moran, and Stanley-Jones

The following issues were consolidated under the above title:

Title: Implement Widespread Conjunctive Use between Bay-Delta Water and the State's Groundwater Basins

Originator: Mills

Issue Description:

Provide incentives for local and regional agencies to develop groundwater storage projects to recharge high-quality water available from the Bay-Delta system during wet years. Since groundwater is unregulated in many parts of the state, a financial incentive program must be developed.

Importance:

High-quality waters from wet years that are stored in groundwater basins can be withdrawn and placed in transmission systems to dilute critical contaminant concentrations and meet water quality objectives.

How Do You Propose Meeting or Complying with This Issue?

- CALFED could provide financial incentives for local agency conjunctive-use programs; include funding for recharge facilities, extraction wells, and storage fees.
- Implement legislative encouragement (threat) for locals to develop more voluntary AB3030 programs (local groundwater management plans).

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **Optimize Soil Aquifer Treatment and Water Banking to Improve Drinking Water Quality**

Originator: **Moran**

Issue Description:

Research over the last decade in water quality changes that occur during groundwater recharge offers a partial solution to some of the most intractable drinking water quality problems. The large urban districts of southern California have entirely engineered groundwater basins that rely heavily on "soil aquifer treatment" for improving water quality. Growing urban districts that surround the Delta are not utilizing this technique at all, or not to the greatest extent possible. Furthermore, operating artificial recharge facilities in a way that maximizes water quality

improvement, rather than in a way that maximizes infiltration rate, will directly address the issue over which we are gathered.

Importance:

Improvements to water quality that occur when surface water is artificially recharged usually include removal of particulate matter, removal of bacteria, reduction in TOC (and sometimes denitrification, de-activation of viruses, biodegradation of organic compounds). The ability to predict water quality changes during groundwater storage will give confidence to participants, which will lead to additional storage.

How Do You Propose Meeting or Complying with This Issue?

Studies that identify places where artificial recharge is likely to result in improved drinking water quality for water should get priority treatment. Conjunctive use projects should take place in areas where reducing conditions are likely to be encountered, and where contamination sources are not present in the recharge area. Special attention should be given to already over-drafted basins, areas where population is rapidly increasing, and basins that border the Delta. Water treatment of extracted water should be tailored to the quality of the extracted water. Information management and data sharing must be seamless. More research needs to be done on the fate of DBPs and endocrine disrupting compounds. High-tech treatment may therefore still be required upon pumping. Evaluation of whether water quality improvement is being achieved should be based on basin monitoring and assessment. In summary, using more groundwater will help improve water quality.

Title: **De Facto Potable Reuse and Addressing Emerging Contaminants from a Public Health Perspective**

Originator: **Stanley-Jones**

Issue Description:

Public resistance to the potable reuse of treated wastewater is strongly felt in many communities (e.g., Tri Valley, San Diego, Redwood City). Yet, few communities drawing from the Bay-Delta system realize that groundwater recharge for storage already introduces significant volumes of treated effluent into their drinking water supplies. Non-regulated emerging contaminants, such as pharmaceuticals, compound public concerns.

Importance:

Public recognition of the de facto potable reuse of wastewater could rapidly erode confidence and support for State water programs, accelerate a shift among consumers to expensive “boutique” solutions, and paradoxically lead to disinvestments in public infrastructure.

How Do You Propose Meeting or Complying with This Issue?

- Accelerate research into emerging contaminants.
 - Change disposal practices.
 - Invest in pollution prevention, education, and source protection.
 - Expand public dialogue on the health effects of recycled water.
-

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California’s Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California’s majority population is no longer white (“Anglo”), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.

PRIORITY 21

Ensure That CALFED Drinking Water Quality Work-to-Date Is Incorporated into the Strategic Plan's Development

Originators:

Smith on behalf of herself, Holm, and Stanley-Jones

The following issues were consolidated under the above title:

Title: **Ensure That CALFED Drinking Water Quality Work-to-Date Is Incorporated into the Strategic Plan's Development**

Originator: **Smith**

Issue Description:

Since the CALFED Record of Decision was signed, the CALFED Drinking Water Quality Program has supported a variety of projects through directed studies and RFP processes. These water quality projects include research, applied studies, pilot projects, and some project implementation. The grant programs and projects are administered by different agencies (e.g., DWR, SWRCB, CVRWQCB, DHS, USEPA, CBDA, Association of Bay Area Governments). It is not apparent how the outcomes and findings of these water quality projects will be utilized.

Importance:

We risk losing the value of these water quality investments. Since much of the work funded to date is applied research and pilot testing, we must ensure that the findings/results from these projects are incorporated into the development of the drinking water quality strategic plan. This is important to make progress and move forward.

How Do You Propose Meeting or Complying with This Issue?

The Drinking Water Quality Program should establish a science review panel and topic-specific subcommittees. The science panel should be charged with considering the projects, on-going and completed, review what is contributed by the projects, and how they contribute to the strategic plan.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

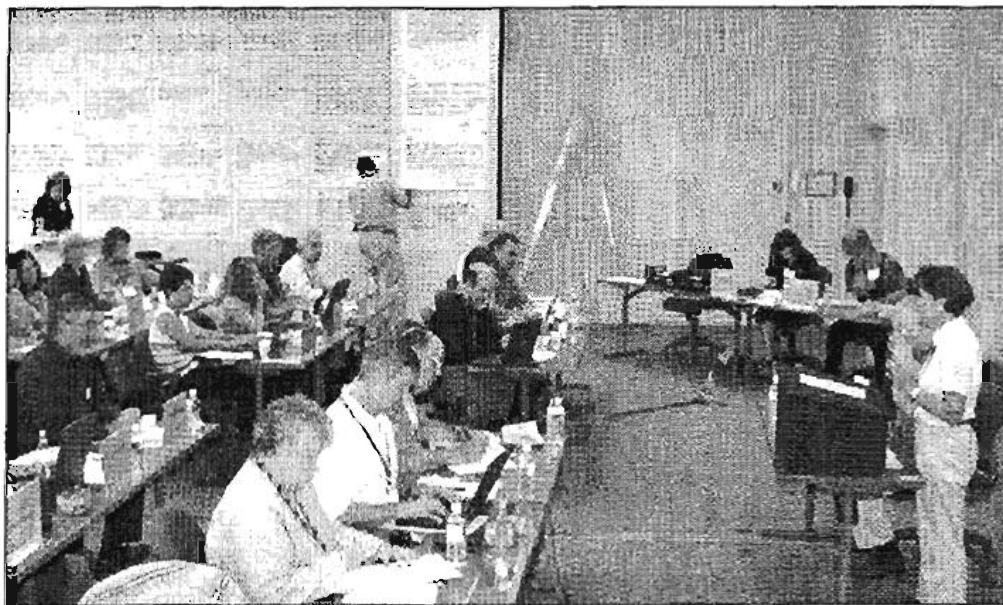
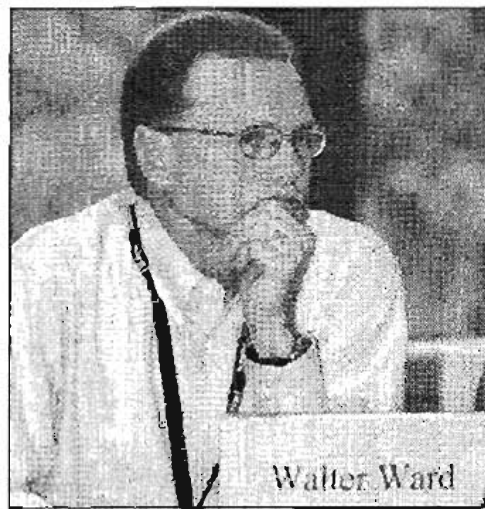
California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 22

Lowering TDS Content of Bay-Delta Water Delivered into Southern California

Originators:

Mills on behalf of himself, Green, Holm, Moran, Stanley-Jones, and Ward

The following issues were consolidated under the above title:

Title: Lowering the TDS Content of Bay-Delta Water Delivered into Southern California

Originator: Mills

Issue Description:

Southern California has enormous recycling opportunities, but many are constrained by the necessity of reducing the salinity of recycled water to meet salinity objectives for intended beneficial uses. Salinity can be reduced by costly desalting and ocean brine disposal.

Groundwater supplies in southern California are becoming more saline. There is a need for a higher-quality recharge source.

Importance:

Increasing wastewater reclamation in southern California to reduce the need for additional exports from the Delta to the south (as a water-use efficiency strategy) would provide more diluted water and improve the salinity of groundwater supplies to help meet water quality objectives.

How Do You Propose Meeting or Complying with This Issue?

- Implement extensive source control above the Delta or bypass the Delta for delivery to the export pumps via a canal.
- Involve CVRWQCB.

Title: Voluntary Water Exchanges in the South San Joaquin Valley
Region – Where Are They Real?

Originator: Green

Issue Description:

The only “real” water available for exchange is flood water or entitlement water used on clay soils that do not percolate to groundwater or have an irrecoverable salt sink under them. These areas may include portions of Tulare Lake and western Kern County that receive Sierran water.

Importance:

Other areas in the South Valley have significant groundwater deficits that could be better used to store high-quality groundwater.

How Do You Propose Meeting or Complying with This Issue?

The areas for potential exchange should be mapped and local sources calculated to determine the optimal amounts available to exchange for lower-quality Delta supplies.

Title: Need an Active Stakeholder Buy-In Process for Success

Originator: Holm

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program’s implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: Apply Sound Science to Reduce Non-Point Source Salinity from Agricultural Runoff and Return Flows

Originator: Moran

Issue Description:

Increasing salinity is an insidious, 500-pound gorilla that sits quietly in the corner, while heated discussions on DBPs, pesticides, and mercury take place in the middle of the room. The natural balance between evapotranspiration and the leaching of salts in soils is disturbed by non-natural agricultural practices. Agriculture along Delta tributaries is slowly, but surely, causing the deterioration of water quality all over the state. Keep in mind that most of the water that flows through California (or would flow in the natural state) is instead used to irrigate crops.

Importance:

Water resource managers and regulators go through extreme contortions to attempt to mitigate the problems associated with increasing TDS in water supplies. Yes, wastewater discharge contributes to the problem. Yes, groundwater mining and seawater intrusion contribute to the problem. These issues are largely addressed through engineering projects. But, when looked at from a total mass “imbalance” perspective, it is agricultural practices that have the largest effect over the longest period of time. The 500-pound gorilla carries on in the same way it always has. The solution is not likely to come from engineering — unless on a scale more grand than what we have witnessed to date.

How Do You Propose Meeting or Complying with This Issue?

In other parts of the world where there is intense pressure on water resources and in arid climates, agricultural practices are modified to minimize the degradation of freshwater by saline water. Drip irrigation is employed on a large scale. Crop selection is based on the water application required and areas where natural formations or soils erode to add concentrated flows are not farmed. Remember that high-quality water equals low-TDS water. TMDLs and the

introduction of BMPs could go a long way. We are not asking the 500-pound gorilla to disappear, but rather go on a diet and lose some mass.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.

Title: **Use Additional Surface Water Storage in the San Joaquin Basin to Meet Drinking Water Quality Goals under the CALFED Program**

Originator: **Ward**

Issue Description:

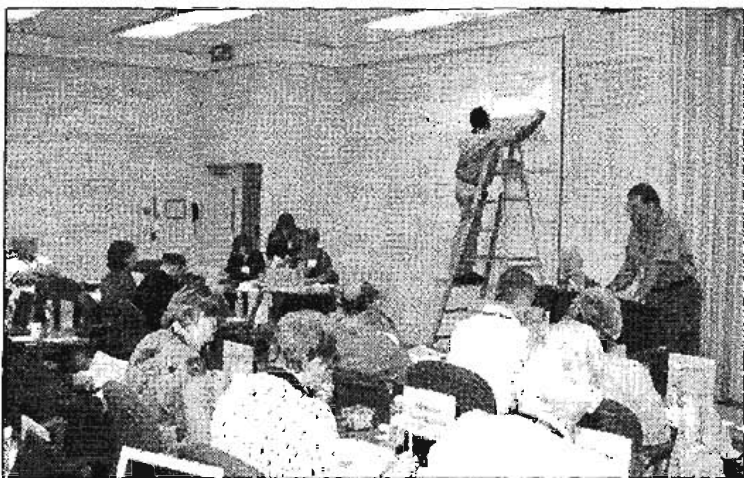
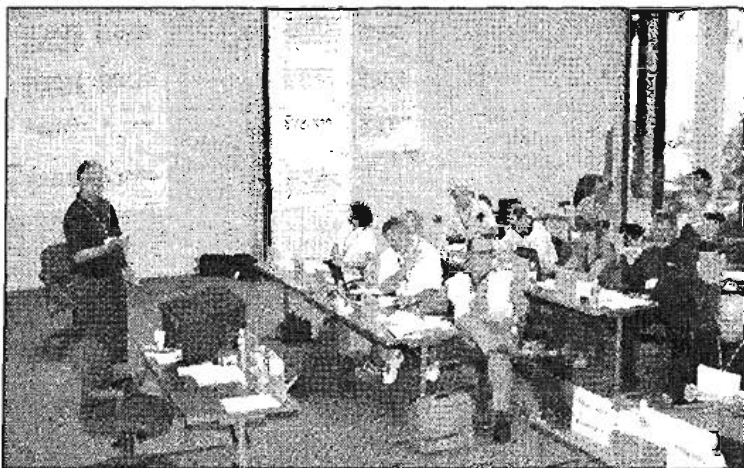
The conveyance of water from north to south across the Delta is problematic for many reasons, especially related to the protection of endangered species from entrainment in the CVP and SWP pumps, and the introduction of water that is high in salinity and TOC. The additional storage of freshwater south of the Delta would help protect endangered or threatened species and improve water quality.

Importance:

- Provides the multiple benefits of flood control, water supply, environmental enhancement, and water quality.
- Potentially reduces treatment costs.
- Reduces adverse impacts to endangered species.
- Provides freshwater released from storage at appropriate times to be used for environmental purposes (such as rewetting the San Joaquin River below Friant Dam) and for diluting water that is used as source water for drinking water and other municipal purposes.

How Do You Propose Meeting or Complying with This Issue?

CALFED.





PRIORITY 23

Bay-Delta Ecosystem Watershed Objectives May or Will Influence and Possibly Direct the Water Quality Program

Originators:

Levin on behalf of herself, Green, Holm, Spivy-Weber, and Stanley-Jones

The following were consolidated under the above title:

Title: Bay-Delta Ecosystem Watershed Objectives May or Will Influence and Possibly Direct the Water Quality Program

Originator: Levin

Issue Description:

Watershed requirements will change over time and differ throughout watersheds. How will we analyze the effects those potential future flow requirements, which are needed to meet watershed objectives, may have on water quality?

Importance:

Making assessments under certain flow scenarios can create future problems in the strategic implementation of a drinking water quality program.

How Do You Propose Meeting or Complying with This Issue?

Employ adaptive management in strategic planning.

Title: Loss of Delta Water Supplies Due to Water Quality Regulation

Originator: Green

Issue Description:

Tighter receiving water objectives and discharge standards will not be achievable by some. The rights holders of these waters will find alternate uses (e.g., groundwater recharge and transfers at their source).

Importance:

Fewer supplies will degrade quality issues to worse conditions.

How Do You Propose Meeting or Complying with This Issue?

Exhaust treatment technologies to avoid catastrophic water rights wars

Title: Need an Active Stakeholder Buy-In Process for Success

Originator: Holm

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **Restoration of the San Joaquin River Can Improve Delta Water Quality for People and the Environment**

Originator: **Spivy-Weber**

Issue Description:

Today, the San Joaquin River is a truncated, interrupted system that contributes to the degradation of Delta water.

Water and a plan are needed to achieve the goal of restoration.

Importance:

- Provides multiple benefits to people and the environment in northern and southern California.
- Builds broad-based support.
- A fully circulating system could improve overall water quality in the system.

How Do You Propose Meeting or Complying with This Issue?

- Through funding and regulation, require investments in conservation in agriculture and increasingly urbanized San Joaquin Valley communities to generate water for restoration.
- Explore other ways to find water supply to achieve this goal.
- Stimulate discussion of the value of water at state and local levels.

Title: Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography

Originator: Stanley-Jones

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 24

Ensure That Improvements in Water Quality Are Maintained As Improved Water Quality and Not Turned into Improved Water Supply or Fisheries

Originators:

Holm on behalf of herself and Stanley-Jones

The following issues were consolidated under the above title:

Title: **Ensure That Improvements in Water Quality Are Maintained As Improved Water Quality and Not Turned into Improved Water Supply or Fisheries**

Originator: **Holm**

Issue Description:

Currently, drinking water quality is protected through the RWQCB Basin Planning Process and SWRCB Water Quality Control Plan. Growth in the State will continue to degrade the tributary rivers to the Delta. The RWQCB has acknowledged in their triennial review process that work needs to be done to develop numerical standards that protect drinking water as a beneficial use, but no resources are available for the effort. Delta water quality standards allow degradation up to a limit; consequently, the implementation of measures to improve water quality can (and do) allow other actions to change in a way that takes water quality back to the same level (shifts the improvement to some other benefit, such as water supply).

Importance:

Water supply is operated to meet current drinking water quality standards (specifically, a chloride standard at Rock Slough is used as an indicator). If water quality is improved and there is no change to the current standard, water supply will continue to operate as it has historically and will gain more water for exports, as it will be less limited by the standards (similarly, the excess water could be used for fishery improvements). Standards that reflect the achievements of the drinking water quality program would be the only way to maintain such water quality improvements.

How Do You Propose Meeting or Complying with This Issue?

- Give high priority and resource support to current work on the Central Valley Drinking Water Policy.
 - Work to get recognition from the SWRCB and RWQCB that the state gives this effort high priority.
 - Develop guidance for how other programs and projects assess their water quality impacts or benefits.
 - Develop guidelines under the SWRCB and RWQCB to ensure that water quality improvement actions are realized.
-

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

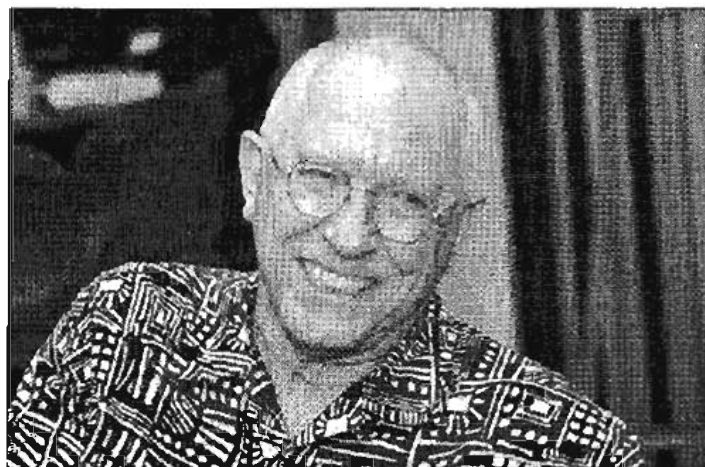
California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



PRIORITY 25

Embrace “Zero” Discharge

Originators:

Young on behalf of herself, Holm, and Stanley-Jones

The following issues were consolidated under the above title:

Title: Embrace “Zero” Discharge

Originator: Young

Issue Description:

The CWA identified zero discharge of pollutants as a goal. While the pace of degradation has slowed or, in some cases, been reversed, we have not achieved this goal. To stop the continued degradation of state waters, we need to revive and revisit the idea that we can minimize or zero-out our impact on receiving waters.

Importance:

Dramatic population increases, climate change, and other factors require us to first stop and then change direction.

How Do You Propose Meeting or Complying with This Issue?

Require new developments to implement pollution prevention, water-use efficiency (including wastewater reuse, demand reduction, etc.), and other mechanisms to achieve least use and zero discharge. Where this is not feasible, a market could be established to buy improvements in existing developments to “net zero.” Over time, this will create a societal climate to reverse the degradation of waters.

Will require legislation, potential water rights determinations, changes in local zoning, and some kind of bank to do the trades. Would also use LCA to look at the introduction of new products into use.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
- Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.





PRIORITY 26

Small Systems, or Rural Areas without Systems, Skew the “Report Card” on Drinking Water Quality

Originators:

Green on behalf of himself, Holm, and Stanley-Jones

The following issues were consolidated under the above title:

Title: Small Systems, or Rural Areas without Systems, Skew the “Report Card” on Drinking Water Quality

Originator: Green

Issue Description:

Small systems are the greatest sources of violations and exceedences that disturb the media and the public about drinking water, and those violations help drive tighter regulations.

Importance:

Bad press and inadequate services will continue to drive the regulatory processes.

How Do You Propose Meeting or Complying with This Issue?

CALFED drinking water processes and solutions should be expanded to develop small system assistance to decrease violations and the lack of adequate supplies, hence improving our “public image” overall.

Title: **Need an Active Stakeholder Buy-In Process for Success**

Originator: **Holm**

Issue Description:

The program was agreed to by stakeholders, on a conceptual level, at the time of the CALFED Record of Decision. It is important to ensure that these stakeholders are supportive of the strategy and goals, which are necessary for the program's implementation and success.

Importance:

If stakeholders do not see that they will receive benefits from the program, they are much less likely to be supportive and to participate in the program.

How Do You Propose Meeting or Complying with This Issue?

- Expand beyond the Drinking Water Subcommittee to offer the public opportunities for direct contact with the program (informational workshops).
 - Shop the program around to identify stakeholders (e.g., agencies and NGOs) to gain their understanding and support.
-

Title: **Diversify Involvement in Drinking Water Policy Making to Better Reflect California's Changing Demography**

Originator: **Stanley-Jones**

Issue Description:

California's majority population is no longer white ("Anglo"), yet water policy forums remain overwhelmingly so.

Importance:

The gap in participation threatens to disconnect the populations served by CALFED programs from decision-makers, and undermines popular and political support for water programs.

How Do You Propose Meeting or Complying with This Issue?

Work with the Environmental Justice Committee and develop mentoring program for ethnically diverse professionals.



STRENGTH OF FEELING ANALYSIS

The idea behind the Strength of Feeling Analysis is that priority ranking alone does not show unanimity, or lack of unanimity, by the workshop participants. Strength of Feeling Analysis, however, provides a transparent quantitative measure of agreement or disagreement among all participants. Table 1 shows how the 31 participants ranked all 26 major issue areas.

The following table lists the research issues, in descending order of importance, the issue title, the times it was voted for (picked), the total number of points received from the balloting, and finally, the strength of the group's feeling, expressed as a percentage.

TABLE 1

Issues (26) Ranked by all Participants (31)

Rank	Title	Times Picked/Pts	Strength of Feeling
1.	Develop Integrated Water Quality Improvement Strategies and Management Options to Achieve Receiving Delta/SWP Water	26/180	58.1%
2.	Long-Term Financing for Water Quality Improvement	24/150	48.4%
3.	Impact of Population Growth and Various Land-Use Practices on Water Quality	24/146	47.1%
4.	Identify a Common, Statewide Definition of “Safe” Drinking Water Suitable for Use As the CALFED Drinking Water Quality Goal of “Equivalent Level of Health Protection”	21/145	46.8%
5.	Identify and Prioritize – Through Appropriate Acquisition and Science – the Most Significant Sources of Degradation of Delta Water Quality	18/110	35.5%
6.	How Shall Regionally Developed Drinking Water Be Coordinated, Approved, and Funded, and by Whom?	15/100	32.3%
7.	Quantify the Level of Public Health Risk Associated with Achieving the Suggested Water Quality Objectives for Each Water System Situation	19/91	29.4%
8.	Methodology for the Sustainable Development Assessment of California Water Resources	15/81	26.1%
9.	Implementation of the CWA and SDWA Must Fit Together to Address Delta-Specific Water Source Problems	16/73	23.5%
10.	How to Encourage Collaboration among Staff and Managers at State and Federal Agencies (Including Operators of the CVP and SWP) to Meet CALFED Drinking Water Goals	18/71	22.9%
11.	Develop an Economic Balance Sheet for the Entire Process That Identifies the Value of the Targets	10/63	20.3%

Rank	Title	Times Picked/Pts	Strength of Feeling
12.	Public Awareness of Water Issues	11/58	18.7%
13.	Prioritize Fully Funded Continuous Basin Planning Activities to Improve Implementation of All Water Quality Protection Programs	14/54	17.4%
14.	Meeting Drinking Water Quality Objectives at the Tap and Fish and Wildlife Objectives in the Delta	10/50	16.1%
15.	Require the Use of BMPs in County and City General Plans	8/40	12.9%
16.	Make Achieving Multiple Benefits a Top Priority in Funding Projects to Attain CALFED Drinking Water Quality Goals	9/39	12.6%
17.	Competing Beneficial Uses – Municipal Drinking Water Versus Aquatic Life Protection	7/38	12.3%
18.	Source Water Improvement Will Be Long Term and Incremental, So Treatment Development Will Relieve CALFED from Source Water Protection Responsibility	8/37	11.9%
19.	Rational Plumbing of the Delta-Peripheral Canal	7/34	11.0%
20.	Implement Widespread Conjunctive Use between Bay-Delta Water and the State's Groundwater Basins	6/32	10.3%
21.	Ensure That CALFED Drinking Water Quality Work-to-Date Is Incorporated into the Strategic Plan's Development	5/27	8.7%
22.	Lowering TDS Content of Bay-Delta Water Delivered into Southern California	5/24	7.7%
23.	Bay-Delta Ecosystem Watershed Objectives May or Will Influence and Possibly Direct the Water Quality Program	4/23	7.4%
24.	Ensure That Improvements in Water Quality Are Maintained As Improved Water Quality and Not Turned into Improved Water Supply or Fisheries	4/21	6.8%

Rank	Title	Times Picked/Pts	Strength of Feeling
25.	Small Systems, or Rural Areas without Systems, Skew the "Report Card" on Drinking Water Quality	4/15	4.8%
26.	Small Systems, or Rural Areas without Systems, Skew the "Report Card" on Drinking Water Quality	2/3	0.1%

APPENDICES

APPENDIX A

ACRONYMS

BMP	best management practices
CALFED	State and Federal agencies with management and regulatory responsibilities for the Bay-Delta
CASA	California Association of Sanitation Agencies
CBDA	California Bay-Delta Authority
CCWD	Contra Costa Water District
CUWA	California Urban Water Agencies
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
DBP	disinfection by-product
DHS	California Department of Health Services
DPR	California Department of Pesticide Regulation
DWR	California Department of Water Resources
ELPH	Equivalent Level of Public Health
FETAX	frog embryo teratogenesis assay – <i>Xenopus</i>
GAC	granular activated carbon
IEUA	Inland Empire Utilities Agency
IRP	integrated resource planning
JPA	Joint Power Authority
LADWP	Los Angeles Department of Water and Power
LCA	life cycle analysis
mg/L	milligrams per liter
MCL	maximum contaminant level
MID	Modesto Irrigation District
MUN	municipal and domestic supply
MWQI	Municipal Water Quality Investigations
MWD	Metropolitan Water District of Southern California
NBA	North Bay Aqueduct
NDMA	N-nitrosodimethylamine
NGO	non-government organization
NPDES	National Pollution Discharge Elimination System
NWRI	National Water Research Institute

O&M	operation and maintenance
POTW	publicly owned treatment works
RFP	Request For Proposal
ROD	Record of Determination
RWQCB	Regional Water Quality Control Board
SAWPA	Santa Ana Watershed Project Authority
SDWA	Safe Drinking Water Act
SFPUC	San Francisco Public Utilities Commission
SRGSD	Sacramento Regional County Sanitation District
SRWP	Sacramento River Watershed Program
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TDS	total dissolved solids
TOC	total organic carbon
TMDL	total maximum daily Loads
µg/L	micrograms per liter
USBR	United States Department of the Interior, Bureau of Reclamation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

APPENDIX B

PREVIOUS NGT WORKSHOPS CONDUCTED BY NWRI

Water Reuse Planning for the State of Washington. Report of a workshop sponsored by NWRI in cooperation with Washington State Department of Ecology. DoubleTree Hotel Seattle Airport, Seattle, Washington, May 30-June 1, 2003. 221p.

Seawater Desalination: Opportunities and Challenges. Report of a workshop sponsored by NWRI in cooperation with Metropolitan Water District of Southern California and Member Agencies. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, March 28-30, 2003. 213p.

Decision Support System. Report of a workshop sponsored by NWRI in cooperation with Tellus Institute. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, February 4-6, 2003. 161 p.

Water Quality and Resource Management Issues. Report of a workshop sponsored by NWRI in cooperation with Lawrence Livermore National Laboratory and University of California. Wente Vineyards, Livermore, California, January 28-30, 2003. 252 p.

Life Cycle Environmental Impacts Associated with Different Fuel Options. Report of a workshop sponsored by NWRI in cooperation with Clarkson University, Lawrence Livermore National Laboratory, and USEPA – Office of Research and Development. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, February 15-17, 2002. 202 p.

Issues in Methanol Research. Report of a workshop sponsored by NWRI in cooperation with the American Methanol Institute. Hilton Hotel, Costa Mesa, CA, October 5-7, 2001. 173 p.

Chino Basin Organics Management. Report of a workshop sponsored by NWRI in cooperation with the Inland Empire Utilities Agency, and the Southern California Alliance of Publicly Owned Treatment Plants. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, April 18-20, 2001. NWRI Report No. NWRI-01-03, 205 p.

Desalination Research & Development. Report of a workshop sponsored by NWRI in cooperation with the United States Bureau of Reclamation. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, January 19-21, 2001. 185p.

Knowledge Management. Report of a workshop sponsored by NWRI. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA January 5-7, 2001. 169 p.

Oxygenate Contamination. Report of a workshop sponsored by NWRI in cooperation with the United States Bureau of Reclamation. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, September 15-17, 2001: 258p.

Utility Leadership. Report of a workshop sponsored by NWRI in cooperation with Malcolm Pirnie, Inc., the University of Southern California, and the University of South Florida. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, October 24-26, 1999: 154p.

Non-potable Water Recycling. Report of a workshop sponsored by NWRI in cooperation with Irvine Ranch Water District and the Orange County Water District. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, May 23-25, 1999: 174p.

Conjunctive Use Water Management Program. Report of a workshop jointly sponsored by NWRI, Association of Ground Water Agencies, and the Metropolitan Water District of Southern California. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, May 27-29, 1998: 157p

Barriers to Providing Safe Drinking Water Through Small Systems. Report of a workshop jointly sponsored by NWRI, Pan American Health Organization, and NSF International/WHO Collaborative Center. Pan American Health Organization Headquarters, Washington, D.C., May 13-15, 1998: English report: 175p., Spanish report: 188p. (Bound in a single volume.)

Barriers to Harvesting Stormwater. Report of a workshop jointly sponsored by NWRI, Los Angeles County Department of Public Works, County of Orange Public Facilities & Resources Department, Southern California Coastal Water Project, and the American Oceans Campaign. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, September 22-24, 1997: 159p.

Groundwater Disinfection Regulations Benefits Conference. Report of a conference sponsored by NWRI. Arnold and Mabel Beckman Center, National Academies of Sciences and Engineering, Irvine, CA, March 17, 1997: 75p.

Groundwater Disinfection Regulation. Report of a workshop jointly sponsored by NWRI and the USEPA. Arnold and Mabel Beckman Center, National Academies of Sciences and Engineering, Irvine, CA, January 6-8, 1997: 209p.

Membrane Biofouling. Report of a workshop jointly sponsored by NWRI, UNESCO Centre for Membrane Science and Technology, and CRC for Waste Management and Pollution Control, LTD. UNSW Institute of Administration, Sydney, Australia, November 15-17, 1996: 176p.

The Santa Ana River Watershed. Report of a workshop jointly sponsored NWRI and the Santa Ana Watershed Project Authority. Co-sponsors included: City of San Bernardino Water Department, City of Riverside, Western Municipal Water District, and Orange County Water District. Kellogg West Conference Center/Hotel, California State Polytechnic University, Pomona, CA, August 23-25, 1995: 182p.

The New River. Report of a workshop jointly sponsored by NWRI and the County of Imperial, California. Barbara Worth Country Club, Holtville, CA, May 19-21, 1995: English report: 134p., Spanish report: 134p. (Bound in a single volume)

Establishment of The Middle-East Water and Energy Research and Technology Centre. Report of a workshop jointly sponsored by NWRI and the Sultanate of Oman through the Worldwide Desalination Research and Technology Survey. Muscat, Oman: September 21, 1994: 29p.

Risk Reduction in Drinking Water Distribution Systems. Report of a workshop jointly sponsored by NWRI and the Environmental Criteria and Assessment Office of the USEPA. Arnold and Mabel Beckman Center, National Academies of Sciences and Engineering, Irvine, CA, February 27-28, 1994: 142p.

Fouling and Module Design. Report of a workshop jointly sponsored by NWRI and the National Science Foundation (NSF). Virden Conference Center of the University of Delaware, Lewes, DE, October 30 ~ November 1, 1993: 115p.

Groundwater Disinfection Rule. Report of a workshop jointly sponsored by NWRI and the USEPA in collaboration with the Weston Institute. Virden Conference Center of the University of Delaware, Lewes, DE. June 7-8, 1992: 103p

APPENDIX C

PARTICIPANTS' BIOGRAPHICAL SKETCHES

Elaine Archibald

Partner

Archibald & Wallberg Consultants

Elaine Archibald has 25 years experience in the preparation of watershed management plans, water quality management studies, and environmental impact reports. At present, she is a Partner in Archibald & Wallberg Consultants, providing consulting services to drinking water agencies throughout California, including the California Urban Water Agencies (CUWA). From December 2002 to May 2003, she served as CUWA's Interim Executive Director and has managed CUWA's Bay-Delta technical studies since 1974. In addition, she specializes on issues related to source water protection of the Sacramento-San Joaquin Delta and the Central Valley watershed. Archibald received a B.A. in Biology from the University of California, Berkeley, and an M.S. in Environmental Science from the University of Texas.

Lynn Barris

Owner

Barris Farms

Since 1987, Lynn Barris has owned Barris Farms, which encompasses two almond farms and management of three almond orchards, totaling over 600 acres. In addition to farming, she has been involved in numerous public outreach programs since 1994. For instance, she was appointed by the State Water Resources Control Board to help set policies for monitoring total maximum daily loads for the State of California. She is also a working member of the Bay-Delta Public Advisory Committee's Watershed Work Group, as well as the Watershed Work Group of the California Biodiversity Council. In addition, Barris is a member of the Butte County Integrated Watershed Stakeholder Group, and serves on numerous boards and committees for groups like California Communities on Water, Southern California Watershed Alliance, Northern California Regional Land Trust, and many others.

Richard S. Breuer

Chief, Municipal Water Quality Investigations Program

California Department of Water Resources

Rich Breuer has worked for the California Department of Water Resources since 1991. At present, he is the Chief of the Municipal Water Quality Investigations Program, managing a drinking water program to monitor, assess, and protect source drinking water quality in the Sacramento-San Joaquin Delta and the State Water Project. He also works with CALFED to develop long-range drinking water protection goals for the Delta and its watersheds. Prior to joining the California Department of Water Resources, he worked as an Environmental Research Scientist for the California Department of Food and Agriculture and as an Agricultural Consultant for the Western Farm Service Corporation. Breuer received a B.S. in Agronomy/Soil and Crop Science from California State University Chico and an M.S. in Plant Protection and Pest Management from the University of California, Davis.

Harvey F. Collins, Ph.D., P.E.
Environmental Engineer Consultant

Harvey Collins has expertise in wastewater reclamation, drinking water, sanitary/environmental engineering, and environmental health. He has over 30 years of experience in California state government, working in all fields of sanitary/environmental engineering and environmental health. When he retired in 1995, he was Chief of the Division of Drinking Water and Environmental Management for the California Department of Health Services. Since then, he has consulted on various water and wastewater engineering projects, including serving as Chair of NWRI's Scientific Advisory Panel for the Santa Ana River Water Quality and Health Study. More recently, he co-authored the NWRI Occasional Paper, *Assessing Risk Information Concerning Coastal Runoff*. Collins received a B.S. in Civil Engineering from Oregon State University, an M.S. in Sanitary Engineering from the University of Missouri, Columbia, and a Ph.D. in Sanitary Engineering from the University of California, Berkeley.

Phillippe A. Daniel, P.E.
Vice President
Camp Dresser & McKee

Phillippe Daniel is Vice President of Camp Dresser & McKee, a global consulting, engineering, construction, and operations firm helping public and private clients improve the environment and infrastructure. Having worked on over 50 national and international water projects, he has extensive experience in all aspects of water treatment, water resources, and water policy. Daniel specifically works with agencies that make complex resource allocation decisions. In addition, he serves on numerous committees for organizations like American Water Works Association, and also is a reviewer for *Journal AWWA* and *Ozone: Science and Engineering*. Daniel received a B.S. in Bioengineering, an M.S. in Environmental Engineering, and is a Ph.D. candidate in Environmental Engineering at the University of California, Berkeley. He is a professional engineer in Oregon and Washington.

Martha Davis
Manager for Policy Development
Inland Empire Utilities Agency

Martha Davis is Executive Manager for Policy Development and oversees the Water Resources Department at the Inland Empire Utilities Agency (IEUA), a municipal water district serving 700,000 people in San Bernardino County, California. Previously, she served as the Executive Director for Californians and the Land (1998-2000) and for the Mono Lake Committee (1984-1996). Under her leadership, the Mono Lake campaign culminated in a unanimous landmark public trust decision by the State Water Resources Control Board to protect Mono Lake. Since 1998, Davis has served as the Co-Chair of the CALFED Watershed Subcommittee and is a member of the CALFED Bay-Delta Public Advisory Committee. In addition, she serves as a member of the California Bulletin 160 Advisory Committee. Davis received a B.S. in Human Biology from Stanford University and an M.S. at the School of Forestry and Environmental Studies at Yale University.

Sargeant J. Green*General Manager**Tranquillity Irrigation District*

Since 1989, Sarge Green has been the General Manager of Tranquillity Irrigation District, which provides services to the community of Tranquillity, California, including irrigation water to 9,700 acres of cropland and drinking water to 320 connections. In addition, he has been in private practice as an environmental scientist working on hazardous wastes issues and water quality problems. He also spent 14 years with the California Regional Water Quality Control Board – Central Valley Region, where he was in charge of agricultural waste discharges, basin planning, oilfields, hazardous waste, and superfund sites. Green is involved in numerous organizations, acting as Chair of the Association of California Water Agencies, Water Quality Committee and as a member of the Fresno Slough Water District Board of Directors, among others. He received a B.S. in Soil and Water Science from the University of California, Davis.

Joe Grindstaff*General Manager**Santa Ana Watershed Project Authority*

Joe Grindstaff has had 14 years of experience with the Santa Ana River Watershed in Southern California. In 1998, he was appointed the General Manager of the Santa Ana Watershed Project Authority (SAWPA), which has responsibility for over 2,650 square miles of varying terrain that includes parts of San Bernardino, Riverside, Los Angeles, and Orange Counties in California. Since joining SAWPA, he has worked towards a regional effort to make the watershed more water efficient and was a major player in securing \$250 million for the Santa Ana Watershed when Proposition 13 was passed; those funds have been more than tripled by the efforts of local agencies, so that more than \$800 million will be spent to improve the watershed. Grindstaff's most visible activity is pursuing matching federal and state funds for various watershed projects. He received a both a B.A. in Chemistry and B.S. in German from Brigham Young University and an MBA from the University of Phoenix.

Sam Harader*Interim Drinking Water Quality Program Manager**California Bay-Delta Authority*

Since March 2003, Sam Harader has been Interim Drinking Water Quality Program Manager of the California Bay-Delta Authority, which is working to improve the quality and reliability of California's water supplies and revive the San Francisco Bay-Delta ecosystem. As Program Manager, he is responsible for developing a multi-year program plan and for coordinating the grant funding process with the State Water Resources Control Board. Prior, Harader was a Staff Environmental Scientist for the CALFED Bay-Delta Program, where he oversaw and coordinated drinking water quality and ecosystem water quality actions with agencies, stakeholder groups, and other CALFED programs. Harader received a B.S. in Biology from California State University Hayward and an M.S. in Natural Resources Management from Humboldt State University. Harader has more than 20 years experience in water quality protection, including industrial wastewater control and groundwater remediation.

Slawomir W. Hermanowicz, Ph.D.

*Associate Professor, Department of Civil and Environmental Engineering
University of California, Berkeley*

Slav Hermanowicz has taught civil and environmental courses – including water chemistry, wastewater treatment, and water pollution control – at the University of California, Berkeley, since 1983. His research interests include biological activities in engineered aquatic systems, biofilms, biostability of drinking water, and disinfection and disinfection contactors, among others. Prior to joining the University, Hermanowicz was a Senior Research Associate and Instructor at the Institute of Water Supply and Hydraulic Constructions of the Warsaw Technical University, where he conducted research on the kinetics of fixed film biological reactors. Hermanowicz received an M.S. in Environmental Engineering from Warsaw Technical University and a Ph.D. in Environmental Engineering from the University of Toronto.

Lisa M. Holm

*Associate Water Resources Specialist
Contra Costa Water District*

For the past 3 years, Lisa Holm has worked for the Contra Costa Water District (CCWD), which provides drinking water to 450,000 people in central and eastern Contra Costa County in Northern California. As Associate Water Resources Specialist for the District, she is responsible for a variety of tasks centering around water rights, water quality, and water regulations. Some of these tasks include preparing water rights exhibits and testimony, supporting statewide and local water system modeling efforts, and supporting CALFED projects. She is also an Alternate on the CALFED Bay-Delta Public Advisory Committee's Ecosystem Restoration Subcommittee, and provides support to the Co-chair of the Drinking Water Quality Subcommittee. Holm received a B.S. in Mechanical Engineering from Worcester Polytechnic Institute and an M.Eng. in Civil Engineering from the University of California, Berkeley.

Robert H. Hultquist, P.E.

*Chief, Drinking Water Technical Operations Section
California Department of Health Services*

Bob Hultquist has over 30 years experience in drinking water, wastewater, and reclaimed water quality and treatment, serving as a public health engineer with the California Department of Health Services (DHS) Drinking Water Program and, previously, with an engineering consulting firm and a California water utility. As Chief of the Drinking Water Technical Operations Section for DHS, he is responsible for the programs that develop drinking water standards and water reuse criteria, certify water treatment plant operators, evaluate water and wastewater treatment technologies, and manage the Drinking Water Treatment and Research Fund to address fuel oxygenate contamination of water supplies, among others. Hultquist received a B.S. in Civil Engineering from San Diego State College and an M.S. in Sanitary Engineering from the University of California, Berkeley. He is a registered civil engineer in California.

Karen L. Larsen*Environmental Scientist**Central Valley Regional Water Quality Control Board*

Karen Larsen has worked for the Central Valley Regional Water Quality Control Board in Sacramento, California, since 1999. Among her responsibilities as an Environmental Scientist, she oversees drinking water quality issues, specifically in developing a policy to protect source waters in the Central Valley and in coordinating with other Bay-Delta Authority implementing agencies on the drinking water quality program. She also manages toxicity monitoring and provides technical support to local watershed advocacy groups. Prior to joining Central Valley, she was a post-graduate researcher at the Aquatic Toxicology Laboratory at the University of California, Davis, where she developed and implemented a laboratory quality assurance program, including laboratory certification. Larsen received a B.S. in Biology from the University of California, Davis.

Ellen R. Levin*Senior Water Resources and Policy Analyst**City and County of San Francisco Public Utilities Commission*

Ellen Levin is a Senior Water Resources and Policy Analyst for the City and County of San Francisco Public Utilities Commission (SFPUC), which provides water, wastewater, and municipal power services to San Francisco. As Senior Water Resources and Policy Analyst, Levin's primary function is to represent San Francisco's interests in regional, state, and federal water policy-making forums and to provide water resource management expertise to SFPUC water supply planning efforts. She also participates in CALFED forums, Bay-Delta technical advisory committees, and various groups involved in Bay-Delta issues. Prior to joining the SFPUC, she worked for various environmental consulting firms, providing environmental resource management and regulatory compliance expertise to cities, counties, and federal agencies. Levin received a B.S. in Conservation and Resource Studies from the University of California, Berkeley, and an M.S. in Land Resources Program from the University of Wisconsin at Madison.

Kris P. Lindstrom, MPH, REHS*President**K.P. Lindstrom, Inc.*

Kris Lindstrom has 32 years of experience in the fields of water quality and environmental health planning as well as environmental impact assessment. He is a Registered Environmental Health Specialist in California, and he has prepared numerous environmental studies, facilities plans, and technical reports with public agencies and regulatory agencies. Since 1978, he has been president of his own firm, K.P. Lindstrom, Inc., which provides consulting services to agencies responsible for managing water and wastewater. Clients include many water and wastewater districts in California. In addition, he serves as an elected Director of the Monterey Peninsula Water Management District, which serves the greater Monterey area on the central coast of California. Lindstrom received a B.S. in Biological Sciences from the University of California, Irvine, an M.P.H. in Environmental Health Sciences from the University of California, Berkeley, and an M.S. in Ecology from the University of California, Davis.

Bruce A. Macler, Ph.D.

*National Microbial Risk Assessment Expert
United States Environmental Protection Agency*

Bruce Macler has provided toxicology and risk assessment expertise on environmental water issues for the U.S. Environmental Protection Agency (USEPA) since 1989. He manages regulatory workgroups and an extensive research program on drinking-water treatment, and is involved in public outreach and communication. Prior to joining the USEPA, he held academic and research positions at NASA, the University of California, Berkeley, and State University of New York at Stonybrook. Macler has authored more than 90 articles and research publications on biotechnology, microbial risk assessment, and drinking-water regulations, and teaches and lectures widely. His recent honors include the USEPA's Regional Administrator's Award (2000) and Bronze Medal (2000) as well as the George A. Elliott Award from the American Water Works Association (2000). Macler received both a B.A. and Ph.D. in Biochemistry from the University of California, Berkeley.

William R. Mills, Jr.

*Consultant
William Mills and Associates*

Bill Mills recently retired as General Manager of the Orange County Water District, where he was responsible for developing a long-range plan aimed at decreasing the District's dependence on imported supplies and improving the quality of surface and groundwater supplies. Currently, he maintains an active consultancy, William Mills and Associates, and serves as Chair of the Association of Groundwater Agencies, as well as Chair of Association of California's Water Agency's Water Quality Committee. He was also elected to the Board of Directors for the Yorba Linda Water District in 2002. Among his honors, Mills was awarded for Leadership in Engineering, Water Resources (1999) from the Institute for the Advancement of Engineering and the Presidential Award for Distinguished Service (1996) from the American Desalting Association. Mills is a graduate Geological Engineer from the Colorado School of Mines and has an M.S. degree in Civil/Environmental Engineering from Loyola University.

Jean E. Moran, Ph.D.

*Geochemist
Isotopic Tracers and Transport Group, Analytical and Nuclear Chemistry Division
Lawrence Livermore National Laboratory*

Jean Moran has broad expertise in physics, geology, and hydrology and is the author of over 50 publications. For the past 5 years, she has been a researcher in the Isotopic Tracers and Transport group at Lawrence Livermore National Laboratory in Livermore, California. Her research has focused on using natural and artificial isotopes to examine geochemical and transport processes in the vadose zone and in groundwater. Currently, she is co-principal investigator on the Ambient Groundwater Monitoring and Assessment project sponsored by the California State Water Resources Control Board. Moran received B.S. in Geology and B.A. in Physics from the University of Rochester, an M.S. in Geophysics from the University of Washington, and a Ph.D. in Geochemistry from the University of Rochester.

Pankaj Parekh, D.Env

Director, Water Quality Compliance

Los Angeles Department of Water and Power

Pankaj Parekh has worked for the Los Angeles Department of Water and Power since 1985. As Director of Drinking Water Quality, he is responsible for monitoring and securing compliance with federal and state drinking water and wastewater permits and standards. Prior, he was the co-leader of a delegation sent to Liberia on behalf of the U.S. Agency for International Development to assess the nation's health sector and provide recommendations on future bilateral aid programs. Currently, Parekh chairs a multi-agency task force to address emerging issues related to consumer tap water safety in public water supplies. He also heads a team of engineers and scientists who engage in research studies and manage emerging issues that surround the provision of safe water. Parekh received a B.S. and Master's degree in Public Health as well as a Doctorate in Environmental Science and Engineering from the University of California, Los Angeles.

Ruben R. Robles, P.E.

Senior Civil Engineer

Sacramento Regional County Sanitation District

Ruben Robles has worked 12 years for the Sacramento Regional County Sanitation District (District), a public agency that provides wastewater treatment services for the greater Sacramento area in Northern California. Currently, he is a Senior Civil Engineer, where he is responsible for managing the District's biosolids, water recycling, and asset management programs. He also specializes in wastewater and solid waste; include facility design, policy and planning, and operations supervision, and has experience as a surveyor, in materials testing, and in construction inspection. Robles received a B.S. in Civil Engineering, M.S. in Environmental Engineering, and a Masters in Business Administration from California State University Sacramento. He is a registered civil engineer in California.

Karen Schwinn

Associate Director, Water Division

United States Environmental Protection Agency, Region 9

Karen Schwinn began her career at the U.S. Environmental Protection Agency (USEPA) with Region 9 in late 1980. She worked in the solid and hazardous waste programs for 14 years. Since 1994, she has served as a Deputy Director in the Water Division, focusing on Northern and Central Californian issues. Since 1997, she has represented USEPA as a Commissioner on the San Francisco Bay Conservation and Development Commission and as USEPA's representative to CALFED's Management Team. She also serves on the Board of Directors for the San Francisco Estuary Institute. Schwinn received a B.S. from Cook College of Rutgers University in New Jersey.

Lynda A. Smith*Environmental Specialist**Metropolitan Water District of Southern California*

Lynda Smith is an Environmental Specialist with the Metropolitan Water District of Southern California, which is a consortium of 26 cities and water districts that provides drinking water to nearly 18-million people in parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino and Ventura counties. Smith has worked for Metropolitan since 1990 in both the Water Quality and Water Resource Management groups. Currently, she focuses her work on Bay-Delta water quality issues and the development of strategies to achieve source water quality improvement objectives for State Water Project supplies. Smith received a B.A. in Biology from the University of California, Los Angeles, an M.S. in Zoology from the University of South Florida, and completed additional graduate studies in Environmental Science and Engineering at the University of California, Los Angeles.

Frances Spivy-Weber*Executive Director, Policy**Mono Lake Committee*

Frances Spivy-Weber has over 25 years experience in environmental public policy work with a wide range of environmental issues (water, wildlife, land use, oceans and coasts, and forests). Since 1997, she has been Executive Director of Policy for the Mono Lake Committee, which is a non-profit citizen's group dedicated to protecting and restoring the Mono Basin ecosystem. Prior to joining the Mono Lake Committee, she was the International Program Director of the National Audubon Society in Washington, DC. Spivy-Weber received a B.A. in Political Science from the University of Texas, a B.A. in Biology from San Francisco State University, and an M.A. in Advanced International Studies from The Johns Hopkins University. Spivy-Weber serves on the Bay-Delta Public Advisory Committee and is co-chair of the CalFed Water Use Efficiency Sub-Committee.

Michael Stanley-Jones*California Director**Clean Water Action & Clean Water Fund*

Michael Stanley-Jones joined Clean Water Action & Clean Water Fund as California State Director in March 2003, following 5 years of service with Silicon Valley Toxics Coalition as Manager of the Sustainable Water Program. He is active in California environmental affairs, serving on the Board of Directors of Friends of the San Francisco Estuary, the Silicon Valley Environmental Partnership, and the Silicon Valley Pollution Prevention Center. In addition, Stanley-Jones is a founding member of the Environmental Justice Coalition for Water and currently represents this organization on subcommittees of the California Bay Delta Authority Public Advisory Committee dealing with Water Use Efficiency and Drinking Water Quality. Stanley-Jones received a B.A. in Government from San Jose State University and an M.A. in Political Science from The Claremont Graduate School. His current research addresses California water policy, watershed management, and public right-to-know initiatives.

R. Scott Summers, Ph.D.

*Professor, Civil, Environmental and Architectural Engineering
University of Colorado, Boulder*

Scott Summers has been a professor of environmental engineering at the University of Colorado since 1998. His areas of expertise is drinking water quality, treatment and modeling, with special interest in natural organic matter, DBPs, and taste and odor as related to activated carbon, filtration, membrane processes, coagulation, biological treatment, disinfectant behavior, and distribution systems. Prior to joining the University, Summers spent 2 years as a research associate at the German water works research (DVGW) institute at the University of Karlsruhe, 10 years as a professor at the University of Cincinnati, and was a visiting Fulbright Professor at the University of Crete. He has co-authored over 150 publications and 100 presentations, and has served as a consultant on over 40 treatment studies for drinking water utilities. Summers received a B.S. in Civil Engineering and M.S. in Environmental Engineering from the University of Cincinnati and a Ph.D. in Environmental Engineering and Science from Stanford University.

Douglas I. Wallace

*Environmental Affairs Officer
East Bay Municipal Utility District*

Since 1996, Doug Wallace has served as the Environmental Affairs Officer for the East Bay Municipal Utility District, which supplies water and provides wastewater treatment for parts of Alameda and Contra Costa counties on the eastern side of San Francisco Bay. As Environmental Affairs Officer, he has been active in the development of the CALFED Bay-Delta Program, as well as a variety of collaborative efforts with numerous stakeholders in the water user and environmental communities. For several years, Wallace has operated his own business in mediation, dispute resolution training, and consulting in public participation. He has also served as the Director of the Regulatory Task Force for the Massachusetts Department of Environmental Protection, and was a Peace Corps Volunteer in Niger, West Africa. Wallace received a B.S. in Environmental Sciences from Yale University and an MPA from Harvard University.

Walter Ward

*Assistant General Manager of Water Operations
Modesto Irrigation District*

Since 1996, Walter Ward has served as the Assistant General Manager of Water Operations at the Modesto Irrigation District (MID), which is a multi-purpose utility supplying electricity, irrigation, and domestic water to residents and businesses in California's Central Valley. Ward manages the departments of irrigation services, drinking water, and water rights for MID. Prior to joining MID, he was a Supervising Professional with the South Florida Water Management District in West Palm Beach, Florida. In addition, he has held various water resources management and professional positions for more than 20 years, working primarily in the areas of urban and agricultural water supply in both the private and public sector water industries. Ward received a B.A. in Geological Sciences from the University of California, Santa Barbara, and attended graduate school at the University of Wyoming, specializing in ground water resources.

Leah Wills*Research Associate**Forest Community Research*

Leah Wills is a Research Associate for Forest Community Research, a non-profit organization advancing community well being and community-based approaches to ecosystem management. As Research Associate, she works on water and water-related issues, including rural water rights protection and source water quality improvement, and on securing investment into the "areas of (water) origin" for land and water stewardship. She is the author a number of publications where her research has focused on the environmental, economic, and socio-political connections between forests and water. In addition, she serves on numerous committees, including the State Water Resources Control Board's Public Advisory Group, CALFED's Drinking Water Subcommittee, and an advisory subcommittee for the CALFED Bay-Delta Watershed Restoration Program. Wills received an M.A. in Rural Development from California State University, Chico.

Richard Woodard*Principal**Woodard Water Quality Consultants*

Rick Woodard is the Principal of Richard Woodard Water Quality Consultants, a private consulting firm specializing in drinking water quality. Prior to entering private practice, Woodard joined the California Department of Water Resources in 1972, working in the field of water quality. By 1996, he was Chief of the Water Quality Assessment Branch, which included management of the Municipal Water Quality Investigations Program, a drinking water quality assessment program in the Sacramento-San Joaquin Delta. From 1996 to 1999, he was Manager of the CALFED Water Quality Program and Assistant Director of the CALFED Program. He subsequently entered into private consultant practice, and is presently representing the State Water Contractors, which is composed of numerous agencies that have contracts with the Department of Water Resources to supply water through the State Water Project. Woodard received a B.S. in Biology from San Fernando Valley State College.

Marguerite Young*Consultant**Clean Water Action and Clean Water Fund*

Since January 2003, Marguerite Young has been Consultant to the Clean Water Action and Clean Water Fund, which are two organizations that collaborate to promote public and community involvement with water-related issues. As Consultant, she represents the Clean Water Action and Clean Water Fund on Bay-Delta issues and provides advice and consultation on water quality issues, program direction, and development. Prior to joining the Clean Water Action and Clean Water Fund in 1997, Young was a Regional Supervisor for the Clean Water Action and Citizen's Campaign, Inc., and a Field Canvass Director for the California League of Conservation Voters. Among her many appointments, she is a committee member of the Bay-Delta Public Advisory Committee, which helps guide the restoration of the San Francisco Bay and Sacramento-San Joaquin Delta. Young received a B.S. in Political Economy of Natural Resources from the University of California, Berkeley.

Thomas M. Zuckerman
Co-Counsel
Central Delta Water Agency

Tom Zuckerman is an expert on California Water Law, with special emphasis in the area of the Stockton/Sacramento Delta and related issues. In 1988, he retired from the active practice of law and now serves on several corporate boards. Currently, he serves as Co-counsel on the Central Delta Water Agency, which was organized in 1973 to protect the water supply of the lands within the County of San Joaquin, California, against intrusion of ocean salinity and to assure a dependable supply of water. Zuckerman was a founder and director of Matlock Charles Rowe & Company, an investment bank with emphasis on agribusiness. He also organized the Zuckerman & Hartmann law firm in Stockton, California, which merged with the San Francisco-based law firm, Feldman, Waldman & Kline, where he was a senior partner. Zuckerman received a B.A. in American Studies from Amherst College and a J.D. from the University of California, Berkeley (Boalt Hall).

APPENDIX D

PARTICIPANTS ADDRESS LIST

Elaine Archibald
Partner
Archibald & Wallberg Consultants
California Urban Water Agencies
1604 Potrero Way
Sacramento, CA 95822
916-736-3713
916-736-3714 Fax
awconsult@aol.com

Lynn Barris
Owner
Barris Farms
Butte Environmental Council
2830 House Avenue
Durham, CA 95938
530-893-5243
lbarris@lbarris.com

Richard Breuer
Chief
Municipal Water Quality
Investigation Program
California Department of Water Resources
901 P Street
Sacramento, CA 95814
916-651-9687
916-651-9653 Fax
Rich@water.ca.gov

Harvey F. Collins, PhD., P.E.
Environmental Engineer Consultant
8685 River Road
Sacramento, CA 95832
916-665-1818
916-665-2898 Fax
Hcoll27156@aol.com

Phillipe A. Daniel, P.E.
Vice President
Camp Dresser & McKee, Inc.
One Walnut Creek Center
100 Pringle Ave. Ste. 300
Walnut Creek, CA 94596
925-933-2900
danielpa@cdm.com

Martha Davis
Manager for
Policy Development
Inland Empire Utilities Agency
607 S. Kimball Ave.
Chino, CA 91710
909-993-1742
909-606-7320 Fax
mdavis@ieua.org

Sargeant J. Green
General Manager
Tranquillity Irrigation District
25390 W. Silveira Street
Tranquillity, CA 93668
558-698-7225
558-698-5105 Fax
sarge@trgid.org

Joe Grindstaff
General Manager
Santa Ana Watershed
Project Authority
11615 Sterling Avenue
Riverside, CA 92503
909-354-4229
909-785-7076 Fax
jgrindstaff@sawpa.org

Sam Harader
Interim Drinking Water Quality
Program Manager
California Bay - Delta Authority
650 Capitol Mall, 5th Floor
Sacramento, CA 95814
916-445-5466
sharader@calwater.ca.gov

Slawomir W. Hermanowicz, PhD
Associate Professor
Department of Civil & Environmental
Engineering
University of California, Berkeley
4605 Setting Sun Drive
El Sobrante, CA 94803
510-642-0151
Hermanowicz@ce.berkeley.edu

Lisa M. Holm
Associate Water Resources Specialist
Contra Costa Water District
1331 Concord Avenue
Concord, CA 94524
925-688-8100
925-688-2187 Fax
lholtm@ccwater.com

Robert H. Hultquist, P.E.
Chief
Drinking Water Technical
Operations Section
California Department of Health Services
601 N. 7th Street, MS-92
Sacramento, CA 94234
916-353-6111
916-323-1382 Fax
bhultquist@dhs.ca.gov

Karen L. Larsen
Environmental Scientist
Central Valley Regional
Water Quality Control Board
3443 Routier Rd. Ste. A
Sacramento, CA 95827
916-255-0746
916-255-0752 Fax
larsenk@rb5s.swrcb.ca.gov

Ellen R. Levin
Senior Water Resources and Policy Analyst
City and County of San Francisco Public
Utilities Commission
1145 Market Street Suite. # 401
San Francisco, CA 94103
ELEVIN@SFWATER.ORG

Kris P. Lindstrom, MPH, REHS
President
K. P. Lindstrom, Inc.
729 Bay View Avenue
Pacific Grove, CA 93950
831-372-5989
831-372-6168 Fax
kplinc@redshift.com

Bruce A. Macler, PhD
National Microbial Risk Assessment Expert
United States Environmental Protection
Agency
75 Hawthorne Street (Wtr-6)
San Francisco, CA 94105
415-972-3569
415-647-3549
Macler.Bruce@epamail.epa.gov

William R. Mills, Jr.
Consultant
William Mills and Associates
5141 Siesta Lane
Yorba Linda, CA 92866
714-577-1194
714-961-8041 Fax
wrmills@sbcglobal.net

Jean E. Moran, PhD
Geochemist
Isotopic Tracers and Transport Group,
Analytical and Nuclear Chemistry Division
Lawrence Livermore National Laboratory
7000 East Avenue
L-231
Livermore, CA 94550
925-423-1478
925-422-3160 Fax
moran10@linl.gov

Pankaj Parekh, D. Env
Director
Water Quality Compliance
Los Angeles Department of Water & Power
111 N. Hope Street Room 1213
Los Angeles, CA 90051
213-367-3191
213-367-3630 Fax
PankajParekh@water.ladwp.com

Ruben R. Robles P.E.
Senior Civil Engineer
Sacramento Regional County Sanitation
District
10545 Armstrong Avenue # 101
Mather, CA 95655
916-876-6119
916-876-6160 Fax
roblesr@saccounty.net

Karen Schwinn
Associate Director
Water Division United States
Environmental Protection Agency Region 9
75 Hawthorne Street (Wtr-1)
San Francisco, CA 94105
415-972-3472
415-947-3537 Fax
Schinn.Karen@epamail.epa.gov

Lynda A. Smith
Environmental Specialist
Metropolitan Water District of
Southern California
1121 L. Street Ste. # 900
Sacramento, CA 95814
916-650-2632
916-650-2625 Fax
Lsmith@mwdh2o.com

Frances Spivy-Weber
Executive Director, Policy
Mono Lake Committee
228 ½ So. Juanita Ave.
Redondo Beach, CA 90277
310-316-0041
310-316-8509 Fax
frances@monolake.org

Michael Stanley - Jones
California Director
Clean Water Action & Clean Water Fund
814 Mission Street # 602
San Francisco, CA 94103
415-369-9160
415-369-9180 Fax
msjones@cleanwater.org

R. Scott Summers PhD
Professor
Civil Environmental and Architectural
Engineering
University of Colorado, Boulder
Department – CB428
Boulder, CO 80309
303-492-6644
R.Summers@colorado.edu

Douglas I. Wallace
Environmental Affairs Officer
East Bay Municipal Utility District
375 11th Street # 808
Oakland, CA 94607
510-287-1370
510-287-0778 Fax

Walter Ward
Assistant General Manager of
Water Operations
Modesto Irrigations District
1231 11th Street
Modesto, CA 95354
209-526-7459
209-526-7352 Fax
walterw@mid.org

Leah Wills
Research Associate
Forest Community Research
4438 Main Street
Taylorsville, CA 95983
503-284-1022
Lwills@fcresearch.org

Richard Woodard
Principal
Woodard Water Quality Consultants
2168 SE Portola Drive
Grants Pass, OR 97526
541-956-8524
541-956-8669 Fax
rpwoodard@charter.net

Marguerite Young
Consultant
Clean Water Action & Clean Water Fund
366 50th Street
Oakland, CA 94609
510-568-2500
510-568-3652 Fax
myoung@cleanwater.org

Thomas M. Zuckerman
Co-Counsel
Central Delta Water Authority
2200 W. Forest Lake Road
Acampo, CA 95220
209-745-5537
209-745-4792 Fax
tmz@talavera.us

WORKSHOP STAFF

Brian J. Brady
Brian J. Brady & Associates
19712 MacArthur Blvd.
Suite 120
Irvine, CA 92612
949-752-1352
949-752-8922
bjbassociates@sbcglobal.net

Tifanie Cole
Teresea Colomac
Margaret Ridgway
Word Processors
Appleone Employment Services
16371 Beach Blvd.
Huntington Beach, CA 92647

Barbara Close
Graphics
16148 Orsa Drive
La Mirada, CA 90638
714-522-3084
714-523-4201 Fax
BarbiCL@aol.com

Patricia Linsky
Editor
476 Esther Street
Costa Mesa, CA 92627
949-650-3431
949-650-3681 Fax
rblinsky@earthlink.net

Ronald B. Linsky
Executive Director
National Water Research Institute
10500 Ellis Avenue
Fountain Valley, CA 92708
(714) 378-3278
(714) 378-3375 Fax
Rlinsky@nwri-usa.org

Gina Melin
Editor
National Water Research Institute
10500 Ellis Avenue
Fountain Valley, CA 92708
(714) 378-3278
(714) 378-3375 Fax
Gmelin@nwri-usa.org

Jesse Rosas
Graphics Assistant
Appleone Employment Services
16371 Beach Blvd.
Huntington Beach, CA 92647

Tammy Russo
Administrative Assistant/
Workshop Coordinator
National Water Research Institute
10500 Ellis Avenue
Fountain Valley, CA 92708
(714) 378-3278
(714) 378-3375 Fax
Trusso@nwri-usa.org

Teresa Taylor
Photographer
T. Taylor Photography
23010 Lake Forest Dr. Ste. D-401
Laguna Hills, CA 92653
949-461-0606
949-461-0688 Fax
www.ttaylorphoto.com

APPENDIX E

WORKING GROUPS' VISUAL PRESENTATION



Working Group 3

Power Point Presentations

Impact of Population Growth and Various Land Use Practices on Water Quality



Elaine Archibald
Harvey Collins
Rich Breuer

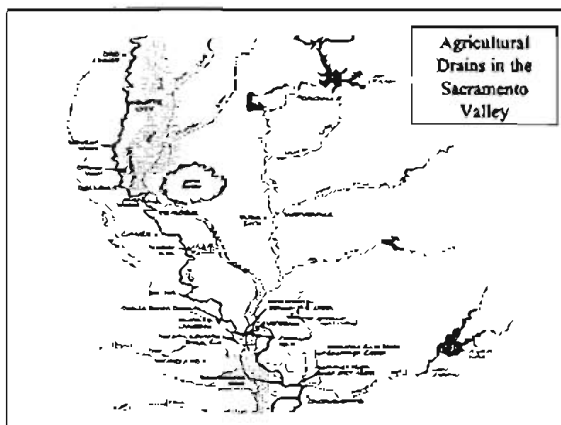
Issue Description

- Many Sources of Contaminants
- Point and Non-Point Sources
- Urban Growth
- Proposed CALFED Activities

SPECIFIC PARAMETERS OF CONCERN FOR DELTA DRINKING WATER QUALITY

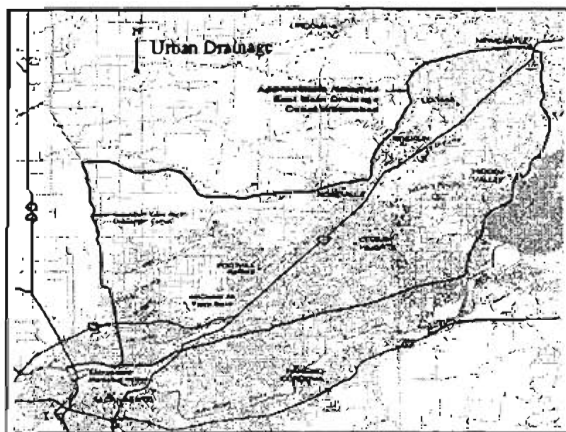
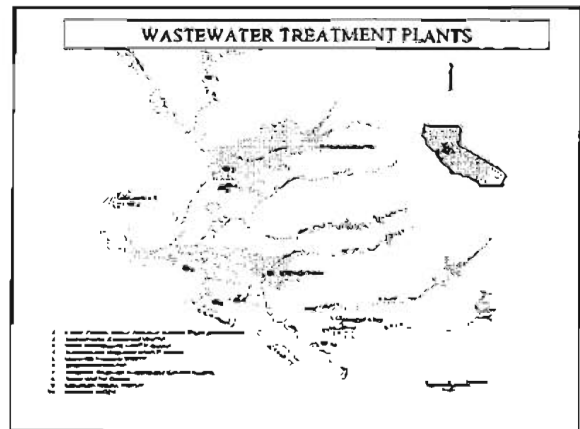
Monitoring Parameter	Significance to Drinking Water Quality
TOC (DBP precursor)	Formation of disinfection byproducts
Bromide (DBP precursor)	Formation of brominated disinfection byproducts
Pathogenic organisms	Waterborne diseases
Chemical contaminants	Regulated drinking water quality constituents
TDS or salinity	Taste and odor problems (salty taste), corrosion of infrastructure and appliances, impacts on wastewater reclamation programs, groundwater conjunctive use programs, and blending projects
Nutrients	Taste and odor problems (algae - geosmin and 2-methylisoborneol), impacts on filtration (algae)
Turbidity	Appearance problems, impacts on filtration & disinfection

AGRICULTURAL DRAINS IN THE DELTA



State Water Project Watershed Sanitary Survey Update 2001

*“Urban Runoff is Increasing in the
Delta Watersheds, including at
sources Close to Drinking Water
Diversions”*



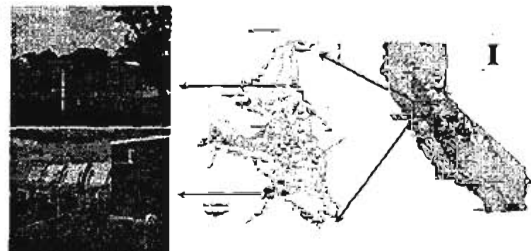
Proposed Approach

*Monitoring and Assessment
Management Practices
Drinking Water Policy
Equitable Regulations*

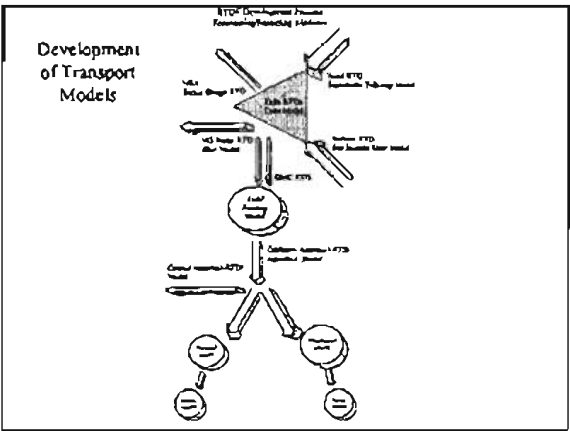
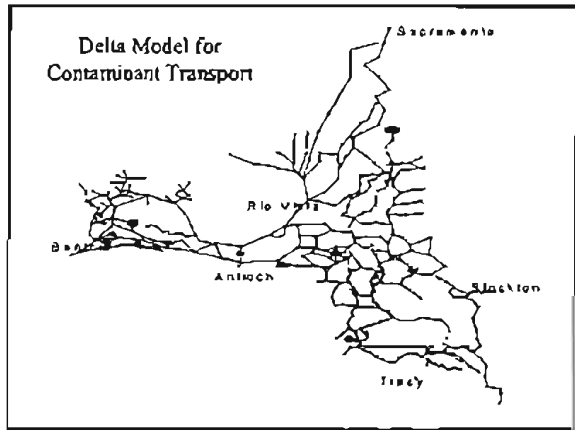
Monitoring and Assessment

*Real-time monitoring
Loading analysis
Model development
USGS and DWR*

Real Time Monitoring of Carbon



The diagram illustrates the Real-time Data System architecture. It shows a sequence of components connected by arrows: TOG Analyzer → Data Logger → Photo Monitor → PC → Database → Video Display Monitor. The Photo Monitor displays a bar chart with labels '5000' and '7000'. The PC is labeled 'PC'. The Database is labeled 'Database' and 'Query Data'. The Video Display Monitor is labeled 'Video Display Monitor'.



Identify Key Sources
Evaluate Cost Effective Practices
Monitor Effectiveness
RWQCB, DPR, RCDs

Drinking Water Policy

Basin Plan Amendment

Numeric or Narrative Objectives

*RWQCB, DHS, SWRCB, CALFED,
USEPA, CUWA, SRCSD*

Goal: Measurable Water Quality Benefits

Cost Effective and Equitable

Pollutant Trading Policy

RWQCB, dischargers, interested stakeholders

Budget Needs

*CALFED Drinking Water Program – initial
estimate - \$40 million per year*

Monitoring and Assessment - \$20 million

Management Practices - ???

Drinking Water Policy - \$2 million

Equitable Regulations - ???

Working Group 4

Power Point Presentations

**Identify a Common, Statewide Definition of
"Safe" Drinking Water
Suitable for Use as the CALFED Drinking
Water Quality Goal of
"Equivalent Level Health Protection"**

Macler
Parekh
Summers

Issue Description

Regions, cities, regulators – all have different expectations of what constitutes "safe" drinking water. For a statewide effort like CALFED, it is essential to have a singular expectation about a minimum protective level necessary for drinking water. It may not necessarily be regulatory based.

Issue Description

Currently, CALFED water quality goals in the Record of Decision include achieving source levels of 3 mg/l total organic carbon and 50 ug/L bromide, or an "equivalent level of health protection."

But organic carbon and bromide have no health consequences, per se. They are only precursors to disinfection byproducts of health concern, depending on treatment technologies used.

Issue Description

We need reasonable and agreed-upon health-based goals.

Some possibilities include

- no waterborne-disease outbreaks,
- compliance with drinking water regulations,
- total risks that are less than 1/10,000 excess disease

Importance

- Without specific public health goals, efforts can neither be prioritized, nor the results evaluated.
- This definition, which may change over time, will allow for the creation and evaluation of projects and policies to meet the goal.
- It must consider both SDWA and CWA public health goals, as well as other criteria and views of what constitutes "safe."
- A common denominator may also help evaluate whether a Bay-Delta solution is feasible or not to achieve that "safe" target.

Meeting / complying with this issue?

- In the CALFED Record of Decision, benchmarks of 3.0 mg/L total organic carbon and 50 ug/L for bromide were established based on treatment to achieve potential drinking water standards of
 - 5 ug/L for bromate,
 - 40 ug/L for total trihalomethanes and
 - 30 ug/L for haloacetic acids (HAA5).
- In interpreting equivalent level of health protection, a reasonable approach is to consider risks associated with these concentrations

Meeting / complying with this issue?

- Of the three, the level for bromate has the highest level of risk associated with it, at one additional cancer per 10,000 people exposed over a lifetime.
- Risks from TTHMs and HAA5 are more than an order of magnitude lower than this, so that bromate risk dominates.
- At the same time, the treatments considered were also designed to achieve *Cryptosporidium parvum* inactivation adequate to achieve no more than one additional infection per 10,000 exposed per year.

Meeting / complying with this issue?

- Therefore, we propose a plausible interpretation of equivalent level of public health protection for treated Delta water to be no more than
 - an aggregate total risk of 1/10,000 for lifetime cancer risk and
 - 1/10,000 for annual infection risk, regardless of contaminant.

Address, illuminate, refine and focus this criterion

- The Drinking Water Subcommittee will need to consider this recommendation.
- If it is suitable as a candidate, the larger public should have an opportunity to comment.



Working Group 5

Power Point Presentations

CALFED Drinking Water Quality – NGT Workshop

Issue Development Priority Issue #5

July 31, 2003

Ellen Levin, Ruben Robles, Rick Woodard

ISSUE:

Identify and Prioritize —
Through Appropriate Data Acquisition and
Science — the Most Significant Sources of
Degradation of Delta Water Quality

Issue Description

- Major sources of WQ degradation must be identified and quantified for cost-effective /equitably improvement of Delta WQ
- Includes quantifying contaminant inputs from manmade and natural, point/non-point sources
- Inefficient use of resources can lead to data gaps and redundancy

Importance of Issue

- Limited resources may be used ineffectively
- Difficult to make effective decisions
- Data provides basis to evaluate actions based on risk
- Pathogen data acquisition can allow for actions to protect the public from the most significant risk, microbial disease.
- Dissemination of data and information to stakeholders will assist in developing the necessary support

Proposed Approach

Develop Joint Powers Authority That
Secures the Involvement of Diverse
Stakeholders and The Environmental
Justice Community



Goal of JPA

To ensure that local, regional, and state decision
makers understand and use scientifically
sound data to make management decisions
that will result in improvements and
enhancements in the Bay-Delta System

Objectives of JPA

- Collect data on quality of waters in the Bay Delta system
- Coordinate work of JPA with other agencies/orgs.
- Interpret data collected by JPA and others
- Manage data to assure continued usefulness
- Develop/disseminate information about drinking WQ
- Carry out other programs of mutual interest
- Other tasks in support of collection, interpretation, management of data



JPA Participants

- Bay-Delta Authority
- SWRCB, RWQCB, DHS, DWR, USGS
- CUWA
- CASA
- SRCSB, Cities of Sacramento, Vacaville, Stockton
- State Water Contractors
- Delta Keeper & other environmental groups
- SRWP
- Farm Bureau / Agriculture
- North/Central/South Delta Water Agencies



JPA Timelines

- Short-term goals include development of baseline water quality
 - Data available from disparate sources, undertake process to collect data to establish baseline
 - Data gaps could exist
 - 1-2 year timeframe
- Longer-term goals
 - Fill in data gaps
 - Assess CALFED actions that have possible impacts on water quality
 - Develop priority list of impacts on Delta WQ
 - 2-5 year program

Budget

- Funding on the order of \$2-4 million/year for data acquisition & related work
- Potentially 50% funding provided by CALFED
- 50% funding provided by JPA members



Conclusions

- The importance of scientifically sound and complete data cannot be overstated
- This will allow for appropriate management decisions
- And for the most effective use of limited resources
- BUT – data collection is only a tool in support of developing programs to improve water quality
- Data collection should be focused and collected within reasonable periods of time



Working Group 6

Power Point Presentations

How Shall Regionally Developed Drinking Water Strategies Be Coordinated, Approved, and Funded, and By Whom?

Tom Zuckerman, Joe Grindstaff, and Jean Moran

THE PROBLEM

- Water quality solutions are workable at the regional level, but are not coordinated by state and federal agencies.
- Open questions are: Who decides how plans fit together and who gets funding?
- A single blueprint that brings regional plans together is needed.
- Participating agencies may not work well together (SWRCB — wears too many hats, DHS, EPA, and other federal).

ONE SOLUTION

- Should be provisional grant of authority by federal agency to state decision-making process (delegate first cut to state agencies).
- Tie process to regional planning.
- Let a state agency have decision-making authority or coordinate actions by state agencies.
- Develop a single process that supports regional solutions.
- Add a legislative “hammer” to motivate state agencies to work together (e.g., Machado’s

MORE SOLUTIONS

- Make regional strategies support CALFED goals.
- Local strategies that fit CALFED goals and do not add cost (e.g., let high TOC water go by, and add drought protection).
- Bay-Delta authority needs more “authority” (help fund regional activities, provide incentives to regions).
- Use a “carrot” to get the regions to develop plans.
- Traditional MWD role represents antithesis of holistic approach.
- REAL stakeholders should supply plan — a coordinated process will help stakeholders define and develop projects.
- Take integrated approach that moves beyond water quality (requires expertise from various state agencies).

CRITICAL ELEMENTS

- Within CALFED context, solutions may come from discrete regions.
- All parties know who will implement proposed solutions(s).
- A “drought-proof” system should be available within all regions (not dependent upon imports or short-term climate fluctuation).
- The evaluation process needs to assess the multiple benefits and different scales (local, regional, or statewide) of the benefits.
- Make data transfer between participating agencies seamless.
- Define solution area (SWP, USBR) e.g., put \$\$ into Colorado River salinity remediation, rather than Delta.
- May need to go outside traditional solution areas/sourced areas when it comes to drinking water quality issues.

Working Group 7

Power Point Presentations

A Risk Analysis Approach to Characterizing Alternatives for Meeting CALFED Water Quality Objectives

Phillippe Daniel
Robert Hultquist
Michael Stanley-Jones

1. Need for comprehensive systems approach

1996 SDWA: Alternative Standard Setting

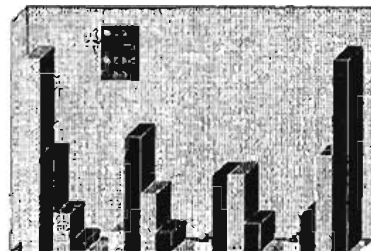
...the level or levels of treatment techniques shall minimize the overall risk of adverse health effects by balancing the risk from the contaminant and the risk from other contaminants the concentrations of which may be affected by the use of a treatment technique or process that would be employed to attain the maximum contaminant level or levels

Integrated Environmental Decision- Making (EPASAB, 2000)

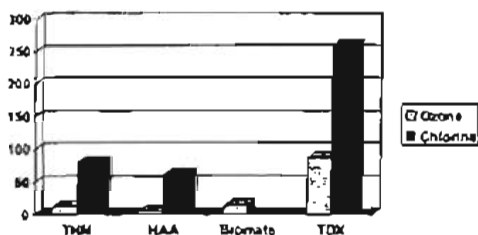
... there is a growing consensus, both within and outside the Agency, that a more integrated approach to environmental management is needed. Prioritizing and managing risks pollutant by pollutant...can be both inefficient at reducing the major burdens of environmental impacts on human health and ecosystems and costly in the face of today's shrinking budgets. Of still greater concern is the possibility that such a fragmented approach may cause us to overlook significant environmental problems while we busy ourselves with comparatively minor issues that contribute little to the overall protection of human health

2. Equivalent Level of Public Health Protection Must Consider Mixture Trade-offs

Bromide Concentration Impacts Mixture Composition



Technology Choice Impacts Mixture Composition

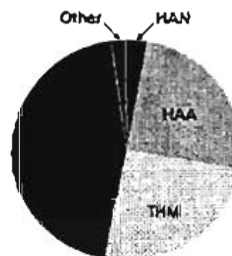


Other Constituents of Concern

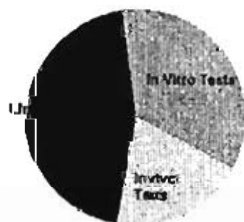
- Arsenic
- NDMA
- Perchlorate
- Plus
 - Endocrine disruptors
 - Viruses
 - etc

3. Incomplete Information on Mixture Health Effects

Chemical Characterization of Compounds Produced During Chlorination



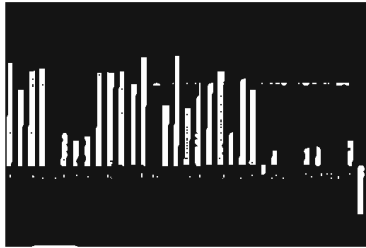
Toxicological Characterization of Known DBP Limited



4. Technology choice for influences other water quality constituents

Ratio of DBP Concentrations for Chlorine and Ozone (chloraminated)

The bar chart displays the ratio of DBP concentrations for Chlorine and Ozone (chloraminated) across 100 locations. The Y-axis, labeled 'Ratio', ranges from 0 to 1.0. The X-axis lists locations from 1 to 100. The ratios vary significantly, with some locations showing ratios near 1.0 (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100) and others showing ratios near 0.0 (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100).



5. Trade-offs exist

or

Need for total risk accounting

Need for total risk accounting

[illegible]

6. Challenge: How to craft an approach that reduces total drinking water risk...

Notion of Risk Index

- Sort by endpoint
 - Cancer
 - Non-cancer
 - Microbiological
- Basic premise
 - Each constituent has a potency factor
 - Multiplying by the actual concentration gives a risk
 - Summing across endpoints provides an index

- ## Tool for Benchmarking and Evaluation
-
1. Establish benchmark index for the 3.0 mg/l TOC and 50 ug/l bromide.
 2. Test technology alternatives against range of TOC and bromide to determine which combinations meet the benchmark index.
 3. Can use this to determine technology costs of dealing with source water quality targets greater than the ROD
 4. Compare this to proposed source protection measures

1. Establish benchmark index for the 3.0 mg/l TOC and 50 ug/l bromide.
2. Test technology alternatives against range of TOC and bromide to determine which combinations meet the benchmark index.
3. Can use this to determine technology costs of dealing with source water quality targets greater than the ROD
4. Compare this to proposed source protection measures

**7. Risk index approach must
be complemented by other
measurements**

Whole Mixture Assessment Tools

- Very developmental
- Range from medaka fish and the frog embryo teratogenesis assay-*Xenopus* (FETAX).
- Test batteries (i.e., arrays of in vitro tests akin to the Ames test for mutagenicity and others)
- Results most likely used to establish benchmarks and deviations from benchmark.

**Need to Hold Analysis Lightly –
Simply One More Tool to Shed Light
on a Difficult Issue**

Budget

- \$6M over 5 years



Working Group 8

Power Point Presentations

Sustainable Development Assessment


Methodology

Workteam

- **Sargeant Green**
 - Tranquility Irrigation District
- **Leah Wills**
 - Forest Community Research
- **Slav Hermanowicz**
 - University of California, Berkeley

Sustainability

- growing buzz around the word

 www.sfgate.com [Return to regular view](#)

Humanity is taking more than Earth can give
Researchers calculate the planet is ecologically overburdened
by 20 percent

San Francisco Chronicle
1 week ago, June 14, 2001
12000 San Francisco Chronicle

Sustainability

- growing buzz around the word

 www.sfgate.com [Return to regular view](#)

Humanity is taking more than Earth can give

Sustainable Development
A Dubious Solution in Search of a Problem

by Jerry Taylor
Cato Institute

Sustainability

- feeling in search of
a definition...

Sustainability

- "meet the needs of the present
generation without compromising
the ability of future generations to
meet their own needs"

Brundlandt Report, 1987

Sustainability

- "meet the needs of the present generation without compromising the ability of future generations to meet their own needs"

Brundlandt Report, 1987

- what does it mean?
- philosophical, ethical questions
 - individual rights
 - collective rights

Water Resources Development

- must be sustainable
 - economic
 - environmental
 - social
- water resources development is a long-term commitment of resources

Water Resources Development

- difficult to assess
 - conflicting impacts
 - uncertainty
 - time-value

Water Resources Development

- difficult to assess
 - conflicting impacts

Conflicting impacts

- larger residuals to be disposed vs. higher energy use

Water Resources Development

- difficult to assess
 - conflicting impacts
 - uncertainty

Uncertainty

- project boundary
- scientific
- environmental
- regulatory and institutional
- cultural and value-based
- economic

Water Resources Development

- difficult to assess
 - conflicting impacts
 - uncertainty
 - time-value

Time-Value

- Depending on the time frame of an analysis, certain actions or investments may appear more or less favorable.
- Certain benefits (or avoided impacts) could be discounted as the evaluation period is shortened.

Starting Point

- Life Cycle Analysis
 - quantitative assessment of project impacts
 - construction
 - operation
 - decommissioning
 - inventory of material and energy inputs and outputs

Follow-up

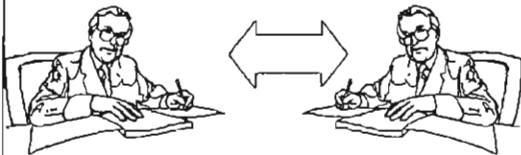
- economic
- environmental impacts
- social aspects

Physical Sustainability

- living within means
- cannot violate laws of nature
 - first and second law of thermodynamics
 - spontaneous irreversible processes
 - entropy increase

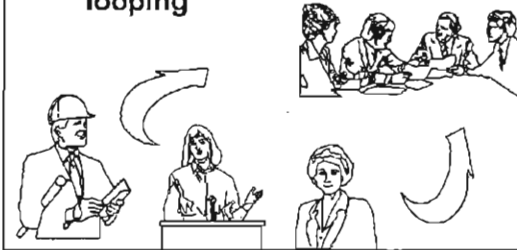
Process

- current back-and-forth process inadequate



New Methodology

- open assessment and learning "looping"



What Next?

- pilot project
 - objective: advance the methodology for sustainable development assessment
 - apply to real-life cases
 - water treatment residuals
 - effects of climate changes on water supply
 - source protection in ungaged watersheds

What Next?

- pilot project
 - scientists
 - social
 - political
 - natural
 - engineers
 - economists
 - agency decision-makers
 - public involvement professionals
 - community organizations

Budget

- \$200K per case



Working Group 9

Power Point Presentations

Source Water Quality

Maximizing the use of the basin planning process to integrate implementation of the Clean Water Act, Safe Drinking Water Act, Porter-Cologne, and the CALFED water quality program plan.

*Frances Spivy-Weber
Kris Lindstrom
Karen Larsen*

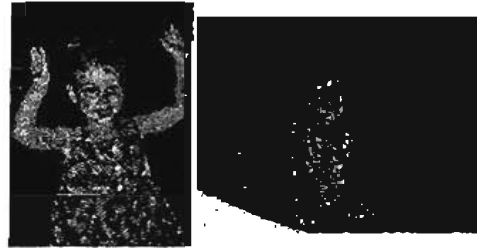
Issue

- DHS – Regulates Treated Drinking Water
- Regional Board – Regulates Surface/Source Water Quality
- Some overlap in these functions
- Coordination lacking – evident in basin plan

Importance

- ♦ Inefficiency & inadequate objectives
- ♦ Source water quality issues must be addressed in a comprehensive way

Importance



Recommendations

- Formally establish a well-funded working group
- Encourage coordinated and comprehensive approach to source water protection
- Prioritize basin planning activities

Budget

- \$500K
 - Supports 1st year of coordination between DHS and the Central Valley Regional Board
 - Additional funding necessary for sustaining efforts long-term & expanding to the other 8 Regional Boards