

**Drinking Water Papers
(Pertains to CALFED
Drinking Water Strategy)**

PROTECTING AND IMPROVING DRINKING WATER QUALITY

BACKGROUND

Delta waters are used to produce drinking water for approximately 22 million Californians – nearly two-thirds of the state’s residents. Urban water agencies divert source water at several points in the Delta, each with distinct water quality characteristics, to deliver to these customers. The safety of this drinking water is a function of both the source water quality and treatment to control contaminants.

What are the threats to the quality of that water? If inadequately treated, pathogens from fecal contamination (e.g., livestock operations, boating, swimming, runoff) make people sick. Disinfection by certain often-used technologies in the presence of bromide or organic carbon, which can be elevated during certain times of the year, can produce byproducts that are themselves toxic. Salinity and nutrients can compromise treatment and palatability of the finished drinking water. In addition, salinity can reduce opportunities for water recycling and blending and cause real economic impacts by corroding plumbing and industrial facilities.

While some water quality problems are common to all utilities, each has its own specific issues. Each of these utilities also has local sources (e.g., groundwater) that complement Delta supplies.

- The **Santa Clara Valley Water District** is connected to both the Federal (at San Luis Reservoir) and State projects (via the South Bay Aqueduct from Clifton Court). Algal problems associated with nutrients and low levels in San Luis Reservoir can be major water quality concerns in summer. In addition, high salinity can be a problem seasonally and during dry years, and when the Delta Cross Channel is closed.
- **Alameda and Zone 7** water agencies receive Delta water via the South Bay Aqueduct and have similar problems with water from Clifton Court as those noted above. Because of the short transit times, rapid water quality changes are common and difficult to control.
- For Solano County Water Agency and several other **North Bay users**, delta water is supplied through the North Bay Aqueduct. Water quality is impacted by high loads of total organic carbon and microbial pathogens from runoff near their Barker Slough intake.
- **Contra Costa Water District** diverts water from two intakes in the south Delta at Old River and Rock Slough. Nonpoint source pollution around those intakes can contribute to poor water quality, as can increased salinity and bromide seasonally and during low flow periods, and when the Delta Cross Channel is closed.
- The **Metropolitan Water District** and other southern California utilities obtain water from the Delta via the State project. MWD also receives highly saline Colorado River water which is then blended with Delta water. High levels of salinity are a major water quality problem for MWD, along with

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elevated levels of bromide and organic carbon, and degraded upstream source water quality. Because of their distance from the Delta and access to local storage, short-term water quality disturbances are often tempered by the time they reach MWD intakes. However, degradation can occur as water flows through the aqueduct on its way to those intakes.

- **San Francisco PUC and EBMUD** do not rely on the Delta at all, since they have direct access to sources of high quality Sierra water. EBMUD is also pursuing water from the American River.
- Other cities (e.g., Tracy) take water directly from the Delta and, because of the short transit times, rapid water quality changes are common and difficult to control.
- Runoff into aqueducts and terminal reservoirs can contribute additional nutrients and pathogens.

CALFED's drinking water quality objective is to continuously improve water quality that allows for municipal water suppliers to deliver safe, reliable and affordable drinking water. In order to address these water quality problems and achieve this goal, CALFED has identified a broad set of solution approaches, including source water blending, exchanges, new water-quality focused infrastructure, treatment, operational changes, and source water quality improvements.

KEY RECOMMENDATIONS

Listed below are the key elements of a comprehensive drinking water quality program and the policy issues associated with each proposed action.

- **Expand and endorse policy of continuous improvement of in-Delta water quality.**
- **Develop and implement a comprehensive Source Water Protection Strategy.**
- **Implement a comprehensive San Joaquin Valley drainage program.**
- **Invest in treatment-technology development of UV disinfection and membrane treatment.**
- **Control runoff into the California Aqueduct.**
- **Develop and implement the first phase of a Bay Area Water Quality strategy.**
- **Expand cross-valley interconnects to facilitate Sierra/Valley exchanges.**
- **Improve in-Delta and/or near-Delta storage capability for water quality benefits.**
- **Initiate evaluation of Hood/Mokelumne Diversion and Delta Cross Channel Operation.**

ATTACHMENT

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Expand and endorse policy statement of continuous improvement of in-Delta water quality.

Issue: In the Phase II Report, the agencies made a commitment to the continuous improvement of source water quality in the Delta. This statement should be expanded and reaffirmed to specify the means by which the CALFED program will ensure that water quality will be an equal consideration in operational decision-making.

Proposed Policy: Maintaining and improving in-Delta water quality is a necessary and important component of the Program. The CALFED Agencies will work collaboratively during and after Stage 1 to ensure the full recognition and protection of in-Delta water quality, through but not limited to, comprehensive protection for drinking water uses against excessive salinity levels, under the capabilities and implementation approaches of the Clean Water Act and its California implementation authorities. The CALFED Agencies will direct staff to conduct appropriate evaluations of all proposed CALFED actions to assure that the net impact on in-Delta water quality is consistent with the goal of continuous improvement of in-Delta water quality.

Develop and implement a comprehensive Source Water Protection Strategy.

Issue: The responsibility for drinking water protection in California is shared by DHS, the water boards, DWR, as well as many local agencies. USEPA sets national standards and provides funding and technical assistance. This fragmentation can result in confusion, duplication, gaps, and missed opportunities. For instance, although each agency has regulatory tools that can address drinking water problems, application of these tools has not been maximized to address drinking water problems. In addition, various agencies collect water quality data though there is no system-wide monitoring program or shared database. There is also no comprehensive effort to forecast future drinking water issues (as exists for water supply).

One area where this issue presents itself most clearly is in water project operations. Unless water quality considerations are comprehensively and effectively incorporated into the decision-making processes and substantive criteria for operating water supply and conveyance facilities, water quality can be put at risk.

Proposed Actions:

(1) Policy Development. The Central Valley RWQCB will establish a drinking water policy for the Delta and upstream tributaries. This policy will include the comprehensive designation of appropriate water bodies for drinking water uses, the establishment of water quality objectives for salinity and other drinking water constituents of concern, and the development of plans to control sources of established drinking water contaminants of concern. The CVRWQCB and SWRCB (because of its traditional role in establishing Delta standards and conditioning project water rights accordingly) would then evaluate, and where appropriate, determine whether additional protective measures are needed to protect those beneficial uses. For instance, the policy will allow the State

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to impose necessary requirements on dischargers, and will describe how the various tools, including water operations criteria, permits, TMDLs, local stewardship efforts, etc., will be used to achieve and maintain drinking water protection. Such a comprehensive water quality protection strategy will need to be a collaborative effort among several state and federal CALFED agencies, encompassing water quality data and regulatory tools as well as operational criteria.

(2) Monitoring and Assessment. A comprehensive monitoring and assessment program is needed to evaluate the contribution of pollutants from a variety of sources, including ag, wetland, and urban runoff, wastewater, and boating, and to prioritize pollutant reduction measures.

(3) Implementation. Following this monitoring and evaluation, appropriate actions will be identified to control these pollutants.

(4) Funding. Federal and State drinking water programs in the Bay-Delta region are currently funded through a variety of sources (e.g., CWA and SDWA State Revolving Funds, other Clean Water Act programs, state funds at DHS, DWR and Central Valley RWQCB). Competition for these limited funds is significant. As a result, there must be a clear commitment by the CALFED Agencies to direct some amount of existing funds toward the implementation of mutually agreed upon priority actions. Even so, since those funds will likely be insufficient to accomplish all Stage 1 actions, new appropriations are necessary.

Implement a comprehensive San Joaquin Valley drainage program.

Issue: While there is a drainage problem in the entire San Joaquin Valley, the immediate concern is how to deal with the increasing salt loads that are entering the San Joaquin River. The CALFED EIS/EIR identifies 37,000 acres adjacent to the San Joaquin River for retirement; however, the Federal agencies may end up securing significantly more land retirement through ongoing settlement discussions. However, land retirement alone will not solve the entire drainage problem.

Proposed Actions:

(1) Evaluation. Initiate an independent San Joaquin Valley Drainage Program to conduct a comprehensive evaluation of the drainage problem in the San Joaquin Valley including an analysis of potential solutions (e.g., on-farm and district source control measures, development of treatment technology, real-time management, implementation of projects such as the Grasslands Bypass Project Use Agreement, and land management/fallowing/retirement). This program will involve the CVRWQCB, DWR, USBR, San Joaquin Valley ag, wetland, municipal/county government, and out-of-basin drinking water interests.

(2) Implementation. Based on these evaluations, implement initial San Joaquin Valley Drainage Program actions, including appropriate monitoring.

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Invest in treatment-technology development of UV disinfection and desalinization

Issue: Treatment can overcome nearly all water quality limitations to yield safe drinking water. However, some technologies are currently expensive or have technical obstacles to overcome at very large scale. For example, UV disinfection is a promising prospect whose feasibility has been demonstrated through extensive field use but will require significant work to apply it at the very large scale needed by Delta utilities. Research and development to produce cost-effective methods for pathogen inactivation resulting in fewer byproducts or salinity control may be critical means of addressing or avoiding source water contamination problems. For example, UV disinfection minimizes concerns for bromide and organic carbon, since adverse byproducts are not produced. Desalinization, of brackish agricultural drainage (which presently drains into the San Joaquin River) could provide higher-quality source waters. Even a modest reduction in salinity levels can yield real water quality gains for the public and economic benefits for suppliers. For example, MWD estimates that a 100 mg/L reduction in salinity could result in savings of \$95 million.

Proposed Actions:

(1) UV Disinfection. Implement a demonstration project to design and operate an open-channel UV disinfection plant at 5-10 mgd to treat Delta water.

(2) Desalinization. Implement demonstration projects to design and operate desalinization facilities for agricultural drainage on a local (i.e., site specific) and regional scale that would have both Delta and statewide significance. Emphasis should be on management of brines and waste streams on-site.

Control runoff into the California Aqueduct.

Issue: Much of the land surrounding the southern reaches of the California Aqueduct is used for agriculture and livestock grazing. A number of agricultural drains directly affect the aqueduct. Pump-in from groundwater programs during drought emergencies also can degrade water quality. In addition, the introduction of stormwater runoff that might be affected by agricultural and livestock operations and by soil erosion is a primary problem identified for the San Luis Canal section of the California Aqueduct (which runs from near Los Banos to near Kettleman City).

Proposed Action: Implement appropriate physical modifications and watershed management programs to control runoff into the California Aqueduct.

Develop and implement the first phase of a Bay Area Water Quality strategy.

Issue: As noted above, several Bay Area water agencies rely on the Delta as a water supply source, while others rely almost exclusively on direct high quality sources from the Sierra.

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In addition, some Bay Area utilities have not maximized the efficient use of their water through recycling or other means. At issue is how CALFED can provide access to higher quality water for more consumers throughout the Bay Area. The combination of available facilities and diverse high quality sources provides opportunities to turn individual utility vulnerabilities into area-wide strengths that can improve both water quality for agencies relying on the Delta and reliability for agencies with sources impacted by drought conditions. This strategy should include several types of projects, including exchanges, water use efficiency measures, and infrastructure improvements. While there may be local political and institutional obstacles to some actions, together they could substantially improve Bay Area water quality.

Proposed Action: Develop and implement a Bay Area urban water quality strategy during Stage 1, which will:

- Implement the initial phase of the **Bay Area Blending/Exchange** project, including evaluation of existing infrastructure and alternative changes in conveyance (e.g. San Luis Bypass) and storage.
- Ensure aggressive implementation of Bay Area utilities' **water use efficiency measures**.
- Implement the initial phase of the **Bay Area Regional Water Recycling Program**.
- Initiate feasibility studies to determine the costs and benefits of both (1) implementing **North Bay Aqueduct exchanges** with Lake Berryessa and (2) relocating the North Bay Aqueduct intake nearer to the Sacramento River.
- Implement actions that address problems of elevated salinity and other pollutants at **CCWD intakes** (Old River/Byron Tract; Rock Slough/Veale Tract).

Expand cross-valley interconnects to facilitate Sierra/Valley exchanges

Issue: Several southern California utilities rely on Delta water as a drinking water source. While they are able to treat the water to a level that is both safe and palatable, they continue to seek out alternative sources of higher quality water for their consumers. One such source is water from the Sierras. Much of that water is currently used to support agricultural operations in the San Joaquin Valley. With the expansion of cross-valley interconnects, there is an opportunity to facilitate the exchange of high quality water from the Sierras/Valley (e.g., Kings, Kern, San Joaquin) to urban users in southern California for Delta waters which are more suitable, untreated, for agricultural use. Such exchanges involve a number of political and operational issues to be resolved. In addition, appropriate limitations would be essential to assure that any diversion of flows out of the San Joaquin River for this purpose would not adversely impact the current cooperative effort to restore the San Joaquin River.

Proposed Action: Appropriate infrastructure improvements will be evaluated to facilitate Sierra/Valley water exchanges to address water quality concerns of municipal suppliers.

Improve in-Delta and/or near-Delta storage capability for water quality benefits.

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Issue: Programmatic evaluations prepared by the Integrated Storage Investigation (ISI) suggest that some new or expanded storage in or near the Delta could be operated to provide drinking water quality benefits. At this point, it appears that in-Delta and near-Delta storage may have the potential to achieve those benefits. These facilities could improve Bay Area water quality by facilitating the Bay Area Blending project and improving export water quality for South-of-Delta suppliers. The agencies need to decide whether or not ISI conclusions on the net benefits and costs of these facilities (e.g., economic and environmental) justify the initiation of further site-specific evaluations during Stage 1.

Proposed Actions: as per Preferred Program Alternative

Initiate evaluation of Hood/Mokelumne Diversion and Delta Cross Channel Operation.

Issue: The current Preferred Program Alternative (PPA) includes an evaluation of a screened diversion structure on the Sacramento River at Hood (up to 4,000 cfs) to improve water quality in the event the water quality program measures do not result in continuous improvement toward the CALFED drinking water goals. The PPA also sets up a series of conditions (e.g., regarding the need to resolve fish migration issues) that must be met before it could be built. There continues to be debate about whether or not the proposal could overcome the significant “fish hurdles” that CALFED has established for it. If not, some are concerned that CALFED would be left with a significant gap in its water quality program. The two key issues are: (1) ensuring that operational mitigation options for the proposed structure will be evaluated in Stage 1 and (2) identifying how the structure and process – for evaluating and deciding on the necessity for its water quality benefits and the adequacy of fish mitigation options – are set forth in the PPA.

Proposed Actions: as per Preferred Program Alternative