CONTRA COSTA WATER DISTRICT
Memorandum

DATE: August 23, 2002

TO: BDPAC Drinking Water Subcommittee

FROM: Greg Gartrell

SUBJECT: Draft Framework for a Policy on drinking water quality and CALFED Projects and Actions

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INTRODUCTION

As projects and actions move forward under the CALFED Program, it will be necessary as part of the environmental documentation and planning processes to identify project or action impacts or benefits to water quality. A CALFED commitment is for a continuous improvement in Delta water quality. While some projects or actions may degrade drinking water quality, others have the potential to improve conditions in this regard. The overall CALFED Program should result in an improvement. The purpose of this memorandum is to start the discussion on a recommended approach to determining how projects and actions that move forward can ensure they are not conflicting with meeting CALFED drinking water quality goals.

RECOMMENDATION

Review and comment on the draft policy framework on drinking water quality and CALFED Projects and Actions.

DISCUSSION

In some instances, it will be found that projects and actions under the CALFED program will adversely affect water quality (and in particular, will cause increases in constituents targeted for reduction as defined in the CALFED ROD) while providing benefits in other important areas. For example, increased conveyance or storage diversions may reduce Delta outflow, thereby increasing salinity intrusion; Delta barriers may change salinity levels in some parts of the Delta; creation of tidal wetlands may increase TOC levels and cause increased salinity intrusion; recycled water projects in the Delta or upstream of it may reduce flows while increasing concentration of pollutants in the remaining discharges; levee restoration projects may involve channel dredging which can impact turbidity or cause release of heavy metals in the sediment.

In some cases, the project or action itself may be able to provide mitigation measures to avoid or offset these impacts. In other cases, the project or action may have to rely in whole or in part on other parts of the CALFED Program to ensure water quality improvement goals are met.

For those projects and actions that result in an improvement in water quality (but do not have water quality improvements as a primary objective), then a credit may be available for an offset for those that degrade water quality and a linkage could be made. For example, some tidal restoration projects may result in reduced salinity intrusion; these projects could, if implemented with other projects or actions that might degrade water quality, result in a complete or partial offset. This too should be evaluated and identified during the planning process. In addition to alternatives (that would avoid impacts or result in water quality improvements) and mitigation measures (that would reduce impacts) for projects, CALFED should consider bundling projects for implementation to ensure water quality improvement goals are met.

A draft framework for a policy for dealing with these issues is presented here for discussion purposes. This draft policy framework is not intended to change or replace the existing legal requirements under CEQA and NEPA for review and identification of project impacts and mitigation for significant impacts. Rather, this draft policy framework is intended to guide CALFED planning and implementation to ensure the CALFED target of continuously improving Delta water quality for all uses is achieved. Eventually, such a policy can be used to help develop linkages and priorities, as appropriate, in the water quality strategic plan.

The draft policy framework is consistent with and complements the CALFED EIR/EIS, which discusses at length potential impacts to water quality from projects in other program elements (Chapter 5.3). Appended to this policy are excerpts from that document that provide further examples of potential significant adverse water quality impacts and possible mitigation strategies.

DRAFT POLICY FRAMEWORK

1. All projects or actions under CALFED should identify, as part of the planning process and as part of the CEQA/NEPA compliance process, water quality impacts and benefits of the project or action. . This should be a technical evaluation based on the best information available. This evaluation should include impacts of either a continuous or intermittent nature, the magnitude of the impacts, and the ultimate effect on Delta water quality and drinking water quality. For this policy, the primary constituents of concern are pathogens, organic carbon, bromide, salinity, nutrients, taste and odor, and turbidity. In some cases it may not be possible to evaluate water quality impacts due to a lack of information. In those cases, project implementation should include monitoring and adaptive management steps.
2. Where feasible, CALFED projects or actions should attempt to develop reasonable alternatives that still meet the project goals but that avoid drinking water quality degradation or improve water quality. For example, if, by altering the timing of water entering and leaving a wetlands project, seawater intrusion can be reduced rather than increased without affecting the project goals, that alternative should be considered.
3. The information on water quality impacts/benefits, mitigation measures incorporated into projects and potential alternatives for CALFED projects should be considered as part of the CALFED decision-making and implementation process for both the project and the program as a whole. CALFED should endeavor to bundle projects for implementation to ensure that the CALFED target of continuously improving Delta water quality for all uses is achieved.
4.
5. The water quality assessments of projects and actions should include the following:
    a) The spatial and temporal parameters of linked projects or actions should be explicitly considered, described, and delineated.
    b) A project's or action's mitigation monitoring plan (under CEQA) may provide a vehicle for monitoring of impacts and implementation of this policy.
    c) Water supply forecasts from CALFED agencies should provide an accompanying forecast of water quality. Such forecasts include annual or more frequent water supply allocations, as well as long-term or ad hoc planning efforts, such as

DWR's Bulletin 160 series (*The California Water Plan Update*) or the Governor's *Critical Water Shortage Contingency Plan*.

d) Operational decisions made in CALFED forums or processes, such as the CALFED Operations Groups ("CALFED Ops"), the Water Operations Management Team, and the Environmental Water Account, should be balanced and should consider water quality impacts on equal footing with water supply and fishery impacts. Operations decision processes should explicitly consider and report impacts to water quality. When such decisions are not protective of drinking water quality, mitigation should be provided for unavoidable significant adverse impacts.

e) Operational criteria for existing and future surface storage reservoirs should include water quality. For example, water quality should be a legitimate criterion among other traditional reservoir operating criteria, such as power generation, fish and wildlife enhancement, and recreation.

f) A precise definition of water quality degradation will need to be developed in order to implement this Policy Framework. Factors such as modeling uncertainty, limits of detection, and parameters for determining the degree to which tradeoffs, offsets or mitigation measures compensate for increases of constituents of concern will need to be considered. The CALFED Science Program should be consulted for its recommendations during the development of this definition.

cc: John Andrew
Patrick Wright

Summary of Potentially Significant Adverse Impacts and Mitigation Strategies Associated with the Preferred Program Alternative

Potentially Significant Adverse Impacts

Releases of inorganic and organic suspended solids into the water column and turbidity resulting from increased erosion during construction, dredging, or drainage of flooded lands (7,8,9,19).

Releases of toxic substances, such as pesticides, selenium, and heavy metal residues, into the water column during construction and dredging and other program actions (7,8,9,14,15,19).

Net increases in salinity, if evaporation increases from in-Delta storage or converting irrigated cropland to wetlands (2,3,13).

Increased EC (a measure of salinity) of water in a few localized areas of the central Delta would result in a potentially significant unavoidable impact on the local suitability of the water as a source for agricultural irrigation. (2,3,12).

Increases of TOC in river water caused by the increased contact between flowing or ponded water and vegetation or peat soils that would result from conversion of agricultural lands to wetlands and from actions in other Program elements (4,5,10,11,12).

Increased water temperatures and resultant decreased dissolved oxygen concentrations due to the increased residence time of water in the Delta (2,3,13).

Decreases in in-stream water quality if water use efficiency measures or water transfers reduce diluting flows (1,2,3).

Increases in concentrations of constituents of concern if water transfers reduce in-stream flows and deplete river assimilative capacities (1,2,3,6).

Increases in methylation of mercury in constructed shallow-water habitat (16).

Degradation of surface water by the transfer of poorer quality groundwater (2,3).

Changes in natural flow regimes in areas where new surface storage is built (17).

Surface storage inundation of toxic material (18).

Mitigation Strategies

1. Improving treatment levels provided at municipal wastewater treatment plants to upgrade the quality of the constituents of concern discharged to receiving waters in order to compensate for the reduction in dilution caused by improved water use efficiency or water transfers. Salt concentrations in discharges could be reduced by improved salt management of wastewater inputs to treatment plants.

2. Releasing additional water from enlarged or additional off-stream surface storage, or from additional groundwater storage.

3. Releasing additional water from storage in existing reservoirs or groundwater basins.

4. Treating water at the source (such as Delta drains), upgrading water treatment processes at drinking water treatment plants, and/or providing treatment at the point of use (consumer=s tap).

5. Using innovative, cost-effective disinfection processes (for example, UV irradiation and ozonationCin combination with other agents) that form fewer or less harmful DBPs.

Summary of Potentially Significant Adverse Impacts and Mitigation Strategies Associated with the Preferred Program Alternative (continued)

6. Using existing river channels for water transfers and timing the transfers to avoid adverse water quality impacts.

7. Using best construction and drainage management practices to avoid transport of soils and sediments into waterways.

8. Using cofferdams to construct levees and channel modifications in isolation from existing waterways.

9. Using sediment curtains to contain turbidity plumes during dredging.

10. Separating water supply intakes from discharges of agricultural and urban runoff.

11. Applying agricultural and urban BMPs, and treating drainage from lands with concentrations of potentially harmful constituents to reduce contaminants. Treating drainage from agricultural lands underlain by peat soils to remove TOC.

12. Relocating diversion intakes to locations with better source water quality.

13. Restoring additional riparian vegetation to increase shading of channels.

14. Conducting core sampling and analysis of proposed dredge areas and implementing engineering solutions to avoid or prevent environmental exposure of toxic substances after dredging.Capping exposed toxic sediments with clean clay/ silt and protective gravel.

16. Testing for mercury in soils and locating constructed shallow-water habitat away from sources of mercury until methods for reducing mercury in water and sediment are implemented.

17. Operating surface storage release times and magnitude to mimic natural regimes.

18. Avoiding inundation or designing solutions to inundation of toxic materials, such as covering with an engineered cap.

19. Scheduling ground-disturbing construction during the dry season.

Bold indicates a potentially unavoidable significant impact.

5.3.11 MITIGATION STRATEGIES

These mitigation strategies will be considered during project planning and development. Specific mitigation measures will be adopted consistent with the Program goals and objectives and the purposes of site-specific projects. Not all mitigation strategies will be applicable to all projects because site-specific projects will vary in purpose, location and timing.

Ecosystem Restoration Program. The Ecosystem Restoration Program element could increase the TOC content of Delta waters. TOC concentrations could increase as a result of having more aquatic vegetation. TOC contributes to the formation of DBPs, some of which have been shown to cause significant health problems. Therefore, the release of TOC is not as critical as TOC being increased at municipal water supply intakes. The following mitigation strategies could be employed: TOC increases may be mitigated by locating created wetlands away from drinking water intakes, by treating wetland discharges, or by treating water to remove TOC before it is disinfected and supplied to water system customers.

The Water Use Efficiency and Water Transfer Program elements of the alternatives, would result in some localized adverse impacts on water quality which could be mitigated, in most cases, by release of greater volumes of fresh water from upstream reservoirs.

The Ecosystem Restoration Program could promote the conversion of elemental mercury into the bioavailable form, methyl mercury. Increasing methyl mercury production would happen only if mercury-laden sediment or water were allowed into constructed shallow-water habitat. Therefore, shallow-water habitat would need to be located away from mercury sources until such time as methods for eliminating mercury from water and sediment are implemented.

Ecosystem Restoration Program actions are proposed for portions of the Delta and Bay Region that may result in coincidental beneficial water quality impacts, according to model results on concepts of several projects. Detailed studies of these projects have not been conducted, and further studies are being pursued (as part of Stage 1 implementation). If these projects meet the CALFED solution objectives, project-specific environmental evaluation and documentation will address the environmental impacts of individual projects. Should a project be considered for construction with beneficial water quality impacts as part of the project, these beneficial impacts may be considered as mitigation for other Program actions. Considering the preliminary nature of information about these projects, it is uncertain whether the projects will be able to reduce adverse salinity impacts to a less-than-significant level.

Levee System Integrity Program. Construction activities for the Levee System Integrity Program would be similar to and integrated with those described for the Ecosystem Restoration Program. Existing levees would be demolished, and new levees would be constructedCeither at or close to the site of the original levees or set back some distance from the original levees if a channel is to be widened or a wetland created. Short-term effects on water quality would be similar to those described for the Ecosystem Restoration Program but would occur only in the Delta Region. Local increases in the TSS content of waters in Delta channels are expected. Some increase in nutrient and TOC concentrations also may occur. Toxic substances contained in old levees or in channel sediments could be released during demolition or dredging. Dredged materials will be analyzed, dredged, and handled in accordance with permit requirements. Permits will incorporate mitigation strategies identified in Section 5.3.11 to prevent release of contaminants of concern.

It is expected that short-term construction impacts can be reduced to a less-than-significant level by employing construction methods that minimize in-water construction and by applying appropriate mitigation strategies. Soils in the levees and channel sediments would be tested prior to commencement of construction so that the need for special mitigation measures can be determined. (See ASediment Dredging and In-Channel Earth Movement@ below.)

Water Use Efficiency Program. Increased water use efficiency would adversely affect water quality when the volume of municipal wastewater or agricultural tailwater discharged to a stream is reduced but the mass load of salts and other contaminants in the discharge remains the same. The adverse effect would be most pronounced in streams where municipal or agricultural discharges represent a substantial proportion of streamflow. Adverse effects would occur most acutely in small streams in the Sacramento River and San Joaquin River Regions, downstream of municipal and agricultural wastewater discharges.

It is expected that the localized adverse water quality impacts of the program can be mitigated to a less-than-significant level by increasing treatment of wastewater before it is discharged to waterways or increasing fresh-water releases from reservoirs to provide more dilution water.

Water Transfer Program. Water transfers could affect water quality primarily through changes to river flow and water temperatures. The source of water for a transfer; and the timing, magnitude, and pathway of each transfer would affect the potential for significant impacts. Because specific transfers can invoke both beneficial and adverse impacts, at times on the same resource, net effects must be considered on a case-by-case basis. Water transfers could result in a potentially significant adverse (although localized) impact on water quality if diversions are transferred in a pipeline or canal to the area of use. For direct groundwater transfers, water quality could be adversely affected if the groundwater source is of poorer quality than the conveying channel. Possible methods to mitigate these adverse impacts could include:

- Requiring transferred water to be conveyed through natural channels to the area of use where feasible.
- Developing water transfer rules that protect downstream users (see Section 7.2.7.3).

Storage. All of the long-term adverse effects of surface and groundwater storage on water quality could be reduced to a less-than-significant level by various mitigation measures. Surface water reservoirs could be sited to avoid areas where rocks contain mercury or other potentially hazardous substances. If avoidance is impossible, rock outcrops could be covered with inert materials and vegetation cleared from the site to minimize the development of anaerobic conditions at the bottom of reservoirs. Outlet works at the reservoirs could be designed with multiple outlet portals to minimize depression of dissolved oxygen concentrations, to minimize the elevation of dissolved nitrogen concentrations, and to better control the temperature of released water. Water could be released from surface storage reservoirs to simulate natural flows in the small stream on which they are built.

Sediment Dredging and In-Channel Earth Movement. Sediment that is dredged from the Bay and Delta has the potential to cause water quality impacts due to the chemical quality of the sediment and its final disposition. Suitability of reuse of the sediment depends on its soil properties and the final disposition of the sediment.

The Program proposes to dredge sediment in Delta channels for a variety of reasons, including to widen or deepen channels and to deepen intake structures. Other sediment dredging and earth moving (or channel modification) may be conducted to modify levees, provide habitat, or build up areas for the protection of habitat. Each of these activities could benefit from soils dredged from Delta channels.

Sediment with toxic materials (such as mercury) must be prevented from degrading water quality. The potential to degrade water quality is related to the concentrations of toxic material, its contact with surface water, and the mechanisms by which the material becomes toxic to aquatic organisms.

Much of the mercury in dredged sediment is not an immediate threat to aquatic organisms. Mercury must be transformed to a toxic form to affect the ecosystem. In nature, this transformation is accomplished through bacteria that exist in the greatest numbers in shallow-water habitat. Therefore, mercury that remains buried under sediment or in a levee may not pose a substantial threat to the environment. The transformation of other toxic materials is less complicated. Preventing release to the environment of toxic materials often requires simply segregating the material from contact with surface water.

Each application of dredged sediment would be assessed for sediment quality through core sampling (both of the removed sediment and the sediment that is exposed on the channel bottom). The proposed placement of the material would be based on the quality of the sediment. The sediment would be assessed for suitability both from a soil property and a chemical quality standpoint. Criteria set by regulatory authorities would need to be met for placement of the dredged sediment. Other permit requirements should include the following mitigation strategies as principal methods of preventing the release of sediment and toxic material into surface water. These mitigation strategies will be applied in various ways to achieve the best protection of the environment.

Sediment curtains or cofferdams (a method of separating disturbed sediment from surrounding stream water) will be used in all cases of dredging and in-stream earth moving. Performing specific sediment core sampling prior to project implementation will provide the information necessary to determine the suitability of the soils for placement. Quality information (both soil properties and chemical qualities) from the cores will be compared to criteria set by regulatory authorities, and the appropriate mitigation measures will be identified and implemented. In some cases, simple separation of mercury-laden soils and surrounding water is necessary to prevent releases of additional mercury into the environment. Separation may be provided by a few centimeters of fine soils (capping) that are protected from erosion by various means (such as vegetation or gravel). Not all sediment is expected to be suitable for placement near water or human exposure. Regulatory agencies will set criteria for those soils not suitable for reuse.

The following mitigation strategies can be implemented to reduce water quality impacts:

$ Improving treatment levels provided at municipal wastewater treatment plants to upgrade the quality of the constituents (other than dissolved inorganic solids) discharged to receiving waters in order to compensate for the reduction in dilution caused by improved water use efficiency or water transfers. Salt concentrations in discharges could be reduced by improved salt management of wastewater inputs to treatment plants.

$ Releasing additional water from enlarged or additional off-stream surface storage, or from additional groundwater storage.

$ Releasing additional water from storage in existing reservoirs or groundwater basins.

$ Treating water at the source (such as Delta drains), upgrading water treatment processes at drinking water treatment plants, and/or providing treatment at the point of use (consumer=s tap). Using a mix of alternative source waters to reduce the influent bromide concentration.

$ Using innovative, cost-effective disinfection processes (for example, UV irradiation and ozonationCin combination with other agents) that form fewer or less harmful DBPs.

$ Using existing river channels for water transfers and timing the transfers to avoid adverse water quality impacts.

$ Using best construction and drainage management practices to avoid transport of soils and sediments into waterways.

$ Using cofferdams to construct levees and channel modifications in isolation from existing waterways.

$ Using sediment curtains to contain turbidity plumes during dredging.

$ Separating water supply intakes from discharges of agricultural and urban runoff.

$ Applying agricultural and urban BMPs, and treating drainage from lands to reduce contaminants. Treating drainage from agricultural lands underlain by peat soils to remove TOC.

$ Relocating diversion intakes to locations with better source water quality.

$ Restoring additional riparian vegetation to increase shading of channels.

$ Conducting core sampling and analysis of proposed dredge areas and engineering solutions to avoid or prevent environmental exposure of toxic substances after dredging.

$ Capping exposed toxic sediments with clean clay/silt and protective gravel.

$ Locating constructed shallow-water habitat away from sources of mercury until methods for reducing mercury in water and sediment are implemented.

$ Engineering surface storage release times and magnitude to mimic natural regimes.

$ Avoiding inundation or engineering solutions to inundation of toxic materials, such as covering with an engineered cap.

$ Scheduling ground-disturbing construction during the dry season.

5.3.12 POTENTIALLY SIGNIFICANT UNAVOIDABLE IMPACTS

One potentially significant adverse impact on water quality that is associated with the Preferred Program Alternative may not be reduced to a less-than-significant level by mitigation. This impact is an unavoidable consequence of implementing the Preferred Program Alternative.

Although the Preferred Program Alternative would improve water quality at many locations in the Delta, it would cause water quality to deteriorate in others. Without a diversion facility on the Sacramento River, impacts on water quality associated with the Preferred Program Alternative would be similar to those for Alternative 1. The increased EC (a measure of salinity) of water in localized areas of the central Delta would result in a potentially significant and unavoidable impact on the suitability of the water as a source for agricultural irrigation.

CALFED ROD Pages 17-18

Water Quality Program
The CALFED Program is committed to achieving continuous improvement in the quality of the waters of the Bay-Delta system with the goal of minimizing ecological, drinking water and other water quality problems. Improvements in water quality will result in improved ecosystem health, with indirect improvements in water supply reliability. Improvements in water quality also increase the utility of water, making it suitable for more uses and reuses.

The Water Quality Program includes the following actions;

- Drinking water parameters - Reduce the loads and/or impacts of bromide, total organic carbon (TOC), pathogens, nutrients, salinity, and turbidity through a combination of measures that include source reduction, alternative sources of water, treatment, storage and if necessary, conveyance improvements such as a screened diversion structure (up to 4000 cfs) on the Sacramento River between Hood and Georgiana Slough. The Conveyance section of this document includes a discussion of this potential improvement.
- Pesticides - Reduce the impacts of pesticides through (1) development and implementation of BMPs, for both urban and agricultural uses; and (2) support of pesticide studies for regulatory agencies, while providing education and assistance in implementation of control strategies for the regulated pesticide users.
- Organochlorine pesticides - Reduce the load of organochlorine pesticides in the system by reducing runoff and erosion from agricultural lands through BMPs.
- Trace metals - Reduce the impacts of trace metals, such as copper, cadmium, and zinc, in upper watershed areas near abandoned mine sites. Reduce the impacts of copper through urban storm water programs and agricultural BMPs.
- Mercury - Reduce mercury levels in rivers and the estuary by source control at inactive and abandoned mine sites.
- Selenium - Reduce selenium impacts through reduction of loads at their sources and through appropriate land fallowing and land retirement programs.
- Salinity - Reduce salt sources in urban and industrial wastewater to protect drinking and agricultural water supplies, and facilitate development of successful water recycling, source water blending, and groundwater storage programs. Salinity in the Delta will be controlled both by limiting salt loadings from its tributaries, and through managing seawater intrusion by such means as using storage capability to maintain Delta outflow and to adjust timing of outflow, and by export management.
- Turbidity and sedimentation - Reduce turbidity and sedimentation, which adversely affect several areas in the Bay Delta and its tributaries.
- Low dissolved oxygen - Reduce the impairment of rivers and the estuary from substances that exert excessive demand on dissolved oxygen.
- Toxicity of unknown origin - Through research and monitoring, identify parameters of concern in the water and sediment and implement actions to reduce their impacts to aquatic resources.