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SEP 23 1999

COMMUNITIES FOR A BETTER ENVIRONMENT

September 20, 1999
Letter Snow, Executive Director
CALFED Bay-Delta Program
1416 Ninth Street, Suite 115
Sacramento, CA 95814

Re: CALFED Draft EIS/EIR (State Clearinghouse #94632463) - Comments on Environmental Justice Issues Related to Water Quality and Hydrodynamics, submitted on behalf of Communities for a Better Environment (CBE)

Dear Mr. Snow:

Thank you for considering CBE's comments on this major project centered around whether to take more water from the San Francisco Bay/Delta, and taking water quality, food resources, industrial issues and human health issues that touch off California.

The Draft EIS/EIR does not identify low income communities and communities of color affected by the project's acknowledged potential for significant environmental impacts due to increased delta runoff pollution, decreased bay water circulation, and decreased drinking water quality. It does not assess whether significant environmental impacts on these communities are disproportionate impacts, identify and develop a reasonably broad range of alternatives including a truly environmentally superior alternative, develop specific actions for mitigating impacts, or assess its own alternatives adequately. As a consequence, the Draft does not provide adequate information to assess whether significant environmental impacts of the project might be avoided by options an adequate assessment would reveal.

Adoption of this Draft would result in at least two major violations of environmental justice principles and guidance related to water quality and flow. First, the Draft does not identify, identify, identify, and disproportionate impacts on low income communities and communities of color due to drinking water pollution. The Draft states that the project would increase pollution of delta runoff and reduce bay water circulation, and that these significant impacts on bay water quality would not be mitigated fully. Increased pollutant inputs to the bay and decreased bay water circulation will meet cumulative impacts, interacting synergistically to increase bioaccumulation of toxic pollutants.

By increasing water diversion, thus increasing water availability and decreasing its cost, the project will even hinder industrial pollution prevention, which goes hand in hand with reducing the ongoing waste of water by many industrial plants. Indeed, the Draft overlooks an opportunity to take up significant amounts of water while preventing higher exposure to toxic loads.

These cumulative project impacts are disproportionately high and adverse to communities of color which surround the majority of Bay/Delta anglers. Though the Draft fails to mention it, the U.S. EPA has found that toxic loads threaten to Bay/Delta anglers are a "high priority" because of their high Bay/Delta fish, and mercury bioaccumulation in this food resource is also a high priority. Other toxic chemicals reach levels in the fish that threaten anglers' health as well.

Second, the Draft does not assess potential disproportionate significant environmental impacts on low income communities drinking water drawn from Delta water project pumps. The Draft describes a potential for significant impacts of increasing bromine levels in water drawn from Delta pumps because toxic trihalomethanes (THMs) and bromate form when this water is disinfected for drinking water use. However, it does not assess the potential for disproportionate impact on low income communities with increased THM formation in older water systems and

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lose affordable access to bottled or home-treated water. It does not discuss requiring treatment for these toxics in the drinking water plants, or replacement of aging public water pipes in our communities - the two areas where these disinfection by-products are formed. Nor does it adequately address alternatives to taking drinking water isolated with bromide, which forms these pollutants, from the Delta. This is an important oversight because all project alternatives (even an intake at Yacody) may suck more bromide into drinking water in the future.

The increases in global temperature and sea level that have already occurred, and the changes in timing of rain and snow melt that occurred in California's recent drought, and again in our more recent wet years, are all consistent with the effects of global warming. They affect us project of to women in the future, pushing ocean salt further into the Delta at times when there is less river flow to counter the rising tide, increased bromide, which forms the contaminants, is likely at all project water intake locations in the future. Though the Draft lacks the data, the project might lock in water development with significantly increased long-term drinking water contamination affecting millions in low income communities with less access to alternative drinking water supplies. Thus, this second environmental justice impact is also traceable to the project.

With respect to water quality issues affecting many thousands of Bay/Delta anglers of color and potentially thousands in low income communities drinking Delta water, the Draft is deficient due to gross lack of information, and adopting it without substantial revision would violate environmental justice principles and guidance.

We recommend that CALFED gather data on the issues we discuss and present them with appropriate analysis in a revised Draft EIS/EIR that allows full consideration of the best alternatives and mitigation for environmental health and justice.

Respectfully submitted,

Greg Kerner
Senior Scientist

- or: Arlene Wong, Pacific Institute
Joan Olson, Environmental Water Caucus
Susan Florke, United Farm Workers
Kathleen Lloyd, People United for a Better Oakland
Joyce Lawrence, Coalition of Black Trade Unions
Marguerite Young, Clean Water Action
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John Rosenblum, Rosenblum Environmental Engineering
Henry Clark, West County Toxic Coalition
Michael Stanley Jones, Silicon Valley Toxics Coalition
Geoff Davis, Bay Institute
Barry Nelson, Natural Resources Defense Council
Pat Ferraro, Silicon Valley Pollution Prevention Center

Enclosure: Detailed comments of CBE on the DEIS/DER
Attachment 1. Comments of John Rosenblum, Ph.D., on water use efficiency

23 September 1999

Mr. Letter Snow, Executive Director
CALFED Bay-Delta Program
1416 Ninth Street, Suite 115
Sacramento, CA 95814

Re: AG/URBAN CALICUS COMMENTS ON JUNE 1999 DRAFT PROGRAMMATIC EIS/EIR FOR THE CALFED BAY-DELTA PROGRAM

Dear Mr. Snow:

This letter and its attachments continue comments from the Ag/Urban Caucus on the subject PEIS/EIR. The Ag/Urban Caucus includes thirty-six individual agricultural and urban water agencies, including the membership of CWA, ACWA, SWC and CWPWA. We remain a supporter of the CALFED Bay-Delta Program and see continued to working with you to address the many unresolved issues prior to finalization of the PEIS/EIR and a Record of Decision.

OVERALL COMMENTS

The success of the CALFED program depends on all the stakeholders having a very specific understanding of the benefits they can reasonably expect to receive from implementing the solution package. While the program outlined in the PEIS/EIR has made progress in some key areas (such as water use efficiency, long-term water quality improvement targets, continued planning for surface storage and development of additional groundwater storage), overall the program lacks a real commitment to meet California's needs for an increased and more reliable water supply of good quality. Those deficiencies must be corrected before the program can successfully move forward.

Water Supply/Reliability

Delta-dependent water users have experienced the loss of more than one million acre-foot of water during the 1990s. As California's population continues to increase - by as many as 15 million more people by the year 2020 - it is critical that we begin to recover those supplies and provide more. However, the CALFED program provides no margin for an increased water supply. Our analysis of the CALFED proposal shows that the program at best might provide less than 200,000 acre-foot of new water, and at work could actually reduce supplies by another 700,000 acre-foot.

CALFED must set water supply goals of at least a net increase of 200,000 to 400,000 acre-foot per year during the first seven years of this program and aggressively pursue their realization.

The ability to generate additional water supplies is directly dependent on having the necessary facilities in place. California's water infrastructure investments over the past two decades have been woefully inadequate to meet the state's water supply needs.

CALFED must explicitly explore the planning and implementation of the State's Delta improvements, which hold the greatest potential for increasing water supplies during the first steps of the program. Water supply benefits from this program must be equitably balanced among urban, agricultural and environmental uses. CALFED must at the same time ensure that there is no resulting degradation of Delta water quality from

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**Comments on the Draft EIS/EIR for the CALFED Bay-Delta Program:  
Environmental Justice Issues Related to Water Quality and Hydrodynamics;  
submitted on behalf of Communities for a Better Environment (CBE)**

by Greg Karras, Senior Scientist  
September 20, 1999

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INTRODUCTION, SCOPE AND LIMITATIONS

Communities for a Better Environment (CBE) is a community based nonprofit environmental health and justice organization that works with communities to ensure a healthy, toxics-free environment for all people where we live, work and play. Our goal is toxics-free communities with clean air, food and water. CBE has reviewed water quality and related hydrodynamics issues presented by CALFED's proposal, for joint comments of many groups to be submitted under separate cover. CBE's comments, including details of this analysis, are presented herein.

The Draft EIS/EIR ("Draft") contains many errors and omissions in its project description, goals, comparison of existing conditions and alternatives, analysis of impacts, and analysis of mitigation to avoid and/or mitigate impacts. The comments presented here do not attempt a comprehensive assessment of all these errors and omissions. Nor do these comments attempt to remedy them. Rather, these comments address some major problems in the Draft with respect to two types of significant adverse and disproportionate environmental impacts on people of color and/or low income: toxic chemical health threats from consumption of contaminated aquatic food resources; and toxic health threats from consumption of contaminated drinking water.

## I. PROJECT DESCRIPTION

### A. Arbitrary exclusion of the Bay food chain from the 'problem' area description.

The Draft's Project Description says "[t]he Program is addressing problems that have been identified in or closely linked to the Suisun Bay/Suisun Marsh and Delta area." (Page 1-10.) This geographic description of the problem excludes the vast majority of the San Francisco Bay that is fished by people for food. On its face, the Draft appears to define the Project in a way that down plays or ignores environmental justice issues affecting Bay anglers.

The Draft states that: "Any problem currently associated with (1) the management and control of water in the Bay-Delta, or (2) the beneficial use of water in the Bay-Delta (including both environmental and economic uses) is within the purview of the Program if at least part of the problem is located in the Bay-Delta or is directly associated with conditions in the Bay-Delta." (Page 1-11.) Yet though it asserts "[g]ood quality water is required ... [because] the Bay-Delta system is a source of drinking water for millions of Californians" (page 1-9), it makes no such assertion regarding the need to address pollutants threatening people who eat fish from the Bay.

However, like chemicals in exported drinking water, chemicals in Bay fish are "directly associated with conditions in the Bay-Delta" and further, "at least part of the [fish consumption is] in the Bay-Delta." If anything, the Bay's food chain would appear to fit the Draft's confusing problem definition better than other areas of focus. The Draft arbitrarily excludes water quality problems affecting people who rely on Bay fishing, while emphasizing drinking water problems affecting people in many areas state-wide.

### B. Exclusion of an adequate description of fishing uses from the Project's goals.

The Draft's Project Description for water quality states a goal "to provide good-quality water for all beneficial uses, including drinking water, agricultural uses (both in-Delta and exported), industrial uses, recreational in-Delta uses, and Delta aquatic habitats." (Page 1-7.) Commercial and other fishing uses are designated beneficial uses of Bay-Delta waters (see basin plans), but this description lists export agricultural and even industrial uses of water without mentioning fishing. It even appears to limit recreational uses (which could include some types of fishing) to the Delta. A discussion of fishing the Bay as a food resource is nowhere in the Draft's project description. This is extraordinary.

San Francisco Bay was a central food resource for the Ohlone People before European immigrants arrived: it was at one time the major commercial fishing center on the U.S. west coast; and today it is fished by hundreds of individuals and families who eat their catch. (See Nichols et al., 1986; Smith and Kato, 1979; Karras, 1998; Cohen, 1995; Wong and Nakatani, 1997; and Chiang, 1998.) Although the Draft clearly includes the need to support and protect other food resources (agriculture), it describes no water quality goal in terms of restoring the once-premiere food resources of California's largest estuary. It describes no need to protect the health of people who still rely upon these food resources from toxics in the fish, let alone the relationship of this goal with that of a sustainable regional food resource. This description is surely lacking.

C. Arbitrary exclusion of low income (non-well) drinking water issues from description.

The Draft's Project Description correctly emphasizes the need to provide high quality drinking water. (Page 1-9.) It asserts the likelihood of widespread water quality impacts from drinking surface water from the Delta contaminated with bromates and/or brominated trihalomethanes (THMs) that may cause cancer, reproductive, or other effects. (See eg., WQ Program Plan at 3-3; and WQ Appendix E.) The Draft also discusses the potential for adverse environmental justice impacts in rural areas where drinking water wells may be affected (page 7.14-7).

However, the Project Description, water quality, and environmental justice analyses fail to mention the issue of greater impacts on low income people who may be more highly exposed to contaminants in developed surface waters. It discusses neither the older and leakier pipes often found in low income communities, and in which there is more THM formation, nor the income restrictions that may result in less use of cleaner bottled water, home purification devices, or other means to reduce bromate and THM exposure.

Although the Draft admits such adverse environmental impacts may be significant, it excludes the issue of whether they are *disproportionate* from its project description (and subsequent analysis). This omission appears glaring given the likelihood of increased costs for high quality California drinking water in the future.

D. Exclusion of water quality improvements independent of CALFED from description.

Major municipal and industrial waste water treatment required by the Clean Water Act and State law, numerous significant examples of industrial pollution prevention instigated by organized communities, environmental law enforcement, and other environmental action improved Bay/Delta water quality over that which would otherwise exist now. Absent any CALFED Program the laws, government agencies charged with enforcing them, overwhelming community support, and mandates for further action will result in further improvement.

The assumption that present and planned actions cannot improve water quality without the CALFED Program is a mistake. This false assumption would result in a fundamental flaw in any comparison of project and 'no project' alternatives. Even a failure to judge the appropriate course of future improvement, out of of ignorance of the past history and trends, might be a fatal error in deciding the appropriate alternative. Therefore, this information – at least in broad terms – is crucial to a reasonably adequate decision. Incredibly, however, this information on water quality improvements without the Project is not in the project description.

E. Lack of a clear lay person's explanation of the existing human-made water system.

A reasonable assessment of alternatives assumes at least a general understanding of the timing and amounts of water movement through precipitation, snowpack and melt, ground water and rivers, and the Bay/Delta to the sea, and how this relates to the water diverted, stored behind dams or in ground water basins, distributed, and used by agriculture, industry and residents. For human health issues, an important part of this description would address differences in the residual disinfection of drinking water in older public plumbing affecting low income communities.

This information is about the guts of the existing human-made conditions the Project would alter. Indeed, it should be obvious that the water system should be described in the Project Description in a clear, understandable, explanatory summary. However, the Draft appears to assume that all people already know this information, and does not provide this concise overview explanation. This fails to describe project components that affect water quality.

The Draft's failure to provide the public a clear summary explanation of the water system the Project would change does not appear to meet the environmental justice requirement to "develop effective public participation strategies" in that it does not appear to "acknowledge and seek to overcome ... cultural, institutional ... and other barriers to meaningful participation." (See: *Environmental Justice Guidance Under NEPA*, Council on Environmental Quality, at page 7.)

E. Failure to describe the long term time frame of the Project.

The Draft's Project Description states that "implementation is likely to take place over a period of 20-30 years" and, further, refers to this time frame as its "planning horizon." (Page 1-6.) Its water quality, hydrology and environmental justice sections provide no analysis to the contrary: the Draft plans for 30 years at best.

However, the water system built now will be in place for more than 30 years, or, at a minimum, will fundamentally influence the course of water use decisions past 30 years hence, as dams and diversions built before now influence the options and course of today's decision.

Further, in this time frame and beyond, pollution of the global atmosphere will cause climate change that results in significant long-term changes in water flow and quality at *all* current and planned water intakes described by the alternatives assessed in the Draft. The American Chemical Society points out that "almost every year since 1990 has been hotter than the preceding year ...[and] average global surface temperature in 1998 was higher than in any year this century and was in fact higher than it has been at any time in the past 1,000 years" (Chem. & Eng. News, August 9, 1999, pp. 16-23). An expert review by the American Association for the Advancement of Science pinpoints the two critically important issues for this project:

"Along the coasts rising sea level will reduce freshwater in aquifers and push the tongue of saltwater further up estuaries, jeopardizing intakes of freshwater."

"Coupled with changes in the timing or magnitude of freshwater inflows, a rise of a few feet in sea level might increase the penetration of the salt front from the bay into the delta (Williams, 1985). Water is drawn from the delta for the State Aqueduct, which provides a major portion of southern California's water, and for the Delta Mendota Canal, which carries irrigation water to the San Joaquin Valley. Under current operating policies the quality of water in these very large systems could be adversely affected by climate change."

*Climate Change and U.S. Water Resources*. Am. Ass. Adv. Sci. (Wiley & Sons) NY pp 2, 314.

Changes in climate, sea level and the timing and amount of rain and snowfall are likely to cause their full impacts on Bay/Delta water quality after the year 2030. Moreover, polluting with persistent, bioaccumulative toxic chemicals today can impact water quality and public health for generations (see eg., WQ Prog. Plan at 4.4). However, the Draft does not describe impacts past 2030, nor does it discuss the effects of climate change, sea level change, and

change in the timing of Sierra precipitation and snowmelt on the quality of water drawn from Delta intakes. The missing information appears fundamental to analysis of long term cumulative impacts on the environment, communities of color, and low income communities.

G. Exclusion of public and private interest roles from the description of conflict.

The Draft's Project Description asserts up front: "For decades, the region has been the focus of competing interests – economic and ecologic, and urban and agricultural. These conflicting interests have resulted in a number of threats to Bay-Delta resources." (Page 1-1.) It goes on to say that "environmental, urban, and agricultural interests ... have been unable to agree on appropriate management of the Delta resources." (Page 1-2.)

This bold and conclusory assertion of the nature of the conflict to be resolved by the project fails to describe other obvious conflicts which run deeper than those it does describe. The Project Description fails to mention conflicts between the *long-term public interest* in environmental and economic health and the *short-term private interests* in profits and quick return on capital investments, when private interests result in water waste and pollution. It fails to mention the conflicts between communities of color and low income who are disproportionately affected by industrial pollution, and corporate management who live elsewhere and are given bonuses for short term economic performance. These omissions are far from trivial.

In its failure to distinguish private economic interests in short term profit from public economic interests which include long term considerations of children's health and costs of illness, the Draft's description assumes (and states on page 1-1) that there is a conflict between "ecologic" and "economic" interests: This assumption is dangerously misleading and should be corrected in the initial pages of a revised DEIS/EIR in order to ensure that the public and decision makers are not fundamentally misled by this decision document.

II. DESCRIPTION OF EXISTING CONDITIONS

A. Failure to describe toxics threats and environmental injustice affecting anglers.

Though the Draft admits mercury, chlorinated pesticides, PCBs and selenium have accumulated to concentrations in Bay-Delta fish and other food resources that can threaten human health, much of the relevant factual information on these important public health threats is difficult to find in Draft documents (see eg., WQ Prog. Plan at 4-3, 6-2 and 8-8). For example, it fails to mention that the State water boards and US EPA designated mercury contamination of bay fish as a "high priority" under Clean Water Act section 303(d).

The Draft completely ignores angler health threats from 29 dioxin compounds – polychlorinated dibenzo-*p*-dioxin, polychlorinated dibenzofuran, and 'dioxin-like' polychlorinated biphenyl (or PCB) compounds that are the most toxic synthetic pollutants known – despite findings this year by EPA and Bay Area governments that dangerous levels of these pollutants in bay fish are a "high priority" for action. EPA researchers report that dioxin may cause diabetes, increased viral susceptibility, endometriosis, and childhood developmental toxicity at or near general population exposures (see eg., Birnbaum, 1998; and Schecter, 1997), and EPA found that some S.F. Bay anglers suffer even higher dioxin exposure than this level, and high cancer risk.

US EPA ruled on May 12, 1999 that these 29 dioxin compounds are a "high priority" for action under Clean Water Act section 303(d) – the highest priority ranking available under this section. In 1999 the Oakland City Council and the San Francisco Board of Supervisors voted unanimously to make dioxin compounds a high priority for action to eliminate dioxin production at all Bay Area sources, wherever possible, and to ask the Regional Water Quality Control Board and EPA to use their full powers and authority toward this zero dioxin goal. The Draft mentions none of this. Its only reference to dioxin compounds appears to be an erroneous statement on page 5.3-15 that some dioxin has its "origin" in the atmosphere. (Dioxin pollution is a by-product of industrial processes involving chlorine.)

The Draft fails to describe the significant environmental impact of dioxin fish contamination in its description of existing conditions.

EPA designated dioxin as a high priority in the Bay specifically because of the health threat it poses to subsistence anglers (see May 12, 1999 letter from Alexis Strauss to Walt Pettit), yet despite this explicit rationale, and its own findings of mercury, PCBs, selenium, and pesticide food chain threats, the Draft fails to discuss health threats to subsistence anglers in S.F. Bay. This omission ignores three independent surveys conducted by CBE, Save San Francisco Bay Association, and the Asian Pacific Environmental Network (APEN) with more than 1,000 S.F. Bay anglers, which each found that the majority (approximately 75%) of regular Bay anglers are people of color. This information, which was accepted for consideration by EPA in its Clean Water Act decision, is missing from the Draft.

The Draft fails to discuss evidence that the significant impact of S.F. Bay fish contamination is a disproportionate and adverse impact on people of color.

The National Environmental Justice Advisory Council to EPA (NEJAC), a leading national authority on matters of environmental justice, convened in Oakland in 1998 and considered the issue of dioxin contamination specifically as it applies to San Francisco Bay. NEJAC adopted a resolution on June 3, 1998 finding that dioxin contamination of San Francisco Bay fish is an environmental injustice. (See September 1, 1998 letter from Haywood Turrentine to Carol Browner.) The Draft fails to mention this authoritative finding.

Without explanation, acknowledgement, or discussion, the Draft fails to discuss environmental justice with respect to subsistence anglers of San Francisco Bay. Its discussion of environmental justice is limited to discussion "only for the Delta Region" (page 7.14-10). It finds impacts only on employment, accessibility to groundwater supplies, utility infrastructure in communities, and homes near levees (pages 7.14-10 and 7.14-11). It actually claims "[l]ong-term benefits from increases in ... fish and hunting opportunities" (page 3-26).

Thus, the Draft's analysis appears to disagree with the findings of US EPA and NEJAC regarding the existence of a disproportionate, significant environmental impact on subsistence fishers, and a significant environmental justice issue, but it does not discuss any factual or other reasons for its disagreement. The Council on Environmental Quality states: "Where a potential environmental justice issue has been identified by an agency, the agency should state clearly in the EIS ... whether, in light of all of the facts and circumstances, a disproportionately high and adverse human health or environmental impact on minority populations ... is likely to result from the proposed action and any alternatives." (See: *Environmental Justice Guidance Under NEPA*, CEQ, page 13.) The Draft fails to comply with this guidance.

B. Failure to describe the synergy between reduced peak flows and bioaccumulation.

The Draft fails to address the synergistic effects of reduced peak flows from the Delta to the Bay, and pollution, on bioaccumulation and exposure to toxic pollutants in the Bay. This results in its failure to discuss impacts of the Project on the environmental injustice to Bay anglers discussed above. The Draft admits an impact (5.3-30), but fails to discuss adequately the way flows from the Delta increase circulation in the bay's southern reach. Where the Draft says only

“except during sustained high-outflow periods, water quality [in the South Bay] is not significantly affected by Delta outflow. These sustained events do, however, play a significant role in flushing contaminants such as copper and nickel from the South Bay” (page 5.2-6.)

The State Water Resources Control Board has described these conditions much more completely:

“Delta discharges only affect the circulation pattern in the southern basin when discharges are high. At these times, surface salinities in the Central Bay are reduced, causing net movement of freshwater southward and saline water northward. This pattern is reversed when Delta discharge declines. ... Circulation in the southern basin is generally more sluggish than in the northern and central reaches. Residence time [the time for a given water inflow to leave the basin] in the southern basin is from two to three weeks during high Delta discharges ... At low Delta discharge, the southern reach's residence time has been estimated at from one to five months.”

*SWRCB Order No. WQ 90-5 at page 51.*

Further, while the Draft speaks only of reduced “flushing” when there is less bay circulation, the scientific evidence shows that two distinct but cumulatively important events take place. First, reduced water circulation results in more *physical accumulation* of pollutants in the water and sediment; and second, reduced water circulation results in more *bioaccumulation* of pollutants, or in other words, increased toxic exposure from a given amount of pollutants in the bay. (See e.g., Luoma and Cain, 1979; and Nichols et al., 1986.) As State Board Order 90-5 notes: “Hydrodynamic processes are also important in transporting particulates, which can affect the bioavailability of metals ... [and] seasonal processes will affect metal bioavailability throughout the Bay depending on the relative magnitude of the processes.” The Draft does not mention this increased bioavailability, and it does not describe the pollutants affected.

Finally, the Draft fails to note that the periodic ‘pulses’ of river flow into the Central Bay, which drive increased circulation and decreased bioaccumulation, are peak flows (see, e.g., Nichols et al., 1986; and Luoma and Cain, 1979.) This point is important to an adequate analysis of the effects of the Project on S.F. Bay water quality. The Draft admits that alternatives it presents would, especially with increased storage of diverted water, decrease peak Delta flows to the Bay. (See e.g., 5.2-1, 5.2-4, and 5.3-30.) Thus, the project contemplates actions that could increase bioaccumulation and impacts on the Bay food chain, including anglers, by an undisclosed amount. However, the Draft does not describe these impacts, or even provide information on the number of pollutants involved and the extent of the impacts of reduced flows on already-severe toxic threats to subsistence anglers.

C. Failure to describe the multiple and cumulative effects of many pollutants in Bay fish.

Just as alcohol and valium are known to exacerbate each others' effects, additive and synergistic effects of toxic environmental pollutants are demonstrated in fish, wildlife and humans. Combinations of toxic metals exert both additive and synergistic (greater than additive) effects on aquatic life (see Spehar and Fiandt, 1986). The 29 dioxin compounds discussed above are known to exert additive effects on humans and other animals (see e.g., Birnbaum, 1998; Farland, 1997; and Schecter, 1997). Mercury, dioxin and non-dioxinlike PCBs attack many of the same biological systems (such as the nervous system) or produce similar toxic effects such as cancer. Despite the fact of multiple exposures to these and many other toxic pollutants in the Bay-Delta, and its admission of possible interactions between mercury and selenium, the Draft fails to discuss any other joint toxicity or provide information on these additive and synergistic impacts.

Similarly, anglers (and aquatic life) are exposed to the same and different cumulative pollutants repeatedly over time. As just one example, anglers are exposed to dioxin in the womb, in breast feeding, and from eating meat and dairy products bought from the market as well as from eating fish caught from S.F. Bay. The Draft fails to discuss or provide information on the extent of these exposures over time. The Draft fails to describe cumulative and multiple exposures to water quality pollutants and fails to provide information on the extent of these impacts.

D. Failure to describe the many pollutants of concern for human health.

The Draft fails to discuss human health concerns stemming from pollution of the Bay-Delta food chain with 29 dioxin compounds, as discussed in detail above. It further fails to discuss, or even list, the majority of the 65 toxic pollutants known to be discharged to the estuary (see Comprehensive Conservation and Management Plan, San Francisco Estuary Project, 1993). Finally, it fails to describe or list newly discovered pollutants of concern that are likely to be contaminating the Bay-Delta and contributing to present and future water quality and human health threats. Polybrominated diphenyl ethers (PBDEs) should be of particular concern given recent findings that levels are increasing in humans and fish, and evidence that these toxicants may alter the Ah, or 'dioxin' receptor protein's function. PBDEs are discussed further below.

Unfortunately, the Draft presents inadequate information to describe many of the pollutants of concern, though this information is necessary for any reasonably comprehensive approach to surveillance, monitoring and pollution prevention that truly protects water quality.

E. Failure to describe, or erroneous description of, the causes and sources of pollution.

The Draft wrongly describes atmospheric sources as an 'origin' of dioxin, as discussed above. (Page 5.3-15.) It assumes that mining activities are the only major cause of mercury pollution in the Bay/Delta, without providing any monitoring data of discharge pipes known to release mercury above health-based levels, incinerators known to release mercury upwind, or massive industrial burning of petroleum coke, a close cousin of the coal-fired utilities that are the major mercury source elsewhere in the U.S. (WQ Prog. Plan at 4.4.1).

The Draft's statement that "urban areas will not differ dramatically in sources of copper" (WQ Prog Plan at 0-5) is contradicted by dramatic cuts in copper discharge concentrations found

in South Bay sewage effluents when 110 copper-using industries in the high tech and related sectors implemented pollution prevention measures. An explanation for this is that copper-using industries can release a chemical form of copper that passes through sewage treatment more readily than other causes of copper discharge, and thus can cause disproportionate amounts of the discharge. These root causes must be identified in any adequate discussion of options to address them at the source.

The Draft's pattern of ignoring ongoing industrial sources of pollutants extends to its analysis of PCBs: "PCBs were once used in industry as a dielectric compound, such as in transformers in the municipal electric industry. .. It is thought that most of the PCBs in the environment are in sediment." (WQ Prog. Plan at 6-3.) This description of existing conditions of PCB discharge is dangerously incomplete. Though their production is banned in the U.S., PCBs are still used in some industries, roughly half of all PCBs ever produced have not yet entered the environment (see eg., Webster and Commoner, 1994), and these PCBs still periodically leak or spill into the watershed and Bay/Delta (see eg., Karras, 1998). Further, new PCBs formed as by-products at incinerators and oil refineries in the Bay Area are still emitted by these industries, as shown by source tests (Ibid.).

Only for selenium does the Draft highlight the importance of industrial causes of the pollution. However, even here its source assessment does not describe existing conditions. Based on weekly monitoring provided to CBE in order to ensure compliance with discharge limits pursuant to legal settlements, selenium discharges to the Bay from oil refineries are now cut by more than 70% from the discharge level given for a period ending in 1992 on page 8-4 of the WQ Program Plan.

After ascribing industrial pollution to 'atmospheric' or 'nonpoint' runoff sources when these are really environmental pathways from the true sources to the Bay/Delta, the Draft omits any description of the root cause of formation for the many synthetic pollutants. This omission is inconsistent with its description of trihalomethanes (WQ Plan App E), and fails to inform the public of factors that can be addressed to prevent pollution (eg., the need for the presence of halogens such as chlorine or bromine before many of the most toxic compounds can form in the first place).

Failure to provide information on the impact of artificially cheap water on pollution is perhaps the most serious problem caused by the Draft's incomplete description of the causes of pollution. Many industrial processes use water and toxic chemicals. The largest, best verified and most comparable study of its kind was conducted in more than 110 Silicon Valley industrial plants in the early and mid 1990s, and showed a strong relationship between cheap water, water waste, and failure to stop preventable pollution (see eg., Drennan, 1994; Karras, 1994; and CBE, 1992). Ongoing research confirms this conclusion (see eg., Rosenblum, 1998; and Dr. Rosenblum's comments on this Draft EIS/EIR – see Attachment 1). The Draft's omission of this information makes it harder for people to see the toxic impacts of water waste.

E. Failure to describe actions taken or planned by others to address sources of pollution.

The Draft fails to describe the citizen enforcement that cut selenium discharges from oil refineries to the Bay by more than 70%. It fails to describe the actions of Oakland and San Francisco with the adoption of policies seeking to eliminate the production of dioxin compounds

at Bay Area sources, wherever possible, and ongoing actions by these and other local governments and communities to implement this zero dioxin approach. It fails to describe actions by US EPA, which overruled the State water boards to make dioxin a high priority for action under section 303(d) of the Clean Water Act, and has signalled it will begin to require approximately ten-times smaller, zero-dilution, discharge limits on toxic pollutants known to impair Bay water quality when dischargers seek renewed permits to discharge wastes. Importantly, the Draft fails to discuss community-based 'green technology' efforts, which have already cut pollution *and* water waste significantly while saving money at industrial plants from Silicon Valley to Petaluma. (See: CBE, 1992; Drennan, 1994; and Dr. Rosenblum's comments in Attachment 1.)

Without descriptions of these efforts, the Draft cannot provide information that the public and decision makers should have access to, in order to determine the extent of water quality improvements that have been achieved, will be achieved, and could reasonably be achieved.

G. Failure to describe disproportionate toxic drinking water threats to low income people.

The Draft highlights the potential that toxic brominated trihalomethanes and bromate contamination of drinking water supplies drawn from the Delta cause a significant environmental impact. These by-products of drinking water disinfection in the presence of bromine are believed to cause significant increased risk of cancer and/or reproductive and other health impacts. (See eg., WQ Prog. Plan at Appendix E.) As described above in the discussion of the Project Description, there is a potential that low income communities drinking treated Delta surface water are disproportionately affected by this adverse impact because of their relative lack of resources for home treatment or purchase of cleaner drinking water.

Clear evidence of a potential for disproportionate and adverse impact is admitted in the Draft: 1) these drinking water pollutants may cause a significant unmitigated environmental impact; 2) many low income people and communities would be affected by this significant environmental impact; and 3) the cost of high quality drinking water is already a concern and this cost is likely to increase in the future. In addition (though ignored by the Draft), low income communities are more often affected by increased pollution due to increased inputs of organic material in their neighborhood's older and leakier pipes, which combine with the residual chlorine present in the water for disinfection, to form more THMs in their drinking water.

The Draft excludes information and discussion of the potential for this disproportionate impact from its description of existing conditions, just as it excludes this potential environmental injustice from its Project Description.

This flawed description of a serious potential for environmental injustice materially affects the Draft's description of problems that must be understood to analyze the full range of alternatives and mitigation. The Draft downplays and fails to adequately describe how the health threat is caused by a *combination* of bromine in drinking water from the Delta *and* the actual formation of THMs and/or bromate far from the Delta, where the drinking water is distributed and disinfected. This inadequate problem description serves to obscure the potential for solving the problem by requiring new decisions at the point of disinfection treatment.

These decisions could include membrane treatment (or equally effective treatment) for the toxic disinfection by-products at the treatment plant, and might also include replacing chlorine

for residual disinfection in neighborhoods' public water pipes, or replacing old leaky pipes in low income communities to reduce organic carbon inputs, all of which reduce toxic exposures.

The Draft's acknowledgement that drinking water treatment solutions may be expensive only supports the need to describe any disproportionate impact on low income communities. It gives short shrift to solving this drinking water problem within the drinking water systems, while looking to solve it mainly by actions taken in the Delta. Yet without these other solutions, when rising sea level and waning mountain snowpack-fed rivers render all in-Delta solutions to the bromine input problem ineffective, these drinking water impacts will only worsen.

H. Failure to describe effects of global warming on long term drinking water quality.

The ongoing long-term buildup of carbon dioxide and other 'greenhouse' gases in the atmosphere is predicted to cause at least four things to happen which will increase bromine (bromide) levels in the Delta. (See: American Chemical Society, 1999; and AAAS, 1990 as cited above.) Global temperature will rise further. Sea level will rise further. Variability in rain and snowfall is likely to increase further, increasing the frequency and intensity of flood and drought events. Mountain snowpacks are very likely to be reduced in some or all spring and summer seasons due to warmer temperatures and warmer rains which quickly melt the snow early. (Ibid.)

Indeed, the fact of these trends is already evident: mean global temperature has increased; sea level has increased; and the frequency and duration of drought and 'wet' periods has increased already in California.

The Draft does not describe these recent trends, and the high likelihood that they will continue, adequately. These factors change not only the Draft's assessment, but the fundamental assumptions of most water development in California. Sea level rise, which will push ocean water further into the Delta, and drought with rain-on-snow events, which will reduce seasonal river flows, will combine to increase salt content in Delta water. The Draft admits past salt intrusion apparently affecting all project water intake locations in the Delta (page 5.2-4). Future intrusions are likely to go as far or further, and do so more often.

Tragically, though, the Draft ignores the cumulative effects of sea level and river flow changes on ocean intrusion into the Delta. It claims sea level rise will not cause significant change for hundreds or thousands of years (page 8-13). Yet the sea level rise of a few feet that it discusses by year 2100 (Ibid.), *in combination* with waning spring/summer river flows, is well predicted to cause sea water intrusion into the Delta (AAAS, 1990 as cited above).

The Draft admits that millions of Californians are affected by toxic chemicals created in the disinfection of drinking water tainted with bromine, which it says comes mainly from sea water intrusion to the Delta drinking water intakes. (See WQ Prog. Plan at 3; and Appendix E.) Further, the Draft claims that "Water Quality Program actions probably will only minimally affect the levels of bromide" in Delta drinking water intakes, and alternative disinfection and drinking water treatment is uncertain or expensive (Ibid.).

If the Draft is correct that significant drinking water impacts on human health will, for the foreseeable future, be linked to the amount of sea water mixing into the Delta, then its failure to provide of information to assess the timing and extent of sea water intrusion here with rising seas and waning rivers, combined, is an extremely important omission.

I. Failure to describe known and reasonably likely impacts of recently-introduced toxics.

The Draft does not describe the present negative environmental impacts of past pollution (including mercury, PCBs, DDT and other pollutants) adequately to give the public and decision makers important historical information about the long term damage from allowing pollution today. This is important because the Project must choose between an approach of preventing pollution, and a conflicting approach of allowing pollution in order to better study its distribution and more of its effects in the environment, before stopping the pollution.

The Draft does not describe the evidence of MTBE's persistence, and of its inevitable escape to contaminate drinking water supplies with widespread use, that was presented to decision makers before Bay Area refineries rebuilt processes to start producing MTBE-laden fuels. (See eg., CBE, 1993.) This is important because the project has the opportunity to avoid the mistakes made by allowing widespread use of MTBE and other persistent chemical pollution; it could take a true pollution prevention approach now.

The Draft does not describe how, despite decades of evidence on its toxicity, dioxin was not monitored in fish throughout the Bay/Delta until 1994, when community members who fish began to demand testing and participated in a 'pilot' testing program's development. This is important, because it is useful to reflect that other 'new' pollutants might be increasing in humans today, without adequate monitoring.

The Draft ignores new evidence of widespread polybrominated diphenyl ethers (PBDEs) pollution. It fails to provide information on PBDE monitoring, concentrations, and trends in the Bay/Delta food chain and anglers, despite startling evidence that PBDEs are already accumulating in the aquatic food chain elsewhere, and are concentrating in people at exponentially increasing rates (see eg., Noren and Meironyte, 1998; and Sjodin et al., 1999).

The Draft provides no information on PBDE toxicity, though PBDEs appear to interfere with the Ah receptor protein – the mechanism of dioxin-like toxicity – and may be endocrine disruptors (see eg., Sjodin et al., 1999). It fails to describe a massive, ongoing increase in PBDE production (see eg., Kirk-Othmer Enc. Chem Tech., 3rd and 4th edition; and Business Communications Co., Inc., 25 Van Zant St., Norwalk, CT 06855), despite the inevitability of increased release to the Bay/Delta with increased production and use. In this regard, the Draft admits that 'controls' on so-called 'nonpoint' pollution are likely to fail (see eg., 5.3-4, 5.3-58).

Perhaps most important, the Draft does not provide information on the persistence of PBDEs and the consequences of this persistence. PBDEs concentrate in human breast milk (see eg., Noren and Meironyte, 1998), suggesting that future generations may be exposed to PBDEs that are produced and released today.

The Draft fails to provide extremely important information to help the public and decision makers define and inform a crucial choice to be made in the Project's Water Quality Program:

**Either:** Act now to stop synthetic trace contaminants from accumulating in our food chain and bodies as a health precaution, before knowing their full toxicity;

**Or:** Allow these new chemicals to be used and released, ensuring that we and our children will be exposed to them, before knowing that this is safe.

### III. PROJECTION OF FUTURE 'NO ACTION' ALTERNATIVE CONDITIONS

#### A. Failure to assess non-CALFED improvements in food resource contamination with no increase in the rate of water diversion from the Bay/Delta system.

The Draft does not describe citizen actions that cut oil refinery selenium pollution of the Bay/Delta, EPA Clean Water Act enforcement, State water board's water quality law implementation and enforcement, growing community campaigns to prevent pollution at individual industrial sites, and other water quality improvements discussed in parts I.D and II.F above. It does not even note that many of its general water quality steps appear to be required, broadly speaking, by existing laws, such as Clean Water Act mandates which prohibit toxic pollution with a goal of eliminating pollution.

Further, the Draft does not assess the demonstrated connection between the price of water, waste of water, and production of many industrial toxic pollutants. Thus, it fails to assess how limiting growth in the developed water supply can, through price increase and other restrictions on industrial water waste, reduce and in some cases eliminate industrial toxic water pollution. (See eg., Drennan, 1994; Karras, 1994; Rosenblum, 1998; and Karras, 1992.)

Therefore, the Draft fails to assess improvements in water quality – from other ongoing and new actions outside CALFED and from pollution prevention effects of reduced industrial water waste – under the 'no action' alternative (no CALFED water quality improvements and no increases in water diversion).

#### B. Failure to assess non-CALFED improvements in drinking water treatment at plants and point-of-use, and alternate drinking water supplies, without increased diversion rates.

The Draft does not describe, assess, or provide adequate information on actions that are likely to be required which may improve drinking water quality.

The Draft does not discuss the combined impacts of global warming on sea level, precipitation, snow melt, and runoff, which may increase salt and bromine in Delta water intakes. (See eg., ACS, 1999; and AAAS, 1990 as quoted above.) It does not assess the possibility that, at some time in the future, sea level rise may coincide with extreme low river flow due to depletion of the snowpack by unseasonal late-winter rain followed by drought. All present and planned major water intakes may be vulnerable: "Historically, during extremely low runoff periods in summer, salt from tidal flows intruded into the Delta as far as Hood." (Page 5.2-4.) This scenario will result in a more complete restructuring of the water system than the Draft assesses. The restructuring, if considered as a whole rather than piecemeal, could consider desalinization, widespread double-plumbing with gray water systems, closed loop water recycling wherever possible, or other options which may improve drinking water quality.

Absent fundamental change, the Draft's apparent assumption that non-CALFED drinking water law enforcement will *not* result in safe drinking water is not supported. Indeed, the Draft claims it is not known whether it will be feasible to develop technology that meets health-based standards for bromine-based drinking water pollutants. (See eg., WQ Prog Plan at 3-3, 3-7, 3-15 and Appendix E.) Programs can also be developed to focus on highest quality water only for the portion of water that is actually consumed, but the Draft does not discuss or assess these possible solutions. The alternative to the Draft's unsupported assumption, that drinking water safety will be enforced with or without the project, reverses the Draft's conclusion.

In sum, the Draft fails to provide information regarding apparently likely influences of global warming, and other public laws and institutions outside CALFED which could ensure water quality protection or improvement. Therefore, based on the incomplete information and analysis in the Draft, and in light of the reasonable potential for global warming, and the reasonable potential that existing requirements could improve drinking water quality, it is not known that drinking water quality will significantly improve or degrade overall, if the 'no project' alternative is chosen now.

C. Failure to assess non-CALFED improvements in water efficiency with no increase in the rate of water diversion from the Bay/Delta system.

Pollution prevention and water efficiency work shows that increased restriction on industrial water waste (and pollution) could cost-effectively free up to 90% of the water currently used by industry. This is demonstrated in more than 100 California plants encompassing several industries (see eg., Drennan, 1994; Karras, 1994; Rosenblum, 1998; and Dr. Rosenblum's comments on this DEIS/EIR – see Attachment 1). In other words, the 'no project' alternative that does not increase water diversion could, by restricting growth in water supply, trigger industrial actions that cost-effectively increase water use efficiency beyond that predicted by the Draft.

IV. COMPARISON OF EXISTING CONDITIONS WITH PREFERRED, ENVIRONMENTALLY SUPERIOR, AND NO ACTION ALTERNATIVES

A. Failure to assess differences between existing conditions today and the 'no action' alternative with likely non-CALFED improvements in water quality.

The Draft concludes that there are essentially no significant differences in environmental impacts between existing conditions today, and those 20-30 years hence under its 'no action' alternative. (See: pages 5.3-22, 5.3-47.) However, the Draft fails to provide the information and analysis to identify and assess:

- 1) Significant disproportionate and adverse environmental impacts on people of color from food chain contamination in the Bay/Delta (see these comments at part II.A).
- 2) Potentially significant disproportionate and adverse impacts on low income residents from drinking water pollution in many areas (see these comments at part II.G).
- 3) The likelihood of reduced food chain contamination from industrial pollution prevention driven by non-CALFED actions and pressure for increased water efficiency in the absence of increased water diversions (see parts III.A and C).
- 4) The possibility of improved drinking water quality due to fundamental restructuring of the water system necessitated by global warming and/or enforcement and implementation of drinking water protection independent of the CALFED program (see parts III.B and C).

Thus, the Draft does not provide information and analysis that would be necessary to determine whether the no action alternative will provide significantly better water quality as compared with existing conditions. It fails to assess this alternative adequately.

B. Failure to compare the preferred alternative with a reasonable forecast of the no action alternative for water quality with non-CALFED water quality improvements.

Unlike its other alternatives, the Draft's 'no action' alternative uses water export conveyance and storage that exists or is being implemented now, and limits future water diversions to within 10% of those now. Unfortunately, with respect to specific types of water quality impacts, only about three clear and understandable distinctions between the no action alternative and its preferred alternative could be found in the Draft:

- The Draft projects that its preferred alternative will significantly improve salinity in the Delta and the quality of exported drinking water, as compared with the no project alternative (pages 2-21, 2-22, 5.3-32, 5.3-33), however, these benefits may be less pronounced when compared with existing conditions (page 5.3-47).
- The Draft projects that its preferred alternative could cause unavoidable significant cumulative impacts on salinity, water circulation and water quality in the Bay, as compared with the no project alternative (pages 5.3-30, 5.3-56, and 5.3-59).
- The Draft projects that its preferred alternative could induce growth which indirectly causes runoff pollution and unavoidable significant cumulative impacts on water quality, as compared with the no project alternative (page 5.3-55, 5.3-57, 5.3-58, and 5.3-59).

Although it does not explain how it weighs these water quality impacts, the Draft concludes that overall: "Compared to the No Action Alternative, the Preferred Program Alternative provides significant improvements in ... water quality." (Page 2-21.) However, the Draft simply assumes water quality will degrade with the no project alternative without the information to identify and assess the same issues noted above, among others:

- 1) Significant disproportionate and adverse environmental impacts on people of color from food chain contamination in the Bay/Delta (see these comments at part II.A).
- 2) Potentially significant disproportionate and adverse impacts on low income residents from drinking water pollution in many areas (see these comments at part II.G).
- 3) The likelihood of reduced food chain contamination from industrial pollution prevention driven by non-CALFED actions and pressure for increased water efficiency in the absence of increased water diversions (see parts III.A and C).
- 4) The likelihood that relatively less water diversion under the no action alternative will result in significantly improved anglers' health due to more bay circulation reducing bioavailability of toxics (see part II.B), coupled with increased pollution prevention (see point 3 above).
- 5) The possibility of improved drinking water quality due to major restructuring of the water system in response to global warming, pollution prevention, and implementation of drinking water protection independent of the CALFED program (see parts III.B and C).

Despite its admissions that its preferred alternative causes significant, unavoidable, and synergistic impacts of increased pollution and reduced water circulation affecting the Bay and anglers, the Draft lacks information and analysis needed to know whether this alternative will improve or degrade water quality overall as compared with no action. It fails to do an adequate forecast of its alternatives' water quality impacts. It fails to assess its alternatives adequately.

C. Failure to describe a reasonable range of alternatives including an 'environmentally superior' alternative based on expanded water quality improvements and no increase in the rate of water diversion from the Bay/Delta system.

The Draft fails to provide much information that is needed to define important aspects of an environmentally superior alternative. For example, until the effects of global warming on bromine at Delta water intakes, or the feasibility of destroying or avoiding formation of the drinking water contaminants now linked to this bromine are adequately assessed, it may be premature to conclude that continued use of the Delta as a key drinking water source should (or should not) be part of the superior alternative for the long term.

Nevertheless, evidence is available now to show that the truly environmentally superior alternative includes several features that the Draft's alternatives do not share:

- Explicit recognition of, and binding commitments to remedy, all environmental justice issues
- No further increase in water diversion until all feasible water conservation, recycling, efficiency, and alternate water source options are fully explored and implemented unless it is proved conclusively that they are infeasible
- Demonstrated adequate financing and commitments to fundamentally restructure the developed water system for reliability with sea level, snow melt and climate changes past 2030
- Explicit commitments to true pollution prevention, including interventions to eliminate intentional and unintentional production of persistent bioaccumulative synthetic compounds forthwith, comprehensive pre-production screening of 'new' chemicals, proof of safety before persistent bioaccumulative chemical production, independent verification and enforcement, and explicit commitments for financial/legal support of a just transition for workers.
- Membrane technology or equally effective treatment, replacement of leaky neighborhood pipes, and a research consortium, for bromine removal/THM treatment of drinking water
- Explicit commitments in funding and land use rights for substantial increase in wetlands
- Comprehensive monitoring of water use and the aquatic food chain, including anglers
- A schedule for technical/financial collaboration seeking cleaner, energy- and cost-saving closed loop recycle, then mandatory action for businesses with high water use processes
- Appointment of subsistence anglers to State and Regional water boards
- PCBs roundup (identification, collection and containment of in-use PCBs in watersheds)
- Increased funding and return to full enforcement of water laws, expanded citizen suit rights
- Establish a trust for an estuarine science department in at least one major Bay Area university

The Draft has failed to analyze, develop and discuss these possible components of an environmentally superior alternative. This is a crucial point. The public and decision makers have a right and need of the opportunity to review a reasonably broad and adequately complete range of options, including these options which are, unfortunately, omitted from the Draft's analysis. An adequate environmental review must analyze and develop this information.

V. FAILURE TO ASSESS SIGNIFICANT ADVERSE AND DISPROPORTIONATE ENVIRONMENTAL IMPACTS OF THE PREFERRED ALTERNATIVE

A. Impacts of toxics in Bay/Delta food resources that are interrelated with the Project.

The Draft omits mention of EPA's May ruling that dioxin compounds are a high priority under section 303(d) of the Clean Water Act specifically because of the significant risk to the health of subsistence anglers who are exposed to dioxin via consumption of Bay fish. (See May 12, 1998 letter from Alexis Strauss to Walt Pettit.) It omits that mercury is designated by the State and EPA as a high priority pollutant in the Bay under this section. PCBs that are not dioxin-like, DDT, dieldrin and chlordane cause priority violations of Bay water quality standards. This, clearly, is a significant adverse environmental impact affecting people who fish the Bay.

The health advisory cited in page 4-3 of the Draft's Water Quality Program Plan indicates that women who are or may become pregnant should eat no more than one eight-ounce meal of Bay-caught fish per month to avoid potential effects on their future children, and increased risk of cancer. Yet high-end Bay anglers eat up to an individual average of 16 ounces *per day* on average (a six- to eight-ounce meal two or more times daily), or about fifty times the maximum recommended level. (See Karras, 1998; Chiang, 1998; Wong and Nakatani, 1997; and Cohen, 1995.) Birnbaum (1998) reports that general population exposures to dioxin are at or near levels that may cause effects on childhood development, diabetes, increased viral susceptibility, and endometriosis. Yet many people eat from four to sixteen ounces of white croaker from the Bay that contains dioxin toxicity at an average of 9.5 to 10 pg/g wet weight, and are exposed at levels from ten times to thirty times greater than this already-dangerous average.

Impacts of these exposures to multiple health advisory toxicants in the fish at levels up to fifty times safety recommendations and, for dioxin compounds, up to thirty times general population exposure levels, are disproportionately high and adverse.

The National Environmental Justice Advisory Council to EPA has considered dioxin impacts on fishing in S.F. Bay and adopted an authoritative Finding that this causes environmental injustice (see September 1, 1998 letter from Haywood Turrentine to Carol Browner). Three independent surveys with a total of more than 1,000 Bay anglers uniformly indicate that the majority of those who fish the Bay are people of color (See Karras, 1998; Chiang, 1998; Wong and Nakatani, 1997; and Cohen, 1995.) These significant, disproportionately high and adverse environmental impacts create a circumstance of environmental injustice.

Further, the Draft admits that its preferred alternative has a significant, unavoidable cumulative impact on Bay/Delta water quality from storm water runoff discharge (see pages 5.3-55, 5.3-57, 5.3-58, 5.3-59). Storm water runoff contains dioxin compounds (see eg., RWQCB, 1997. *Survey of Storm Water Runoff for Dioxins in the San Francisco Bay Area.*), and carries the other food chain pollutants of concern as well. Further, this alternative has a significant unavoidable environmental impact on water quality due to decreased Bay circulation (pages 5.3-30, 5.3-56, 5.3-59), and reduced circulation can exacerbate pollutant bioaccumulation (see State Board Order 90-5 as quoted above). Finally, cheaper water from increased diversions hinders pollution prevention.

The Draft fails to state that its proposed project would cause significant cumulative environmental impacts on people of color that are disproportionately high and adverse.

B. Impacts of toxics in drinking water that are interrelated with the Project.

Bromate and brominated trihalomethanes (THMs) are by-products of drinking water disinfection that might cause cancer and reproductive effects in people exposed to them in drinking water. The Draft acknowledges, and indeed, highlights the fact that these drinking water pollutants may cause significant unavoidable environmental impacts. These impacts may be exacerbated by higher levels of bromine in Delta water intakes for drinking water supplies in the future. The Draft also states that prospects for removing these pollutants through water treatment are uncertain. (See eg., Water Quality Program Plan at Appendix E.)

Many people in low income communities are exposed to this significant impact. The Draft acknowledges that approximately 12% of the population drinking water drawn from the Delta is living below the official poverty line (see page 7.14-3). Thus, low income communities are affected by this environmental problem that the Draft asserts is a significant impact.

Low income people may be disproportionately exposed to these toxics if their community's public plumbing is old and this results in more THM formation, or if their income restrictions result in less use of bottled water and/or home purification devices. Yet, despite its discussion of the potential for environmental justice impacts in rural areas where drinking water wells may be affected by the project, and the millions of low income people who drink non-well water taken from the Delta and are affected by this significant impact, the Draft does not assess whether the impact is disproportionate.

Like the failure to identify the environmental injustice done to Bay anglers, this failure to assess an adverse drinking water impact affecting low income communities and determine if it is disproportionate, is contrary to environmental justice principles. Failure to assess in this circumstance appears contrary to the environmental justice guidance for this EIS/EIR.

VI. EXAMPLES OF SPECIFIC ERRORS AND OMISSIONS IN THE DRAFT'S PLAN FOR MITIGATING IMPACTS AND IMPROVING WATER QUALITY

A. Dioxin compounds.

The Draft fails to propose any mitigation for the significant dioxin impacts EPA has found. This would contradict the Clean Water Act mandate triggered by EPA's May 12, 1999 ruling. The Draft omits proposals to support the regional effort to eliminate the production of dioxin wherever possible that was adopted unanimously by the City of Oakland and the City and County of San Francisco. This fails to meet CALFED's cooperation goal. It does not discuss available evidence of specific pollution prevention actions that could address identified sources, though this evidence has been discussed and distributed widely (see eg., Karras, 1998). This is contrary to requirements to assess relevant available information regarding significant impacts.

B. Mercury.

Many of the same industrial sources known to contribute to dioxin contamination of the Bay/Delta – incinerators, oil refineries, petroleum coke-fired electric power plants, and a cement plant for example – also cause mercury pollution of the estuary. The Draft fails to propose any mitigation to reduce or eliminate this pollution at the source. It appears to assume that these

sources are nonexistent or trivial, however, this is illogical given that industrial processes similar to some of these sources are believed to be the major cause of mercury pollution in the U.S., and the Draft discusses no local source monitoring to the contrary.

The most detailed and specific mitigations proposed for mercury are in the Draft's Revised Phase II Report ("Phase II") at page 115: "Conduct the following mercury evaluation and abatement work: Cache Creek – ...Participate in Stage 1 remediation (drainage control) of mercury mines as appropriate (yr 3-5) .... Sacramento River – .. Participate in remedial activities (yr 7) ... Delta – .. Determine potential impact of ecosystem restoration work on methyl mercury levels in lower and higher trophic level organisms (yr 3-5)."

Even these most specific mitigation actions do not name the responsible agencies, state whether the years given include starting or completion dates, or describe the nature of the "drainage control" or "remedial activities" and "ecosystem restoration." There is no information to assess whether the schedules are realistic or overly drawn out. Clean up criteria are not specified. Given this vagueness, one expects at least general criteria to guard against ephemeral actions that are postponed again and again while the Bay/Delta is further contaminated and anglers suffer health risks. However, the Draft also seems to lack clear mercury discharge reduction targets for specific mines. Thus, it does not ensure effective mine clean up actions.

### C. Selenium.

The Draft correctly identifies petroleum refineries as a significant cause of selenium pollution in the Bay, but its analysis and mitigation proposal contain significant errors. First, it does not update a discharge estimate that dates back to the 1989-1992 time frame, when refineries collectively discharged about 4,800 pounds of selenium to the Bay per year and were the predominant cause of Bay selenium pollution (Water Quality Prog. Plan at 8-4). Pursuant to consent decrees filed in three citizen enforcement actions, the refiners have discharged at less than 30% of of this rate for the past year or more. Discharge has been cut at the Rodeo plant, which once discharged the most selenium of the refineries, by more than 90%.

Second, the Draft asserts ongoing difficulties in "identifying and implementing the best treatment technologies" and asserts that "[c]ontinued work is needed" (WQP Plan at page 8-3). It goes on to assert that: "The following approaches have been identified to potentially reduce the impacts of selenium that is a by-product of the crude oil refining process. ... Treatment of Waste Streams ." (pages 8-16, 8-17). In fact, citizen enforcement actions by CBE, San Francisco BayKeeper, Save San Francisco Bay Association, the Bay Institute, CalPIRG and others have already resulted in specific recycling and treatment actions at the three refineries that had caused the majority of the problem.

These errors in the Draft imply that these efforts have not yet occurred and cite a dated baseline discharge rate more than three times current emissions. The errors indicate that the Draft has based at least this portion of its analysis on erroneous data. In effect, its mitigation proposal takes credit for water quality improvements already achieved by others, in place of new actions needed to address ongoing problems.

D. Polychlorinated biphenyls (PCBs).

The Water Quality Program Plan states the PCBs contamination is a water quality concern (eg., page 6-1), but no discernable mitigation is proposed other than general sediment and soil erosion measures apparently focussed mainly on pesticides. Roughly half of all PCBs ever produced are estimated to be in aging electrical, industrial, and heavy duty transportation equipment scattered throughout the Bay/Delta and other watersheds. (See eg., Webster and Commoner, 1994.) These highly toxic chemicals are waiting to spill, and periodic spills continue to occur. (See eg., Karras, 1998.) A 'PCBs roundup' is needed to find, collect and contain the toxicants before more are released. The Draft fails to identify or discuss this needed mitigation.

Further, the Draft makes no mention that 'new' PCBs inadvertently created in refinery and incinerator processes have been documented in ongoing Bay Area source releases. The emission rates measured are of major concern, especially since a portion of these 'new' PCBs may be extremely toxic dioxin-like PCBs. Tests are available to find out. Incredibly, however, no source tests for dioxin-like PCBs have been conducted at these ongoing Bay Area sources. The Draft wrongly ignores adequate testing and required prevention of this pollution.

E. Methyl tert-butyl ether (MTBE).

The Draft proposes "MTBE reductions in various areas (yr 3-5)." (See Phase II at page 117.) This 3-5 year schedule could be two years longer than the MTBE phaseout ordered by Governor Davis this year, assuming that the year five in "3-5" is a firm completion date. This proposal appears to conflict with the Governor's policy decision. A concern here is the potential that adopting this mitigation could delay actions needed well before three years from now if the three-year phaseout is to be implemented, and stop the pollution, on time.

F. Polybrominated biphenyl ethers (PBDEs).

PBDEs are of urgent concern and remain literally unregulated with respect to Bay/Delta water quality. The Draft proposes no mitigation for them and would continue this highly dangerous trend. It fails to discuss Bay food chain and angler monitoring, despite findings elsewhere that concentrations of PBDEs are already elevated in aquatic food chains, and rising exponentially in humans (Noren and Meironyte, 1998; and Sjodin et al., 1999). In toxicity experiments PBDEs interfere with the Ah receptor protein – the same mechanism by which dioxin compounds cause additive toxicity – and PBDEs appear to cause endocrine disrupting effects as well (Sjodin et al., 1999). Massive industrial PBDE production is still increasing today. The Draft fails to propose a strategy to phase out the production of PBDEs now, before the tragedies of DDT, PCBs, dioxin, and MTBE are repeated yet again.

G. Brominated trihalomethanes (THMs) and bromate in drinking water.

The Draft admits that its proposed mitigation may not be effective (WQ Prog. Plan at 3-11). However, at least three actions are known to be effective: treatment plants could use membrane technology to remove the unwanted chemicals or an equally effective method to be proved in the future such as UV light; old/leaky drinking water distribution systems such as those in many

low income communities and neighborhoods can be replaced to reduce the formation of THMs from bromide and chlorine during 'residual disinfection;' and increased water efficiency or other water sources with less bromine could be used instead of high-bromine Delta water as a drinking water source. This last solution, though it might be applied incrementally at first, might even become essential over the long term due to the effects of global warming.

Feasible mitigation exists for the significant impacts of brominated THMs and/or bromate on drinking water quality and health: the Draft EIS/R errs by failure to propose this mitigation.

Further, the Draft admits that technology development at disinfection plants is challenging (see eg., 3-7). In such circumstances, governments sometimes form an alliance to tackle the common problem. The Draft fails to identify or discuss the option of forming a consortium of water agencies to address disinfection without bromate or THM formation.

#### H. Copper, nickel and other toxic metals.

The Draft asserts that, in contrast to the upper watershed, "[c]orrective measures downstream should be based on the extent of impacts as determined by further studies." (WQ Prog. Plan at 9-1.) No actions are proposed to reduce or eliminate copper and nickel found flowing through industrial/municipal waste water discharges. However, copper and nickel are designated as priorities for action in Suisun Bay due to water quality standards violations here, under Clean Water Act section 303(d). The Clean Water Act would appear to disallow the Draft's proposal, and with good reason. Ample evidence already exists to show that copper toxicity is a real concern, as the Bay Regional Board has asserted consistently over the past decade. Further study without concomitant action to prevent the pollution where possible is little more than a smoke screen for further foot dragging.

The Draft errs by its failure to assess mitigation actions, such as the cost-saving pollution prevention and water efficiency audits that 'closed the loop' at some South Bay industrial plants (See eg., Rosenblum, 1998; Karras, 1994; and the comments of Dr. Rosenblum on this EIS/EIR, which are included for the reviewers' convenience as Attachment 1).

#### I. Pesticides such as diazinon and chlorpyrifos.

The pesticide elimination and alternatives efforts described on page 5-13 of the Water Quality Program Plan are good ideas that should be expanded. In contrast to the "study how bad the pollution is" approach taken by, predictably, the pesticide marketers on page 5-12, this approach of seeking alternatives that avoid environmental health risk altogether can yield measurable, verifiable, and useful results.

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Attachment B  
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Attachment 1

Comments of John Rosenblum, Ph.D., on water use efficiency

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**COMMENTS ON THE COMMERCIAL/INDUSTRIAL ELEMENT  
IN CALFED'S WATER USE EFFICIENCY PROGRAM PLAN**

*John Rosenblum, Ph.D.*

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**1. INTRODUCTION**

Although my comments address a small fraction of the water considered by the CALFED plan, Commercial Industrial and Institutional (CII) usage, I believe that at least two general benefits to the CALFED process can be derived from them:

- Projects that identify and demonstrate multiple benefits can bring together seemingly irreconcilable interests.
- Very large improvements in water use efficiency can generate significant economic savings by paying attention to site-specific details.

The Silicon Valley Pollution Prevention Center's Industrial Water Efficiency program provides an example. The Center was created as part of the settlement of a long series of regulatory and legal battles, and brings together representatives of industry, government, and environmental organizations to seek collaborative approaches to reduce sources of pollution impacting the South San Francisco Bay. The focus of the Industrial Water Efficiency program is to evaluate and demonstrate the technical and economic feasibility of improving process water efficiency and

reducing wastewater discharges from high-technology manufacturing plants. The program began in 1997 and continues to address the interests of all participants in successive stages.

Two plants, a disc-drive manufacturer and a semiconductor Fab, initially volunteered for detailed evaluations. Currently, several disc drive plants are testing measures originally developed for optimizing semiconductor wafer rinsing. This site-specific approach has helped identify 60-80% reductions in plant-wide water demands (and wastewater discharges), derived from 30-60% reductions in process demands followed by 50-90% recycling of rinse wastewater. Based on these large reductions, savings in water purchases, Ultra Pure Water production, and sewer fees can pay for implementation within 2-3 years; when savings in process chemicals are added, the payback can be as short as 4 months.

I believe that paying more attention to site-specific details and local conditions, for all categories of water users, will improve CALFED's efficiency evaluations. Such an improvement will then help focus attention on potential benefits rather than on the sacrifices that different interests believe they are making to others.

## 2. COMMENTS

### 2.1 Include Larger Potential Reductions for CII

The *Draft Programmatic EIS/EIR Technical Appendix* estimates that reduction in unit<sup>1</sup> CII water demand for the year 2020 without CALFED intervention is 15%; with CALFED the reduction is expected to be 22%<sup>2</sup>. The 15% State reduction is derived from the expectation that residential water use will decline by 11% as urban BMP's<sup>3</sup> are implemented, with CII assumed to achieve 4% beyond the BMP's. The 22% reduction is derived from an EPA study of commercial water users<sup>4</sup>, implying that Federal assistance would add 7% to the reductions expected from State programs.

The BMP's include very few measures for the CII sector, and none that effectively target the largest uses of water. For example, installation of ULF toilets addresses only a miniscule fraction of water usage in an industrial plant, and commonly accepted audits based on low cost "walk-throughs" miss the most significant reductions. My own experience in industry<sup>5</sup> is that cost-effective reductions of 50-90% are usually feasible, based on site-specific production-process improvements. My point here is that the assumption of 4% (or even 11%) in unit reductions beyond urban BMP's for the CII sector is far too low.

<sup>1</sup> Unit reduction refers to the CII sector alone, in gallons per capita per day (gpcpd).

<sup>2</sup> The projections are DWR's from January 1998, calculated by multiplying urban per-capita water usage, total population, and fraction of CII usage, and then applying the reduction factor.

<sup>3</sup> Best Management Practices in the Memorandum of Understanding Regarding Urban Water Conservation in California, overseen by the California Urban Water Conservation Council (CUWCC), and revised in September 1997.

<sup>4</sup> *Study of Potential Water Efficiency Improvements in Commercial Business*, EPA 1997 (with DWR).

<sup>5</sup> Including the "hi-tech" sector (semiconductors, disc-drives, printed circuit boards, surface-finishing) and a wide variety of food-processing (dairy, meat and poultry, juices, tomato paste).

Even before addressing the issue of cost-effectiveness, it is possible to recognize the policy implications of underestimating CII reductions:

- Assuming that CII is 30% of total water demand, a 15% CII reduction translates into a total reduction of only 4.5%, which would have very little impact on infrastructure planning. Even with the 22% CII reduction projected with CALFED assistance, the total reduction would be only 6.6%. On the other hand, a 70% CII reduction would provide a 21% total reduction, which is far more significant.
- A 15% or even 22% reduction is smaller than the operational variability in water usage for most industrial plants, and is very hard to verify. Justification of water efficiency projects requires verification of reductions, costs, savings, from public and private perspectives. Projects aimed at 50-90% reductions can be easily verified and justified.
- The additional 4% or 7% unit CII reduction beyond urban BMP's might not be a high priority, but developing a CII water efficiency program to capture an additional 200-500% should be.

## 2.2 Add Industry Specifics to Regional Conservation Estimates

The regional estimations of CII reductions are all based on the same unnecessarily low unit CII reduction (see previous section), regardless of the differences in the mix of CII users. These differences might not be significant when only small reductions are expected from the CII sector, but become increasingly relevant with much larger reductions. Disaggregation based on location and type of industry will reveal the implication of these differences. For example, UR2-Eastside San Joaquin River includes many large food processors, while UR4-San Francisco Bay includes petroleum refineries and high technology plants. These industries have entirely different water demand profiles, wastewater loads, and potentials for efficiency improvements, on-site recycling, and off-site reclamation.

## 2.3 Add Unit Cost Estimates for Specific CII Measures

Unit cost estimates (in \$/AF) are presented for 8 urban BMP measures<sup>6</sup>, including only ULF toilets for the CII sector. CII audits are mentioned, but no costs are listed. My experience in industry is that in-depth, site-specific Pollution Prevention audits can identify very large reductions in water use resulting in negative unit costs (i.e. net savings, with payback periods of 0.5-3.0 years) for the company. Including the costs of the audits reduces the savings somewhat, but does not trigger costs anywhere near the values listed for the 8 BMP measures.

Even though the Pollution Prevention audits show net savings for the companies, the initial investment required usually raises internal organizational barriers. My experience is that funding from public programs for the audits and a fraction of implementation costs (at least for engineering and monitoring equipment) helps overcome such hurdles, and results in broader industry participation<sup>7</sup>. I have found that indexing public funding to the avoided costs of water

<sup>6</sup> Table 5-16 in the plan.

<sup>7</sup> Examples are (a) developing copper/nickel mass limits for industrial dischargers and subsequent Pollution Prevention Demonstration Projects by the Palo Alto Regional Water Quality Control Plant, (b) Pilot Pollution Prevention Studies, Heavy Metals Mass Audit Studies, the Nickel Initiative, and wastewater Flow Reduction

supply, municipal wastewater treatment, and area-wide reclamation projects still provides savings to ratepayers while closely approaching acceptable payback targets for industry.

Validating unit costs and evaluating the appropriate level of public funding are very important needs, which could benefit from CALFED assistance. This applies not only to the development of CII water efficiency measures, but to all urban BMP's and especially to municipal wastewater reclamation (where costs are highlighted as a major hurdle to implementation).

### 3. INTEGRATION OF CII MEASURES INTO STAGE 1 ACTIONS

#### 3.1 Balance Funding Priorities

The recommendations for Stage 1 Actions in the Draft Program Plan are quite comprehensive and have the potential to address further development of the CII element in accordance with my comments. On the other hand, since budget priorities will determine what actually gets implemented, I was disappointed that the only reference to capital funding was \$500 million for agricultural and urban wastewater reclamation<sup>8</sup>. I sincerely hope that other action items will also be recommended for capital funding, and not merely assigned whatever remains after reclamation.

I believe that comparisons between all the different water efficiency alternatives are essential for setting CALFED funding priorities, and necessary for public accountability. For example, section 2.2.4 describing CALFED's approach to providing incentives for wastewater reclamation does not explicitly require such comprehensive comparisons, but mentions the need to "*... develop an incentive program that more closely fits the objectives and timelines of CALFED Stage 1 Actions.*" Since a key CALFED program objective is State-wide cost-effectiveness, funding and incentives for reclamation must be compared with funding for other alternatives, including CII measures.

#### 3.2 Demonstrate CII Measures Beyond Urban BMP's

Demonstration of CII measures, not just their development, can be specifically integrated into several action items of section 2.3.1:

- Item 7 to "*... Develop an incentive based program to identify and implement urban water conservation measures that are supplemental to BMP's in the Urban MOU process and are cost effective from a statewide perspective.*" CII incentive programs could be based on the combined avoided costs for urban water supply, wastewater treatment, and reclamation. This would be similar to energy conservation incentives commonly provided by electric and natural

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Audits for industrial dischargers to the City of San Jose, and (c) developing CII water efficiency program for the City of Petaluma. Reports are available from the Silicon Valley Pollution Prevention Center, the Palo Alto Regional Water Quality Control Plant, the Bay Institute of San Francisco, and the City of San Jose's Environmental Services Department.

<sup>8</sup> Item 7 in section 2.3.1.

gas utilities<sup>9</sup>. My experience is that pilot projects help validate local cost-effectiveness; CALFED funding for implementation in several different areas would help demonstrate State-wide effectiveness.

- Item 11 to "...*Encourage and support research to expand potential water use efficiency measures.*" Ample research on efficiency measures is already available for many different industrial processes; what is missing in order to expand implementation are plant-wide demonstration projects that include all water uses, not just 1-2 individual processes. CALFED funding for several such projects would help expand implementation of CII measures, and not just in California.
- Item 13 to "...*Develop legislation for water measurement ... that requires appropriate measurement ... for all water users ...*" Monitoring is essential for verifying performance and cost-effectiveness of all water efficiency measures, both from a business perspective and for public incentive programs. My experience is that measurement has been inadequate for many CII projects and incentive programs; CALFED funding of monitoring equipment could help overcome this problem and, at the same time, demonstrate appropriate measurement procedures.

Section 2.3.3 to develop better information should include support for specific CII measures, especially "...*New efficiency technologies and their potential to affect water use ... The economics of water recycling ... The effects of source water quality on the costs of producing recycled water.*" Again, my experience is that results from demonstration projects validating performance and cost-effectiveness are more important than general technical information. Thus CALFED funding of CII demonstration projects, especially for adequate monitoring, will jointly achieve the goals of sections 2.3.1 and 2.3.3.

### 3.3 Include CII Measures in Policy Evaluations

Some CII measures require policy changes and/or public funding, and should be specifically included in the action items of section 2.3.1:

- Item 4 to "...*Create a public advisory committee ... for maximum effectiveness of program expenditures ...*" A key issue will be prioritizing support for different agricultural, residential, and CII measures; this will require, first and foremost, broad-based participation in the committee<sup>10</sup>. The second requirement is to develop common parameters for comparing the cost-effectiveness of different efficiency and recycling measures. In my experience, several criteria must be selected to account fairly for differences between different water users and other interests. An example for evaluation of CII programs is that CII volumes might be insignificant compared to agricultural and residential uses, but because unit costs are often negative (i.e. net savings), total program expenditures for water efficiency could be reduced by an aggressive CII element.

<sup>9</sup> In this case, avoided unit costs to water/wastewater ratepayers might represent an upper limit for incentives, with the proponents of different projects bidding competitively for partial funding (section 2.2.4 mentions this as a possible basis for providing reclamation incentives).

<sup>10</sup> Including not only representatives of direct users, but also environmental and community organizations supporting in-stream and public-trust benefits.

- Item 6 to “... *Implement an urban best management practices certification process ... with respect to analysis and implementation ...*” In my opinion, certification would be incomplete without a specific CII component, especially since CALFED support is also aimed at developing supplemental measures to existing residential BMP’s.
- Item 12 to “... *evaluate the need for additional state regulations ... providing protection for water rights holders who have implemented water use efficiency measures and subsequently transferred water to other beneficial uses.*” This should include a specific evaluation of CII reductions and flexibility to meet future CII demands, especially since water rights transfers could provide significant revenues to support public expenditures for efficiency programs.

#### 4. SUMMARY

- ✓ Reductions from CII efficiency programs are much larger than assumed in the draft.
- ✓ Disaggregation of regional CII efficiency programs will reveal much larger reductions than estimated in the draft.
- ✓ Unit costs of CII efficiency measures are much smaller (and often generate net savings) than for residential efficiency or urban wastewater reclamation.
- ✓ Stage 1 Actions must include balancing funding priorities by comparing the cost-effectiveness of all the different water efficiency programs.
- ✓ Stage 1 Actions should include funding for local CII demonstration projects.
- ✓ Policy evaluations in Stage 1 Actions should include specific CII components.