Appendix D

Responses to Comments

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Mercury in San Francisco Bay

Total Maximum Daily Load (TMDL)
Responses to Comments

California Regional Water Quality Control Board
San Francisco Bay Region

September 2, 2004

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OVERVIEW

On April 30, 2004, Water Board staff distributed a proposed Basin Plan Amendment and supporting Staff Report containing a draft Total Maximum Daily Load (TMDL) for mercury in San Francisco Bay. We invited the public to submit written comments on the proposal during a 45-day review period that ended June 14, 2004. Our responses to the written comments we received begin on page 8 of this document.

On June 16, 2004, the Water Board held a hearing to receive public testimony regarding the proposed Basin Plan Amendment. To ensure that everyone who wished to address the Water Board received an opportunity within the time constraints of the hearing, staff declined to respond verbally to most comments received. Responses to oral public testimony (mostly references to responses to written comments) begin on page 136.

On June 16, the Water Board also offered a number of comments and identified issues of particular interest to them. After the staff presentation, the Water Board asked some questions (Transcript page 24) and staff responded orally during the hearing. The questions included the following:

- Who produces methylmercury and how can we reduce it?
- How can we reduce the bed erosion mercury load?
- How does mercury evaporation result in a loss?
- What role do dentists and crematoria play in TMDL implementation?
- Have we done enough to address mercury air emissions?
- How could potential levee failures affect the mercury problem?
- What will implementing this TMDL cost?

The Water Board revisited some of these issues during its later discussion (Transcript page 103). Responses to Water Board comments and concerns appear below.

Stakeholder Input

The Water Board discussed the need to continue seeking input from stakeholders (e.g., keeping the administrative record open for additional comments). At its request, staff held a series of meetings with dischargers, the environmental community, and other interested stakeholders to discuss the proposed Basin Plan Amendment. The meetings focused on resolving stakeholder concerns about the proposal. On June 28, July 7, 14, 26, and 28, and August 3 and 10, 2004, staff met with representatives of the Bay Area Stormwater Management Agencies Association and the Bay Area Clean Water Agencies. Two focused workgroup meetings with Bay Area Stormwater Management Agencies Association representatives took place on July 20 and August 2, 2004. On July 23 and August 4 and 13, 2004, staff met with San Francisco Baykeeper and Clean Water Action representatives. On August 24, 2004, staff met with petroleum refinery representatives. As a result of these meetings and public comments received, staff has proposed a number of changes to the previously circulated Basin Plan Amendment. However, the changes are consistent with the general purpose of and approach to the proposed Basin Plan

Amendment, and logical outgrowths of the evidence, testimony, and comments received. The changes seek to address stakeholder concerns by clarifying the intent of the original proposal. Staff shared a revised draft Basin Plan Amendment with all stakeholders on August 16, 2004, and convened a full Mercury Watershed Council meeting with all stakeholders on August 23, 2004.

Scientific Basis of TMDL

The Water Board expressed concerns about several comments it heard regarding the TMDL's scientific soundness. Most of these comments related to the links between total sediment mercury and methylmercury in fish and wildlife, an issue discussed below. On the broader issue of the TMDL's scientific soundness, the Staff Report and proposed Basin Plan Amendment have undergone scientific peer review. Three independent scientists reviewed the TMDL: Professors James Kirchner and David Sedlak of the University of California, Berkeley, and Professor Rhea Williamson of San Jose State University. Together, they submitted 27 pages of comments regarding whether the scientific portions of the proposed TMDL are based on sound scientific knowledge, methods, and practices. Staff replied with 28 pages of responses and revised the TMDL accordingly prior to releasing it for public review and comment. The following quotes summarize the scientific peer review comments:

> "To my knowledge, the data used in the report are the best currently available. There are several important information gaps which are clearly identified in the report. The treatment of the data is appropriate; the report neither over-interprets the available data, nor overlooks important data bearing on the matters of interest.
>
> "The report recognizes that there are key information gaps, but these do not justify indefinite delay in implementing a plan of action. Enough is known about the sources, fate, and effects of mercury in San Francisco Bay to justify the proposed TMDL allocations and the proposed implementation plan. The implementation plan proposed in the report is a reasonable approach to managing mercury in San Francisco Bay, while simultaneously working to fill the critical information gaps, and allows for changes to be made as new information becomes available." (Professor James Kirchner)
>
> "Generally, the data presented are reliable and appropriate. Some applications of data are questioned. In addition, some parts of the document need a more technical approach." (Professor Rhea Williamson) [Staff responded to these concerns.]
>
> "The development of a TMDL for mercury in San Francisco Bay is very challenging and I believe that the authors of the report should be commended for their efforts. In my opinion, the report articulates the state of the science with respect to mercury in San Francisco Bay and the various approaches that can be used to ameliorate the risks that mercury poses to humans and wildlife.

> The authors have done a good job identifying uncertainties in the data and designing a TMDL that can be adapted as additional information becomes available. Although certain elements of the report could be improved, I believe that the plan should be adopted in a timely manner. The report makes it clear that mercury really is a problem in San Francisco Bay and that a modest allocation of resources can help solve the problem." (Professor David Sedlak)

The scientific review comments and staff responses are available on the Water Board's web site: www.swrcb.ca.gov/rwqcb2/sfbaymercurytmdl.htm.

Total Mercury Versus Methylmercury

The Water Board heard from several stakeholders who questioned the TMDL's linkage analysis. Concerns focused on the relationship between total sediment mercury and methylmercury in fish and wildlife. Mercury exists in elemental, inorganic, and organic forms. Natural processes transform mercury between the elemental and inorganic forms, and between the inorganic and organic forms. The organic form, methylmercury, is the most toxic. The linkage analysis establishes the connections between mercury sources and the numeric TMDL targets. The basis of the linkage analysis is the understanding that mercury entering the Bay binds to sediment and is transported to methylating regions of the Bay. The relationship between inorganic mercury and methylmercury is complex, and the TMDL is based on a very simple assumption: changes in total sediment mercury concentrations will result in commensurate changes in methylmercury concentrations. The concern is that focusing on total sediment mercury may not adequately reduce methylmercury. Depending on one's perspective, this means the TMDL could require too much or too little effort to reduce total sediment mercury. Some comments suggest that the TMDL should focus more on methylmercury.

The relationship between total sediment mercury and methylmercury in fish and wildlife depends on specific conditions that can vary enormously with location and time. Existing information is currently insufficient to better quantify the relationship in a way that could be applied to the TMDL. In the absence of a quantifiable method to describe the relationship, we assume that overall environmental conditions at all specific locations within the Bay will remain constant and that changes in total mercury concentrations will result in proportional changes in methylmercury concentrations. This assumption was implicit in the analysis the panel of independent peer scientists reviewed (see "Scientific Basis of TMDL" on page 2 above).

Due to the uncertainty inherent in the linkage between mercury sources and beneficial uses, the proposed Basin Plan Amendment includes targets closely related to beneficial uses (i.e., the fish tissue and bird egg targets). Because virtually all mercury in fish tissue and bird eggs is methylmercury, these are essentially methylmercury targets. However, these targets are not as closely linked to the load and wasteload allocations. The suspended sediment target is derived from the reductions needed to achieve the fish tissue

and bird egg targets (using the assumption discussed above) and provides a clear rationale for the proposed allocations.

The Basin Plan Amendment does not ignore methylmercury. In addition to including the fish tissue and bird egg targets, it contains specific provisions related to wetlands (locations of relatively high methylmercury production potential) and requirements to investigate opportunities to reduce methylmercury. Moreover, it includes a mechanism—adaptive implementation—for incorporating new relevant information into the TMDL as it becomes available.

Additional Opportunities for Load Reductions

The Water Board inquired as to the potential to achieve additional mercury load reductions by placing more emphasis on sediment dredging and dredged material disposal. Dredging and disposal operations do not fit neatly into the TMDL context because they are firmly linked processes that move sediment from one place to another without necessarily changing the Bay's overall sediment mass (except when disposal occurs outside the Bay). Moreover, the mercury concentration associated with dredged sediment typically depends on ambient sediment mercury concentrations, particularly in the context of maintenance dredging. We expect ambient sediment mercury concentrations to decline as the TMDL is implemented. Furthermore, the existing Long Term Management Strategy (LTMS) seeks to substantially reduce dredged material disposal within the Bay.

The LTMS will result in substantial mercury load reductions. Currently, dredging removes about 640 kg/yr of mercury from the Bay. Dredged material disposal returns about 490 kg/yr. The net result is a loss of about 150 kg/yr. By implementing the LTMS over roughly the next 10 years as planned, the net loss will increase to about 430 kg/yr, assuming ambient sediment mercury concentrations remain unchanged. However, TMDL implementation is expected to reduce sediment mercury concentrations over the long term. When the suspended sediment target of 0.2 ppm is attained and the LTMS is fully implemented, the net dredging and disposal mercury loss will decline to about 80 kg/yr. In all cases, dredging and disposal operations will always be a net loss (i.e., the combined source load will not exceed 0 kg/yr). To ensure that dredged material from any dredging project occurring in an area with elevated mercury concentrations would not be returned to the Bay, the TMDL includes a special concentration-based allocation for dredging and disposal.

Air Emissions Sources

The Water Board expressed a desire to better address mercury air emissions and work more closely with air quality regulators. If all sources met the suspended sediment target (the basis of most of the proposed allocations), the resulting mercury load reductions would be sufficient to meet the suspended sediment target throughout the Bay. Therefore, seeking additional load reductions from air sources may be unnecessary. However, reducing mercury air emissions would accelerate target attainment by reducing

direct and indirect atmospheric deposition. (Indirect atmospheric deposition contributes to urban runoff loads; therefore, reducing air emissions could help to attain necessary reductions from urban runoff.)

Some have argued that the Water Board is authorized to regulate air sources under the Clean Water Act. A more efficient regulatory strategy would be for the California Air Resources Board and the Bay Area Air Quality Management District to retain the lead in regulating air sources. Bay Area Air Quality Management District staff told Water Board staff that reducing mercury emissions from cement manufacturing and crematoria would involve placing new emissions controls on these industries (as opposed to enhancing existing controls) for the first time anywhere in the United States. Industry opposition could be intense. Whether or not air quality or water quality regulators pursue regulatory action, more information linking mercury emissions sources with loads to San Francisco Bay will be needed to prepare for the potentially controversial proceedings and to satisfy the administrative requirements for such regulations. The Basin Plan Amendment calls for collecting such information, plus information about the fate of mercury in crude oil processed in the Bay Area. The Basin Plan Amendment will provide additional incentives for Water Board staff to work with California Air Resources Board and Bay Area Air Quality Management District staff.

Wastewater Allocation Changes

The Water Board discussed confusion regarding changes to wastewater loads and wasteload allocations. The confusion stemmed from a misunderstanding between wastewater dischargers and Water Board staff. Immediately prior to publishing the draft Basin Plan Amendment and Staff Report, consultants completed new calculations that resulted in lower wastewater load estimates. However, staff was unable to forewarn wastewater dischargers about the changes they would see. The dischargers knew of the new calculations—they were paying for them through their consultant contracts—but they did not know the results. The revised calculations relied on a more rigorous approach and incorporated new data; however, the new data represented a year with lower mercury loads, perhaps as a result of slow economic conditions. As a consequence, the proposed allocations decreased, and many dischargers feared they might face compliance problems.

The June 2003 Project Report reported the current wastewater mercury load as 19 kg/yr (17 kg/yr for municipal wastewater and 2 kg/yr for industrial wastewater). The April 2004 Staff Report reported the current wastewater mercury load as 16 kg/yr (14 kg/yr for municipal wastewater and 2 kg/yr for industrial wastewater). Staff has now revised the calculation again. The current wastewater mercury load estimate is 20 kg/yr (17 kg/yr for municipal wastewater and 3 kg/yr for industrial wastewater). With each revised load estimate, staff adjusted the proposed group wasteload allocations, always keeping them the same as the current load estimate. In response to comments, we now employ a more equitable manner to apportion the group allocation to individual sources. All these changes are minor in light of the overall mercury load (1,220 kg/yr) and the total maximum load (now 706 kg/yr).

TMDL Costs and Benefits

The Water Board expressed interest in better understanding the costs associated with TMDL implementation, particularly the relative costs of the source category load reductions. Table 1 summarizes available economic information. For the most part, it is based on our best professional judgment. The table only provides order-of-magnitude estimates. Existing costs include all current costs, not just those related to mercury. Ideally, TMDL costs represent incremental increases and relate only to mercury, but the ability to separate mercury costs from the costs of programs targeting other pollutants is limited. In the short term (roughly the first five years after adoption), funding and budgets are essentially fixed; therefore, TMDL implementation will need to be accommodated by prioritizing existing resources. Short-term costs will not be substantial. However, in the long term (perhaps in the next 20 years), TMDL implementation will likely pose substantial costs.

We estimate that achieving the proposed urban runoff allocations could require the most expensive actions on a cost-per-unit-mercury basis. Our estimate is roughly in line with an early rough estimate from San Francisco Bay dischargers (at least $5 million and up to $50 million) (EOA 2003b). More recent urban runoff agency cost estimates are as high as $500 million (see page 13). Such high-end costs would be similar to existing wastewater treatment costs. However, actual costs would not likely be this high because the urban runoff agencies based this estimate on costs to treat essentially all runoff. A more realistic implementation scheme will be based on strategic application of numerous treatment options, including diverting urban storm water runoff to wastewater treatment plants. The proposed implementation plan and schedule provides opportunity to analyze alternatives and allows time for urban runoff agencies to secure reasonable funding.

More importantly, because mercury adheres to sediment, many actions that reduce mercury discharges (e.g., stream protection and flood management) will offer multi-pollutant benefits. Reducing mercury-containing sediment loads will also reduce discharges of PCBs, PBDEs, PAHs, various pesticides, and metals, such as copper and nickel. Therefore, such actions will serve to control most pollutants of concern in urban runoff. In addition, as reported in the Staff Report (page 106), mercury TMDL implementation will contribute to fishing industry benefits, which are estimated to be between $4 million and $28 million per year, not to mention the substantial, but unquantified benefits to wildlife, rare and endangered species, and human health by attaining water existing water quality standards.

TABLE 1
BAY AREA MERCURY TMDL ANNUAL IMPLEMENTATION COSTS[a]

Source	Existing Load (kg/yr)	Allocation/ Load Reduction (kg/yr)	Existing Cost[a] (millions)	TMDL Cost[b] (millions)	Total Cost (millions)
Bed Erosion	460	220 / 240	**$0**	**$0**[c]	**$0**
Central Valley Watershed	440	330 / 110	**NA**[d]	**NA**[d]	**NA**[d]
Urban Runoff	160	82 / 78	**$50**[e]	**$100**[e]	**$150**
Guadalupe River Watershed	92	2 / 90	**$10**[f]	**$30**[f]	**$40**
Atmospheric Deposition	27	27 / 0	**$0**	**$0**[g]	**$0**
Non-Urban Runoff	25	25 / 0	**$0**	**$0**[g]	**$0**
Wastewater	20	20 / 0	**$500**[h]	**$2**[h]	**$500**
Dredging and Disposal	net loss	0 / NA	**$50**[i]	**$0**[i]	**$50**

NA = not applicable

[a] These costs include all operations. They do not relate solely to mercury.

[b] These long-term incremental mercury TMDL costs may simultaneously address a number of pollutants.

[c] We are not proposing any specific actions to address bed erosion; therefore, no costs are anticipated. If in the future new information suggests that this source can feasibly be reduced, unit costs removal and disposal costs would probably be similar to those for dredging and disposal (about $15 per cubic yard).

[d] Implementing the Central Valley Mercury TMDLs will incur substantial costs; however, these costs will be borne by Central Valley communities, not Bay Area communities.

[e] Existing costs are based on an estimate of $18 per household. TMDL costs could be between the estimate on Staff Report page 103 (up to $50 million) and the estimate the Bay Area Stormwater Management Agencies Association included with its comments, up to $500 million (see page 13). These costs will have multi-pollutant benefits, however, to the extent that they relate to stream protection, flood management, and control of multiple pollutants.

[f] The existing cost refers to ongoing operations. It does not include recent past costs of flood control projects (>$120 million) and mercury mine cleanups (<$15 million) that reduce mercury discharges in the watershed. The future cost is a reasonable estimate of annualized future funding for major improvement projects. We expect to have additional cost information when proposing the Guadalupe River Mercury TMDL.

[g] We are not proposing any substantial actions to address direct atmospheric deposition and non-urban runoff; therefore, costs will be minimal.

[h] Existing wastewater treatment costs are assumed to be roughly $80 per capita. Mercury TMDL-related requirements (e.g., pollution prevention, risk management, and ongoing studies) could minimally add to these costs. Although wastewater representatives have estimated that pollution prevention could cost up to $8 million or more (see Staff Report page 104), we believe most such efforts could be accommodated through existing programs.

[i] Dredging and disposal is assumed to cost about $15 per cubic yard. We assume that the Long Term Management Strategy for the Placement of Dredged Material will be implemented with or without the TMDL.

URBAN RUNOFF

Bay Area Stormwater Management Agencies Association, Donald Freitas

Introductory Comments
Comment Letter Pages 1-3

The introductory comments refer to a number of issues we address individually below with respect to specific comments on those issues.

Regarding the expressed disappointment related to the level of Water Board collaboration with stakeholders, Water Board staff have participated significantly in the Clean Estuary Partnership and have met specifically with Bay Area Stormwater Management Agencies Association (BASMAA) representatives on a number of occasions, particularly during the last few years as we completed the June 2003 Project Report and the April 2004 Staff Report. Recent meetings (see page 1) are not the beginning of our working relationship; they are a continuation of it. However, a Basin Plan Amendment and its supporting staff report must be based on the independent judgment of the Water Board, and sometimes we must go in a direction contrary to stakeholder wishes. Collaboration does not necessarily result in full agreement.

Regarding the suggested two-phase implementation process, we believe our adaptive implementation proposal, which is consistent with the recommendations of the National Research Council (NRC 2001), is superior to the proposed two-phase process. Rather than postponing actions until the mercury problem is more fully understood, we propose to take reasonable initial steps based on available information and adapt our plan as the results of our initial actions become clear and more information becomes available.

Technical Issues
1. Bed Erosion
Comment Letter Page 3

The comment asserts that the bed erosion mercury load is about three times larger than our estimate, and that this difference has important implications. We explained the basis of our estimate beginning on Staff Report page 18. In our report, we did not consider recently published U.S. Geological Survey work describing deposition and erosion in San Francisco Bay's southern reach (i.e., Lower San Francisco Bay, South San Francisco Bay, and Lower South San Francisco Bay) (USGS 2004b). According to that study, between 1956 and 1983, a net average of about 2,600,000 cubic meters per year (m^3/yr) of sediment left the southern reach. Discounting the sediment removed from borrow pits through specific historic human activities, the area's net erosion for that period is estimated to be about 1,700,000 m^3/yr or 1,300 million kilograms per year (M kg/yr). This is comparable to the 1,100 M kg/yr estimated for San Pablo Bay and Suisun Bay. (The comment treats sediment removal from the borrow pits as if it were natural erosion and thereby overstates the eroding sediment load between 1956 and 1983.)

The erosion pattern in the southern reach differs from that of the northern reach. In the northern reach (particularly Suisun Bay), net bed erosion has occurred since roughly 1887 (USGS 2001a,b). In contrast, the southern reach has passed through periods of deposition and erosion. During the 40 years from 1858 to 1898, the southern reach experienced net deposition. During the 33 years from 1898 to 1931, the region experienced net erosion. During the 25 years from 1931 to 1956, there was net deposition. During the 27 years from 1956 to 1983, there was net erosion again. The U.S. Geological Survey study does not provide information about conditions since 1983, but given the southern reach's history of oscillating between net deposition and net erosion, we cannot reasonably determine whether this region is eroding in 2004, 21 years after the study period. A more recent study concluded that sedimentation patterns fluctuated during the 1980s and 1990s (URS 2003). Therefore, we cannot say whether bed erosion in the southern reach is a mercury source, but more studies are underway.

If bed erosion in the southern reach were a mercury source, the bay's recovery would likely take longer than the 120 years we projected (see Staff Report page 59). It is unclear why the comment asserts that incorporating this potential source into the analysis would speed San Francisco Bay's estimated recovery. We suspect this conclusion is based on incorrectly applying assumptions developed for the northern reach to the southern reach. Mercury concentrations based on northern reach sediment cores (particularly the Grizzly Bay core) are unlikely to reflect buried sediment mercury concentrations in the southern reach. More importantly, unlike the northern reach, bed erosion in the southern reach would not be expected to remove all buried mercury-rich sediment. It would take over 300 years of continuous net erosion at the rate observed between 1956 and 1983 to remove 1.3 meters of sediment from the floor of the southern reach. In contrast, net bed erosion in the northern reach, which is likely to continue as it has for 103 years (1887 to 1990), may remove much of the buried layer of mercury-rich sediment there over a period of about 110 years.

We will acknowledge the newly available information by modifying the text on Staff Report page 19 as follows:

> Although sediment burial and erosion are ongoing natural processes throughout San Francisco Bay, San Pablo Bay and Suisun Bay studies indicate that more erosion is occurring than burial (USGS 2001a,b). ~~Equivalent studies have not been published for~~ The status of other San Francisco Bay segments is unknown ~~of San Francisco Bay~~. During the 48 years from 1942 to 1990, Suisun Bay experienced a net loss of about 61,000,000 cubic meters of sediment, averaging a net loss of 1,300,000 cubic meters per year (USGS 2001b)….

We will modify the text on Staff Report page 21 as follows:

> For purposes of this report, mercury loads from bed erosion from bay segments other than Suisun Bay and San Pablo Bay are assumed to be negligible because flows from the Central Valley watershed have their

greatest influence on Suisun Bay, the Carquinez Strait, and San Pablo Bay. ~~The U.S. Geological Survey has not yet published estimates of burial and erosion for~~ A recent study concluded that the bay's southern reach experienced net erosion from 1956 to 1983, but has gone through periods of net erosion and net deposition since 1858 (USGS 2004b). Another study concluded that sedimentation patterns fluctuated during the 1980s and 1990s (URS 2003).

Regarding mercury concentrations in sediment buried in the southern reach, studies ~~A separate study~~ of Lower San Francisco Bay and South San Francisco Bay ~~involved collecting~~ sediment cores ~~at depths of 0.7 meters and greater. Sediment~~ reported that mercury concentrations buried at 0.7 meters and greater ~~these~~ depths are ~~were~~ about 0.1 ppm or less. The mercury concentration pattern in a core from Triangle Marsh (at the southernmost end of the bay, downstream from historic mercury mines) closely resembles that of the Grizzly Bay core shown in Figure 4.2 (SFBRWQCB 2003f). However, because the core was collected from a stable marsh (a depositional environment), it is probably not representative of sediment erosion in the bay's southern reach.

We will modify the text on Staff Report page 118 as follows and add the letter "a" to each citation that refers to this reference:

U.S. Geological Survey (USGS) 2004a. "Continuous Monitoring in the San Francisco Bay and Delta." http://sfbay.wr.usgs.gov/access/Fixed_sta/

We will also add the following references to Staff Report page 118:

U.S. Geological Survey (USGS) 2004b. "Deposition, Erosion, and Bathymetric Change in South San Francisco Bay: 1858-1983," open file report 2004-1192, prepared by A. Foxgrover, S. Higgins, M. Ingraca, B. Jaffe, and R. Smith.

URS Corporation (URS) 2003. *Predicted Changes in Hydrodynamics, Sediment Transport, Water Quality, and Biotic Communities Technical Report*, June, pp. 3-34 to 3-39.

2. Urban Runoff Load Estimate
Comment Letter Page 4

The comment proposes a novel method to estimate local tributary mercury loads, including urban and non-urban runoff loads. We explained our estimate beginning on Staff Report page 23. Previous stakeholder comments have not suggested this new approach before, and this comment offers no new information that was not already available during the scientific peer review process. We believe our existing approach is

reasonable and scientifically sound. The comment suggests a different way of looking at sediment loads, mercury concentrations, and mercury loads.

Regarding sediment loads, breaking out the instream and hillslope process sediment load from the urban and non-urban runoff sediment load as the comment suggests may be a reasonable (though not necessarily better) alternative. According to the comment, the instream and hillslope processes load is about 633 M kg/yr. However, urban development can affect instream and hillslope processes substantially by modifying the hydrograph of local streams. As a result, urban runoff management agencies are responsible for a significant portion of this sediment load. Little information is available from which to apportion responsibilities for this load, but one reasonable strategy could be to assign urban runoff management agencies responsibility for about the same amount of sediment as we estimated in the Staff Report (i.e., responsibility for the instream and hillslope process sediment load could be apportioned using the ratio of urban to non-urban runoff loads).

Regarding mercury concentrations, we question the appropriateness of using data collected in open channels to represent sediment from instream and hillslope erosion processes. Open channel sediment mercury concentrations reflect the influences of urban and non-urban runoff. Therefore, if anything, they should be applied to total sediment loads. However, we are also concerned about the appropriateness of the reported open channel sediment mercury data. The concentration of 0.21 ppm is derived from the consolidated results of two separate studies, which may not be comparable. More importantly, no statistical analysis has been undertaken to demonstrate that the open channel sediment mercury concentrations are significantly different than the urban runoff sediment mercury concentrations. In contrast, we relied on the Joint Stormwater Agencies report, which statistically evaluated concentration data attributed to various land uses and concluded that all the data, including open channel data, belonged in one urban category, except for the open space (non-urban) data.

Regarding mercury loads, the comment's recalculated loads for urban runoff and non-urban runoff are 42 kg/yr and 5 kg/yr, which together total about 47 kg/yr. As discussed in other comments (see "Controllability of Atmospheric Deposition" below), atmospheric deposition contributes about 55 kg/yr of mercury to the urban and non-urban runoff loads. Therefore, subtracting the atmospheric deposition load from the recalculated runoff load results in essentially no mercury coming from urban activities. This conclusion is unreasonable. It lacks credibility because many urban activities involve mercury. For example, mercury may escape into the urban environment when fluorescent light bulbs are broken, and mercury can be released from automobile tilt switches during automobile accidents. Furthermore, if all the mercury in storm drain systems were the result of atmospheric deposition, then we would expect the sediment mercury concentrations measured throughout the watershed to be relatively uniform. However, the mercury concentrations reported in the Joint Stormwater Agencies report vary over orders of magnitude, suggesting that local mercury sources contribute to the urban runoff load.

We propose to implement the TMDL adaptively; therefore, we will work with urban runoff management agencies to incorporate additional information as it becomes available and revise the mercury load estimates if appropriate. According to the proposed Basin Plan Amendment (Staff Report page A-9), the urban runoff management agencies will be able to demonstrate consistency with the TMDL allocations by using one of the following methods:

- Quantifying the annual average mercury load reduced,
- Quantifying the mercury load using data on flow and water column mercury concentrations, or
- Quantitatively demonstrating that the mercury concentration of suspended sediment that best represents sediment discharged with urban runoff is below the suspended sediment target.

These options provide substantial flexibility in terms of meeting the proposed allocations.

3. Linkage Analysis
Comment Letter Page 7

This comment closely mirrors a series of comments submitted by Exponent on behalf of the Santa Clara Valley Water District. Our responses to those comments also respond to this one. See page 94.

Policy Issues
1. Controllability of Atmospheric Deposition
Comment Letter Page 8

The comment states that mercury deposited on the watershed, captured by storm drain systems, and discharged with urban runoff is uncontrollable and should be subtracted from the urban runoff load and allocation (see Staff Report pages 23 and 54). The concern is that we allegedly considered direct atmospheric deposition on San Francisco Bay to be uncontrollable but considered indirect deposition on the watershed to be controllable. We do not assume that direct atmospheric deposition is uncontrollable, even though we are not proposing an allocation that requires a specific load reduction at this time. The implementation plan includes measures to determine the extent to which atmospheric deposition is controllable and to take actions to reduce the atmospheric deposition load in the future where possible (see Staff Report pages 71 and A-13). Such actions would reduce both direct and indirect atmospheric deposition loads. If urban runoff management agencies facilitate these actions, the load reductions may help them meet their allocations.

We assume that some portion of the indirect atmospheric deposition mercury load captured by storm drain systems is controllable because capturing this mercury is a consequence of choices made regarding urban development and storm drain system design. However, the allocation scheme also allows a certain amount of the mercury from indirect deposition to be discharged because the allocation is based on the proposed

sediment target (0.2 ppm), not the "background" concentration represented by open space runoff (0.06 ppm), which also contains some mercury from indirect atmospheric deposition. The roughly 55 kg/yr of the urban and non-urban runoff mercury load that results from atmospheric deposition represents about half of the combined allocations for urban and non-urban runoff.

To clarify our statements regarding the mercury load associated with indirect atmospheric deposition, we will modify the text on Staff Report page 28 as follows:

> This load estimate does not include mercury deposited on the bay's watershed and carried to the bay by runoff. The load associated with such indirect deposition is included in the storm water and Central Valley watershed load estimates. The RMP study estimated the load associated with this indirect deposition on the local watershed (not including the Central Valley) to be about 55 kg/yr (SFEI 2001b). Therefore, of the roughly 180 kg/yr of mercury from storm water (urban and non-urban runoff), about ~~as much as~~ 55 kg/yr could result from atmospheric deposition.

2. Feasibility of Allocations and Burden on Urban Runoff Management Agencies
Comment Letter Pages 8-15

The comment addresses three areas of concern: (1) the feasibility of meeting the proposed allocations, (2) the costs of implementing the allocations, and (3) the desire that we assign the California Department of Transportation its own allocation.

Feasibility of Meeting Urban Runoff Allocations. Regarding the feasibility of meeting the urban runoff allocations (listed on Staff Report page 54), the comment asserts that meeting the allocations is infeasible. It appears that the commenter assumes that because the Water Board must address feasibility when it considers implementation measures that it must also expressly address feasibility when it adopts allocations. The law provides that our primary obligation in proposing allocations is to ensure that they will, if implemented, result in water quality standard attainment. We agree that feasibility must be taken into account when adopting TMDLs; however, we disagree with the comment that feasibility must be considered when establishing allocations. The California Water Code requires us to provide reasonable assurance that the *implementation plan* is feasible. We believe that the proposed mercury TMDL implementation plan is feasible and the urban runoff management agencies have not demonstrated that it is infeasible.

A 48% reduction in sediment mercury concentrations is needed for urban runoff to attain the sediment target. We provided examples of possible load reduction activities that urban runoff management agencies could consider pursuing to meet the allocation. The comment suggests that our examples may not by themselves be sufficient to meet the allocations. However, we cannot specify the methods or means of meeting the allocations. The urban runoff management agencies will be responsible for studying their discharges, selecting specific actions, and ensuring that those actions result in adequate

load reductions. Various options are possible, particularly if urban runoff management agencies better characterize the sources of mercury in urban runoff.

We recognize the concerns about the feasibility of meeting the allocations, and we will change the text as follows to clarify how we will incorporate information about feasibility through adaptive implementation:

Staff Report pages 82:

> The Water Board will adapt the TMDL to incorporate new and relevant scientific information such that effective and efficient actions can be taken to achieve TMDL goals. At a minimum, we propose that the San Francisco Bay Mercury TMDL for be reviewed approximately every five years to evaluate findings from early implementation actions, monitoring, special studies, and relevant scientific literature….

Staff Report pages 83:

> The load and wasteload allocations were determined, using available data, on the basis of their sufficiency to achieve water quality standards. As part of the adaptive implementation process and in collaboration with dischargers and interested stakeholders, the Water Board will review the TMDL as a whole and determine whether new evidence suggests revisions of specific load and wasteload allocations that will result in more strategic, efficient, and cost effective achievement of water quality standards ~~information regarding the feasibility, effectiveness, and cost of actions to control mercury loads~~. For example, as reliable information becomes available regarding methylation control or the relative bioavailability of sources, the Water Board will consider adjusting allocations to implement the TMDL more effectively. The Water Board may also consider revising implementation requirements or resulting permit requirements if such changes are consistent with the assumptions and requirements of the allocations and the cumulative effect of such changes will ensure attainment of water quality standards. During the review, the Water Board will encourage dischargers to share relevant feasibility, effectiveness, and cost information about implementation actions being performed.
>
> Achievement of the allocations for three of the largest source categories (Central Valley Watershed, Urban Stormwater Runoff, Guadalupe River Watershed) is projected to take 20 years, with an interim 10-year milestone of fifty percent achievement. Approximately 10 years after the effective date of the TMDL or any time thereafter, the Water Board will consider modifying the schedule for achievement of the load allocations for a source category or individual discharger provided that they have complied with all applicable permit requirements and all of the following have been accomplished relative to that source category or discharger:

- A diligent effort has been made to quantify mercury loads and the sources of mercury and potential bioavailability of mercury in the discharge;
- Documentation has been prepared that demonstrates that all technically and economically feasible and cost effective control measures recognized by the Water Board as applicable for that source category or discharger have been fully implemented (the Water Board will express recognition of such measures through a variety of regulatory mechanisms [e.g., NPDES permits, Waste Discharge Requirements, Board Orders, Adoption of TMDLs, etc.], all of which allow for public participation**)**, and evaluates and quantifies the comprehensive water quality benefit of such measures;
- A demonstration has been made that achievement of the allocation will require more than the remaining 10 years originally envisioned; and
- A plan has been prepared that includes a schedule for evaluating the effectiveness and feasibility of additional control measures and implementing additional controls as appropriate.

At approximately 20 years after the start of implementation and after taking the steps regarding schedule modification listed above, if a source category or individual discharger cannot demonstrate achievement of its allocation, despite implementation of all technically and economically feasible and cost effective control measures recognized by the Water Board as applicable for that source category or discharger, the Water Board will consider revising the allocation scheme provided that any resulting revisions ensure water quality standards are attained.

Staff Report page A-8 (Basin Plan Amendment):

…~~The permits shall require the implementation of best management practices designed to achieve the wasteload allocations or accomplish the load reductions derived from the wasteload allocations.~~ The allocations for this ~~group~~ source category ~~shall~~ should be achieved within 20 years, and, as a way to measure progress, an interim loading milestone of 120 kg/yr, halfway between the current load and the allocation, ~~shall~~ should be achieved within ten years. If the interim loading milestone is not achieved, NPDES-permitted entities shall demonstrate reasonable and measurable progress toward achieving ~~it~~the 10-year loading milestone.

Staff Report pages A-15 and A-16:

The Water Board will adapt the TMDL to incorporate new and relevant scientific information such that effective and efficient actions can be taken to achieve TMDL goals. Approximately every five years, the Water Board will review the San Francisco Bay Mercury TMDL and evaluate new and relevant information from monitoring, special studies, and scientific literature….

Using available data, the load and wasteload allocations were determined on the basis of their sufficiency to achieve water quality standards. As part of the adaptive implementation process, the Water Board will review the TMDL as a whole and determine whether new evidence suggests revisions of specific load and wasteload allocations that will result in more strategic, efficient, and cost effective achievement of water quality standards.~~will review the feasibility, effectiveness, and cost of actions to control mercury loads. The Water Board may consider in future Basin Plan amendments new evidence in determining whether to revise load and wasteload allocations as well as implementation requirements.~~ For example, as reliable information becomes available regarding methylation control or the relative bioavailability of sources, the Water Board will consider adjusting allocations to implement the TMDL more effectively. The Water Board may also consider revising implementation requirements and/or resulting permit requirements if such changes are consistent with the assumptions and requirements of the allocations and the cumulative effect of such changes will ensure attainment of water quality standards.

Achievement of the allocations for three of the largest source categories (Central Valley Watershed, Urban Stormwater Runoff, Guadalupe River Watershed) is projected to take 20 years, with an interim 10-year milestone of fifty percent achievement. Approximately 10 years after the effective date of the TMDL or any time thereafter, the Water Board will consider modifying the schedule for achievement of the load allocations for a source category or individual discharger provided that they have complied with all applicable permit requirements and all of the following have been accomplished relative to that source category or discharger:

- A diligent effort has been made to quantify mercury loads and the sources of mercury and potential bioavailability of mercury in the discharge;
- Documentation has been prepared that demonstrates that all technically and economically feasible and cost effective control measures recognized by the Water Board as applicable for that source category or discharger have been fully implemented, and evaluates and quantifies the comprehensive water quality benefit of such measures;
- A demonstration has been made that achievement of the allocation will require more than the remaining 10 years originally envisioned; and
- A plan has been prepared that includes a schedule for evaluating the effectiveness and feasibility of additional control measures and implementing additional controls as appropriate.

At approximately 20 years after the start of implementation and after taking the steps regarding schedule modification listed above, if a source category or individual discharger cannot demonstrate achievement of its allocation, despite implementation of all technically and economically feasible and cost effective control measures recognized by the Water Board as applicable for

that source category or discharger, the Water Board will consider revising the allocation scheme provided that any resulting revisions ensure water quality standards are attained.

Costs of Implementing Allocations. The comment contends that the implementation options we discussed in the Staff Report are infeasible due to economic factors. On the basis of available information, we considered economic factors in accordance with the California Environmental Quality Act (Public Resources Code §21159) (see Staff Report page 103). The comment refers to the Porter-Cologne Water Quality Control Act's economic requirements. They are found in §13241 (not §13242 as the comment indicates). Our economic analysis would be adequate for purposes of §13241, but those requirements do not apply because we are not proposing any new water quality objectives.

The comment provides estimated costs to implement the urban runoff allocation. This information will be included in the administrative record for the proposed Basin Plan Amendment. However, we will not incorporate this new information into the Staff Report because we believe much of it exaggerates the reasonably foreseeable costs of TMDL implementation and we believe our original analysis is adequate.

Regarding mercury recycling programs, mercury-containing items (e.g., fluorescent bulbs, thermometers, etc.) are considered hazardous wastes that may not legally be disposed of with the non-hazardous solid waste stream, so recycling programs (and their resulting costs) are necessary with or without the TMDL. TMDL implementation could stimulate improved compliance with existing environmental laws. We propose to ensure that agencies engaged in mercury collection and recycling receive appropriate credit for mercury loads reduced.

Regarding mercury source control plans, many storm water permits already require such plans. Adopting this TMDL will not result in substantial additional costs for these programs. Since many programs are already implementing mercury source control plans, doing so is part of "maximum extent practicable" source control, which means all programs must implement them with or without the TMDL. We propose to ensure that agencies implementing mercury source control plans receive appropriate credit for mercury loads reduced.

Regarding other source controls (e.g., sediment removal), we believe the comment's stated costs and sediment disposal volumes are too high. The estimate is unreasonable because it assumes all sediment would be removed from storm drain systems and the average mercury concentration in removed sediment would be 0.38 ppm (the average observed in all urban land use samples). However, to reduce sediment loads, an efficient sediment mercury reduction project would likely be strategic and focus on areas of known high mercury concentrations. Sediment mercury concentrations at some urban locations are far above the average concentration of 0.38 ppm. Focusing cleanup efforts on areas of elevated mercury could be cost effective. For example, targeting the 5% of sites with the highest mercury concentrations would remove sediment with an average

mercury concentration of about 2.0 ppm and eliminate about 26% of the mercury measured in urban storm drain systems (based on the concentration data cited in the Staff Report). Targeting the top 10% of storm drains with the highest mercury concentrations could remove sediment with an average mercury concentration of about 1.6 ppm and eliminate about 42% of the mercury in urban storm drain systems. Therefore, some targeted sediment removal actions, in combination with other actions, could be useful in attaining urban runoff allocations. We propose that agencies engaged in source controls receive appropriate credit for mercury loads reduced.

Regarding treatment control measures and diversion of urban runoff to wastewater treatment plants, we have not proposed any specific requirements. Since various new and redevelopment requirements already exist (e.g., the "C.3" new development requirements), and since some agencies may wish to route some urban runoff to wastewater treatment plants in the future to address multiple pollutant issues and take advantage of existing treatment capacities, we referred to these options to ensure that agencies engaged in these projects would receive credit for any mercury loads reduced. Similarly, we have not proposed to force any urban runoff management agency to construct an urban runoff treatment plant; however, we do intend to ensure that any agency engaged in such a project would receive appropriate credit for mercury loads reduced.

Regarding special urban runoff source investigations, the comment states, "…implementing special studies…of potential *de minimus* sources of mercury in urban stormwater runoff can be an expensive, time consuming and unfruitful experience." Since we estimate that urban runoff is responsible for about 13% of San Francisco Bay's total mercury load, we do not consider it to be a "*de minimus*" source. Understanding the nature of this source is critically important for identifying options to reduce it. As discussed above, special studies may be cost effective if they help target specific cleanup projects. Without a thorough understanding of mercury in urban runoff, urban runoff agencies cannot credibly argue that reaching the proposed allocations is infeasible.

Regarding mercury monitoring and other investigations and reports, urban runoff management agencies can incorporate TMDL-related monitoring into existing programs. Urban runoff management agencies are already responsible for monitoring their discharges and their effects on receiving waters. Moreover, it is reasonable to expect urban runoff management agencies to prepare reports on their ongoing progress toward meeting allocations.

The comment concludes that implementing the proposed urban runoff allocations could cost between $434 million and $526 million per year. These totals include costs for unlikely schemes to divert urban runoff to wastewater treatment plants and other extreme efforts. Nevertheless, given the Bay Area's existing population of roughly 6.5 million, these worst-case costs amount to about $80 per person per year. While we agree that TMDL implementation costs will be substantial, we believe they will be far less than the urban runoff management agencies have estimated.

Desire To Assign California Department Of Transportation Its Own Allocation. Regarding sharing an allocation with the California Department of Transportation (Caltrans), Caltrans has similar concerns (see page 38). We will change the text as follows to clarify responsibilities.

Staff Report Table 7.2 (page 55) and Table 4-w (page A-5), footnote "a":

> [a] Allocations implicitly include all current and future permitted discharges within the ~~jurisdictions~~ geographic boundaries of municipalities and unincorporated areas including, but not limited to, California Department of Transportation (Caltrans) roadways and non-roadway facilities and rights-of-way, atmospheric deposition, public facilities, properties proximate to stream banks, industrial facilities, and construction sites.

Staff Report page 67:

> The wasteload allocations shown in Table 7.2 will be implemented through the NPDES storm water permits issued to urban runoff management agencies and the California Department of Transportation (Caltrans). The urban stormwater runoff allocations implicitly include all current and future permitted discharges, not otherwise addressed by another allocation, and unpermitted discharges within the geographic boundaries of urban runoff management agencies (collectively, "source category") including, but not limited to, Caltrans roadway and non-roadway facilities and rights-of-way, atmospheric deposition, public facilities, properties proximate to stream banks, industrial facilities, and construction sites.
>
> ¶Urban runoff management agencies can reduce urban mercury loads by preventing urban mercury sources from enriching sediment or by reducing the amount of enriched sediment discharged to the bay….

Staff Report page 69:

> ~~Each individual urban storm water runoff allocation implicitly includes all current and future permitted discharges within the jurisdictions of municipalities and unincorporated areas including, but not limited to, Caltrans facilities and rights-of-way, public facilities, industrial facilities, and construction sites. Municipalities~~ Urban runoff management agencies have a responsibility to oversee various ~~these~~ sources. However, if it is determined that a source is substantially contributing to mercury loads to the bay or ~~and~~ is outside the jurisdiction or authority of an agency ~~municipality~~, the Water Board will consider a request from an urban runoff management agency that may include an allocation, load reduction, and/or other regulatory requirements for the source in question ~~issuing an individual permit for that source~~.

Staff Report page A-8 (Basin Plan Amendment):

> The wasteload allocations shown in Table 4-w shall be implemented through the NPDES stormwater permits issued to urban runoff management agencies and the California Department of Transportation (Caltrans). The urban stormwater runoff allocations implicitly include all current and future permitted discharges, not otherwise addressed by another allocation, and unpermitted discharges within the geographic boundaries of urban runoff management agencies (collectively, "source category") including, but not limited to, Caltrans roadway and non-roadway facilities and rights-of-way, atmospheric deposition, public facilities, properties proximate to stream banks, industrial facilities, and construction sites. ¶

Staff Report page A-9:

> ~~Each urban stormwater discharger allocation implicitly includes all current and future permitted discharges within the jurisdictions of municipalities and unincorporated areas including, but not limited to, Caltrans facilities and rights-of-way, public facilities, industrial facilities, and construction sites.Municipalities~~ Urban runoff management agencies have a responsibility to oversee ~~these~~ various ~~sources~~discharges within the agencies' geographic boundaries. However, if it is determined that a source is substantially contributing to mercury loads to the Bay or~~and~~ is outside the jurisdiction or authority of an agency ~~municipality~~, the Water Board will consider a request from an urban runoff management agency that may include an allocation, load reduction, and/or other regulatory requirements for the source in question ~~issuing an individual permit for that source~~.

3. Growth

Comment Letter Page 15

The comment notes that the TMDL does not explicitly accommodate anticipated growth in urban runoff discharges. Neither the federal Clean Water Act nor its implementing regulations mandate that growth be considered, accommodated, or accounted for in setting allocations. Allocations are set at levels necessary to meet targets and achieve water quality standards (CWA §303(d)(1)(c)). The TMDL does not restrict growth but requires growth to take place in a manner so as to not increase pollutant loads. Assuming that mercury loads could increase with population (as the comment suggests), greater efforts could be needed to implement the TMDL as the population grows. However, allocations must be set to attain water quality standards. Raising the urban runoff allocation to accommodate future growth would require lowering some other allocation where similar growth issues exist. Urban runoff management agencies will need to control their mercury discharges to ensure that their growth does not imperil attainment of water quality standards.

4. Basin Plan Revisions
Comment Letter Page 15

The comment refers to opportunities for further dialog and additional comments. While we look forward to continuing dialog throughout TMDL implementation, the formal public comment period ended June 14, 2004. At this time, new comments must directly relate to proposed *changes* to the draft Basin Plan Amendment and Staff Report.

Regarding the 20-year implementation schedule, the Porter-Cologne Water Quality Control Act (§13242) requires that Basin Plan implementation plans include a time schedule for actions to be taken. We propose to implement the TMDL over 20 years, reaching an interim milestone within 10 years. This 20-year time frame corresponds to two sets of two 5-year permit cycles. The comment does not provide any specific reason to select an alternative time frame.

Santa Clara Valley Urban Runoff Pollution Prevention Program, Adam Olivieri

Comment Letter Pages 1-4

The introductory comments refer to a number of issues we address individually below with respect to specific comments on those issues. These comments closely mirror those of the Bay Area Stormwater Management Agencies Association. Our responses to those comments (pages 8 to 21) also respond to these comments.

Regarding the concern about collaboration with stakeholders, Water Board staff worked closely with stakeholders throughout this TMDL process. We provided many opportunities for stakeholders to express their concerns both verbally and in writing. We are not obligated to respond in writing to all informal communication. However, as a courtesy, in January 2004 we completed written responses to all written comments we received regarding the June 6, 2003, Project Report (the publicly circulated report that preceded the April 30, 2004, Proposed Basin Plan Amendment and Staff Report). Those comments and our responses to them will be included in the administrative record.

1. Linkage Analysis
Comment Letter-Attachment A-Page 1

This comment closely mirrors a Bay Area Stormwater Management Agencies Association comment and other comments. Our responses to those comments (see pages 12 and 94) also respond to this one.

2. Bed Erosion
Comment Letter-Attachment A-Pages 2-3

This comment closely mirrors a Bay Area Stormwater Management Agencies Association comment. Our response to that comment (page 8) also responds to this one.

3. Load Estimate
Comment Letter-Attachment A-Pages 3-5

This comment closely mirrors a Bay Area Stormwater Management Agencies Association comment. Our response to that comment (page 10) also responds to this one.

4. Controllability of Atmospheric Deposition
Comment Letter-Attachment A-Pages 5-6

This comment closely mirrors a Bay Area Stormwater Management Agencies Association comment. Our response to that comment (page 12) also responds to this one.

5. Feasibility of Allocations and Burden on Urban Runoff Management Agencies
Comment Letter-Attachment A-Pages 6-13

This comment closely mirrors a Bay Area Stormwater Management Agencies Association comment. Our response to that comment (page 13) also responds to this one.

The comment notes that we propose to reduce urban runoff mercury loads by 48% and Guadalupe River watershed loads by 98%. We wish to clarify, however, that these loads are separate and distinct. The 48% reduction applies only to urban runoff. The 98% reduction applies to only the mining legacy of the Guadalupe River watershed.

5. Growth
Comment Letter-Attachment A-Pages 13-14

This comment closely mirrors a Bay Area Stormwater Management Agencies Association comment. Our response to that comment (page 20) also responds to this one.

Morrison and Foerster (for Santa Clara Valley Urban Runoff Pollution Prevention Program), Robert Falk

Comment Letter Pages 1-3

We address the introductory comments as we respond to specific comments on the same issues below.

I. The TMDL approach is not authorized under the Clean Water Act and the Porter-Cologne Act requirements.

Comment Letter Pages 3-4

We address the five summary comments in our responses to the specific comments below.

Comment I.A*: The TMDL cannot use numeric targets derived from a translation of a narrative objective when USEPA has already promulgated an applicable mercury standard for South San Francisco Bay. Specifically, USEPA promulgated in the California Toxics Rule (CTR) the exclusive legally applicable mercury numeric water quality objective (WQO) for the protection of human health in South San Francisco Bay and the Board may not substitute its narrative WQO (or numeric targets purporting to translate this narrative WQO) as the appropriate basis for regulatory action. (Comment Letter page 5)*

Response**:** The CTR's numeric WQO for mercury is not the exclusive standard in South San Francisco Bay. The TMDL is based on the Basin Plan's narrative WQO against bioaccumulation. The proposed TMDL complies with the CWA's mandate under §303(d)(1)(C) to develop TMDLs for those impairments identified under the CWA §303(d)(1)(A) listing process. The 2003 mercury listing was based on unacceptable fish consumption and wildlife consumption impacts, which relate to bioaccumulation.

The CTR's WQO for mercury is based on bioconcentration factors (see 65 Federal Register 31697; this is the preamble to the CTR, in which USEPA states that it does not intend to use bioaccumulation factors for purposes of the CTR). Bioconcentration occurs through uptake and retention of a substance from water only, through gill membranes or other external body surfaces; in contrast, bioccumulation considers uptake of contaminants from all routes of exposure. In other words, the CTR's numeric WQO and the Basin Plan's narrative WQO do not address the same end points and thus one does not apply in place of the other.

Even assuming for the sake of argument that the CTR's numeric WQO for mercury is the exclusive standard applicable in South San Francisco Bay, USEPA must ultimately approve the Mercury TMDL, and once it does, the TMDL based on the Basin Plan's narrative bioaccumulation WQO would apply in addition to the CTR's numeric WQO for mercury.

Comment: *Under 40 CFR §130.10(d)(4), numeric WQOs are the exclusively applicable basis for a TMDL when they have been published and narrative criteria may only be used in their absence. (Comment Letter pages 5-7)*

Response**:** The commenter's reliance on 40 CFR §130.10(d)(4) is misplaced. As expressly stated in §130.10(d)(4), this section applies only to listing waters under 40 CFR §130.10(d)(2). It relates state submittals to USEPA lists of navigable waters not

expected to meet water quality standards due to point source discharges of toxic pollutants on the CWA §307(a). Furthermore, the comment is inconsistent with the TMDL regulations. 40 CFR §130.7, applicable to the TMDL listing and development process, does not differentiate between numeric and narrative WQOs, and in fact defines "water quality standards" in the context of 303(d) listings as including both narrative and numeric criteria.

Comment: *The CTR's numeric mercury criterion applicable to South San Francisco Bay to protect public health from fish consumption is currently being met. Thus, since there is no exceedance of the only applicable WQO, the TMDL must be withdrawn for South San Francisco Bay. (Comment Letter page 6)*

***Response*:** The TMDL is based on the Basin Plan's narrative WQO, which also applies to South San Francisco Bay. Thus, whether there is compliance with the CTR's mercury WQO is irrelevant. In any event, Regional Monitoring Program data for areas south of the Dumbarton Bridge indicate 22 exceedances of the CTR objective (51 ng/l) since 1993 (SFEI 2003b).

Comment: *The Basin Plan states that South San Francisco Bay below the Dumbarton Bridge is a unique, water-quality limited, hydrodynamic and biological environment, and thus site specific water quality objectives (SSOs) are necessary. As such, the Water Board may not proceed with the TMDL's numeric targets—only SSOs are appropriate. (Comment Letter pages 6-7)*

***Response*:** Pending California Office of Administrative Law and USEPA approval, the passage cited in the comment regarding South San Francisco Bay has been removed from the Basin Plan through a previous action. Nevertheless, the unique characteristics and challenges related to South San Francisco Bay, like poor circulation, mandate further protection, such as through the TMDL. Indeed, the purpose of TMDLs in general is to address problems and impairments such as those found in South San Francisco Bay.

Comment I.B*: TMDL-derived numeric targets must address the particular impairments identified for water segments listed under CWA §303(d), and South San Francisco Bay was not listed on the basis of harm to bird eggs or protection of wildlife. Furthermore, a TMDL may only address impairments for which a water body was identified and listed under CWA §303(d). Here, the 303(d) listing was based only on fish consumption, and therefore targets to protect wildlife (e.g., bird egg targets) as opposed to human fish consumption are inappropriate. (Comment Letter pages 7-9)*

***Response*:** CWA §303(d)(1)(C) requires that a TMDL be submitted to USEPA for all §303(d)(1)(A) listed waters. The comment claims that the Water Board may proceed with a TMDL only for those impairments identified on the §303(d)(1)(A) list. However, if the criteria for listing a water body for a particular pollutant are satisfied, it would be inconsistent with the purposes set forth in CWA §101 (e.g., to restore and maintain the chemical, physical and biological integrity of the Nation's waters; to prohibit the discharge of toxic pollutants in toxic amounts) to wait until the next 303(d) listing cycle

to list the water body prior to the Water Board's adoption of a TMDL. In addition, while CWA §303(d)(1)(C) requires a TMDL to be submitted to USEPA for listed waters, §303(d)(3) requires states to establish TMDLs for all other waters not listed on the §303(d)(1)(A) list. Thus, listing under §303(d)(1)(A) is not a prerequisite for TMDL development. Furthermore, federal law reserves California's authority to regulate water quality (see CWA §101[b] and §510). Under Water Code §13242, the Water Board may adopt TMDLs as a program of implementation to achieve water quality objectives whether or not a water body is listed.

As explained on Staff Report page 8, bird eggs representing species that consume San Francisco Bay fish and other aquatic organisms have higher mercury concentrations than eggs from the same species in other regions of the country. Their mercury concentrations are above those shown to cause reproductive harm in laboratory tests and may account for unusually high numbers of eggs failing to hatch. In the Bay Area, birds feeding on fish and other aquatic organisms are among the most sensitive wildlife mercury receptors; therefore, a target that protects birds would also be expected to protect other wildlife as well. The wildlife target ensures that the proposed TMDL targets, when taken together, are consistent with water quality standards.

Comment I.C.1*: The numeric targets corresponding to the narrative bioaccumulation WQO are not legally authorized because they are not based on a USEPA approved translator. 40 CFR §131.11(a)(2) requires a translator. (Comment Letter pages 9-13)*

Response**:** CWA §303(c)(2)(B) requires states to adopt numeric water quality criteria for toxic pollutants listed pursuant to CWA §307(a)(2) and §304(a). Where states have not adopted such numeric criteria, USEPA guidance allows a state to satisfy CWA §303(c)(2)(B) by adopting a translator procedure to translate narrative criteria for priority toxic pollutants (57 Fed. Reg. 60853, 60872 [Dec. 22, 1992]). As of 2000, California had not satisfied this section, and therefore USEPA, by promulgating the California Toxics Rule and National Toxics Rule, established the required numeric criteria. USEPA has thus acknowledged that any need for California to have a translator in the absence of numeric criteria to satisfy CWA §303(c)(2)(B) has been superseded by the existence of numeric criteria (see USEPA Letter to Celeste Cantú, dated February 15, 2002).

Regardless, if a translator is in fact required to implement the narrative bioaccumulation WQO, the Basin Plan (Chapter 4) sets forth a program to implement this objective (see, e.g., Basin Plan, p. 4-2). This is especially true for point sources. More importantly, however, *the proposed TMDL is itself the translator* of the narrative bioaccumulation WQO. Through the TMDL, the Water Board is adopting a program of implementation, including targets (which quantify the levels at which bioaccumulating mercury is detrimental to human health and wildlife), allocations, and implementation actions. The rationale behind translators is to give the regulated community certainty as to how a narrative WQO will be applied. The proposed TMDL accomplishes this with the allocations (based on the targets) and the implementation actions. If and when USEPA

approves the TMDL, a clear program of implementation of the narrative bioaccumulation WQO related to mercury will exist, supplementing what is already in the Basin Plan.

The comment also appears to rely on 40 CFR §131.11 for the assertion that a translator is required. This section provides that when a state adopts narrative criteria for toxic pollutants, the state must provide identifying methods by which the state intends to regulate point source discharges. This section is inapplicable because the Water Board is not proposing to adopt any narrative criteria (i.e., WQO). Even if it were, this section merely requires *identification of methods* for how the state will regulate point source discharges. As explained above, the proposed TMDL accomplishes this.

Comment: *The Water Board may not proceed with a TMDL that considers wildlife protection because biological monitoring or assessment methods have not been adopted as required under CWA §303(c)(2)(B), and because the Water Board has not complied with USEPA guidance on ways to develop numeric wildlife criteria.*

***Response*:** CWA §303(c)(2)(B) applies whenever a state reviews water quality standards as part of the triennial review of water quality control plans and whenever a state revises or adopts new standards. The TMDL involves neither of these activities. As explained above, the Water Board is not adopting new WQOs with the TMDL. Rather, the mercury TMDL is an interpretation and implementation of the existing narrative bioaccumulation WQO. Thus, the invocation of CWA §303(c)(2)(B) is inappropriate.

The comment claims that the TMDL does not meet USEPA's guidance for defining ways in which wildlife numeric targets should be developed to meet the CWA goal of protecting and propagating wildlife by means of a TMDL. The comment refers to two USEPA documents to support this contention. The first is a document entitled "Biological Criteria: National Program Guidance for Surface Waters." This document, which is guidance only and does not have the force of law, is mainly directed toward assisting states comply with CWA §303(c)(2)(B), which, in the absence of numeric criteria for toxic pollutants, requires states to adopt criteria based on biological assessment and monitoring methods. As explained above, CWA §303(c)(2)(B) is inapplicable, and this document is thus not germane. The second document is entitled "Biological Assessments and Criteria: Crucial Components of Water Quality Programs." This document is an informational brochure on the importance of bioassessments in determining water quality. It is unrelated to the commenter's assertion.

Regarding the comments citing Santa Clara County's comments regarding bird egg data, we have responded to Santa Clara County's comments (prepared by Applied Ecological Solutions). See page 83. As explained there, the bird egg data are not inaccurate; however, in some cases the data clearly relate only to eggs that failed to hatch.
A reference site is unnecessary to demonstrate that San Francisco Bay bird egg mercury concentrations exceed concentrations shown to be harmful to some species. While mercury may not be the only threat to San Francisco Bay wildlife, targets must be set so as to ensure that mercury does not cause or contribute to detrimental effects. Therefore, the "null hypothesis" need not be tested.

Comment I.C.2*: Targets are de facto WQOs and Water Code §13241 analyses are required. (Comment Letter pages 13-14)*

Response**:** See our response to a similar comment on page 66.

Comment I.D*: The Basin Plan requires a feasibility and cost-benefit analysis. The narrative WQO for bioaccumulation on which the TMDL is based applies only to controllable factors, and sources of mercury subject to this TMDL are not "controllable." (Comment Letter pages 15-16)*

Response**:** With respect to the first part of the comment, the Basin Plan does not support the assertion that a feasibility and cost-benefit analysis must be done. Chapter 3 of the Basin Plan describes that, in addition to technical review, the overall feasibility of reaching objectives in terms of technological, institutional, economic, and administrative factors is considered at many different stages of objective derivation and implementation. This language is descriptive and does not mandate that the Water Board undertake a feasibility analysis for this particular TMDL.

"Controllable water quality factors" is defined as "those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the state and that may be reasonably controlled." Chapter 3 of the Basin Plan also explains that when uncontrollable water quality factors result in degradation of water quality beyond the level allowed, the Water Board will conduct a case-by-case analysis of the benefits and costs of imposing further controls. If that analysis indicates that allowing further degradation will adversely affect beneficial uses, the Water Board will not allow controllable water quality factors to cause any further water quality degradation.

This language does not compel a cost-benefit analysis. First, this Basin Plan provision does not come into play when developing a TMDL. In a TMDL, the Water Board is seeking to restore a degraded water body to levels that support all beneficial uses. The controllable factors language merely indicates that the Water Board will make sure that conditions do not get worse (e.g., if a new discharger wants to discharge, or if an existing discharger wants to increase its discharge, the Water Board will look at those dischargers case-by-case). Second, even if this provision applied to this TMDL, the cost-benefit analysis is triggered only when the impairment *results* from uncontrollable water quality factors. No finding has been made that the mercury impairment is due solely to uncontrollable factors.

Chapter 3 of the Basin Plan states that compliance with WQOs may be prohibitively expensive or technically impossible in some cases, and in those instances, the Water Board will consider modifying those objectives as long as the discharger can demonstrate that the alternate objective will protect beneficial uses, is scientifically defensible, and is consistent with the antidegradation policy. It then states that the Water Board will conservatively compare benefits and costs of these alternative objectives because of the

difficulty in quantifying beneficial uses. This language applies to adoption of alternate WQOs, which is not proposed here. Therefore, this portion of the Basin Plan does not apply. Rather, the proposed action is a TMDL, which is an interpretation of an already existing standard. The Basin Plan language is a statement of intent that the Water Board will be conservative in doing any cost-benefit analysis when adopting alternate WQOs. It does not compel a cost-benefit analysis.

With respect to the second part of the comment, the commenter states that the narrative WQO for bioaccumulation on which the TMDL is based applies only to controllable factors and that the sources of mercury subject to this TMDL are not "controllable" as defined by the Basin Plan. To be accurate, a TMDL has to consider all sources, both controllable and uncontrollable. As a practical matter, the Water Board does not mandate controls over sources (factors) that are simply uncontrollable. The commenter is incorrect in stating that we assumed that direct atmospheric deposition on the surface of San Francisco Bay is uncontrollable, but mercury in urban runoff resulting from indirect atmospheric deposition is controllable (see our response to a similar Bay Area Stormwater Management Agencies Association comment on page 12). Indeed, we assume that mercury air emissions are at least partly controllable; therefore, we have planned to further investigate the extent to which such sources are controllable.

Comment I.E*: The Maximum Extent Practicable (MEP) standard was not taken into account in the TMDL's urban runoff allocation and MEP requires analysis for practicality. While the Water Board has discretion to require strict compliance with water quality standards and impose additional controls, that discretion is circumscribed by the MEP standard (i.e., controls cannot demand more than MEP). (Comment Letter pages 17-19)*

Response**:** The MEP standard need not be taken into account when setting the TMDL's urban storm water runoff allocation. The comment is incorrect in stating that the MEP standard circumscribes the Water Board's discretion to impose additional controls on municipal storm water discharges. The commenter erroneously imputes the MEP standard set forth in Clean Water Act §402(p)(3)(B), applicable to permit requirements for municipal storm water discharges, onto the Clean Water Act's requirement for the development of TMDLs for impaired waters. The Clean Water Act neither expresses nor implies that TMDL establishment requires consideration of the MEP standard. On the contrary, Clean Water Act §303(d) is explicit in its mandate that loads are to be set "at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." Clean Water Act §303(d) does not mention the MEP standard.

The commenter may be suggesting that, since municipal storm water permits are subject to the MEP standard, any wasteload allocation should take this standard into account. This is contrary to the express language of the Clean Water Act as explained above. Moreover, it reflects a misconception of the MEP standard. While the commenter is correct that municipal storm water discharges, unlike industrial storm water dischargers,

are subject to the MEP standard and need not strictly comply with water quality standards, "MEP" does not mean "all that is possible." The MEP standard is the floor for establishing permit limits but allows what is considered MEP to evolve over time if additional actions are needed to meet water quality standards. Moreover, as the comment notes, the Water Board has discretion to impose additional, and perhaps different types of, controls as necessary, and the MEP standard does not circumscribe the Water Board's discretion as the commenter claims. The Clean Water Act and the Ninth Circuit Court of Appeals in *Defenders of Wildlife v. Browner*, 191 F.3d 1159 (9th Cir. 1999), are clear that the Water Board may demand more to achieve water quality control under the Clean Water Act.

In *Defenders of Wildlife*, the Ninth Circuit specifically held that municipal storm water discharges are subject to the MEP standard, but that USEPA may in its discretion determine that other controls are appropriate. This is supported by the statutory language of Clean Water Act §402(p)(3)(B)(iii), which states that municipal stormwater permits (33 U.S.C. §1342(p)(3)(B)(iii)):

> …shall require controls to reduce the discharge of pollutants to the *maximum extent practicable*, including management practices, control techniques and system, design and engineering methods, ***and*** *such other provisions as the Administrator or the State determines appropriate for the control of such pollutants*. [emphasis added]

Given all the above, it is inaccurate to state that the TMDL wasteload allocations may not demand more than MEP. Accordingly, the wasteload allocation for urban storm water runoff and corresponding implementation activities need not, as a matter of law, be analyzed for practicality. Nevertheless, we recognize that the Staff Report and Basin Plan Amendment could be clarified in terms of how we intend to view best management practices and other measures in the context of storm water permits. Therefore, we will change the text on Staff Report page 68 as follows (these changes incorporate revisions related to risk management proposed in response to other comments [see page 109].)

> …As such, we propose to implement the allocation in phases using an interim 10-year mercury loading milestone for this source category of 120 kg/yr, which is halfway between the current load and the allocation. The allocations for this group of discharges <u>should</u> ~~will~~ be achieved within 20 years.
>
> Loads <u>reduced</u> ~~avoided~~ by diverting urban storm water runoff otherwise destined for San Francisco Bay to treatment facilities will also be recognized as credit toward attaining the allocation. If this is accomplished with the assistance of wastewater treatment facilities, credit for mercury loads <u>reduced</u> ~~avoided~~ may be shared by cooperating agencies. In addition, if storm water dischargers help to reduce loads from another source category (e.g., mining legacies), credit for <u>reduced</u> loads ~~avoided~~ can be shared by the cooperating entities.

The NPDES permits for urban runoff management agencies will require the implementation of best management practices and control measures designed to achieve the allocations or accomplish the load reductions derived from the allocations. In addition to controlling mercury loads, best management practices or control measures will include actions to reduce mercury-related risks to humans and wildlife. Examples of risk-related actions are: efforts to reduce production of methylmercury, efforts to reduce uptake of methylmercury by biota, efforts to reduce human exposure to methylmercury, as well as efforts to improve the quality and management wildlife habitat.

Requirements in each permit issued or reissued and applicable for the term of the permit shall be based on an updated assessment of control measures intended to reduce pollutants in stormwater runoff to the maximum extent practicable and remain consistent with the section of the Basin Plan in Chapter 4 titled "Surface Water Protection and Management—Point Source Control - Stormwater Discharges."

This plan proposes incorporating the following additional requirements into urban runoff (storm water) programs covered by NPDES permits issued or reissued by the Water Board. ~~Similar requirements will be put in place five years after TMDL adoption for municipalities covered by the statewide municipal storm water general permit issued by the State Water Resources Control Board.~~

Similarly, we will add text to Staff Report pages A-8 and A-9 (second paragraph under "Urban Stormwater Runoff" in the proposed Basin Plan Amendment):

The NPDES permits for urban runoff management agencies shall require the implementation of best management practices and control measures designed to achieve the allocations or accomplish the load reductions derived from the allocations. In addition to controlling mercury loads, best management practices or control measures shall include actions to reduce mercury-related risks to humans and wildlife. Requirements in each permit issued or reissued and applicable for the term of the permit shall be based on an updated assessment of control measures intended to reduce pollutants in stormwater runoff to the maximum extent practicable and remain consistent with the section of this chapter titled "Surface Water Protection and Management—Point Source Control - Stormwater Discharges." The following additional requirements are or shall be incorporated into NPDES permits issued or reissued by the Water Board for urban ~~stormwater discharges~~runoff management agencies. ~~Similar requirements will be applied to municipalities covered by the statewide municipal stormwater general permit (issued by the State Water Resources Control Board) five years after the effective date of this Mercury TMDL implementation plan.~~

We will add the following text following the listed items on Staff Report pages 69 and A-9 (the Basin Plan Amendment):

> An urban runoff management agency that complies with these permit requirements shall be deemed to be in compliance with receiving water limitations relative to mercury. Once the Water Board accepts that a requirement has been completed by an urban runoff management agency, it need not be included in subsequent permits for that agency. These requirements apply to municipalities covered by the statewide municipal stormwater general permit (issued by the State Water Resources Control Board) five years after the effective date of this Mercury TMDL.

This last addition deals with receiving water limitations relative to mercury. To help interpret this addition, note that existing permits have narrative water quality based effluent limitations in the form of receiving water limitations and associated implementation provisions. The receiving water limitations state that discharges shall not cause or contribute to violations of applicable water quality standards. The implementation provision specifies that dischargers shall comply with the receiving water limitations through the timely implementation of control measures and other actions designed to effectively manage their cause or contribution to violations of applicable water quality standards.

The Mercury TMDL urban stormwater runoff wasteload allocation and implementation requirements are designed to effectively manage the cause and contribution of urban stormwater discharges to violations of San Francisco Bay mercury water quality standards. As such, they are consistent with the permit receiving water limitations and associated implementation provisions. Since they are more specific than the permit implementation provision, compliance with them by design equates to compliance with the receiving water limitations.

Comment: *Many aspects of the TMDL and implementation plan are impracticable and cannot legally be imposed. Bed erosion may be so understated that urban runoff load reductions are unnecessary. Load reductions proposed for urban runoff and the Guadalupe River watershed are disproportionately burdensome. Caltrans, industrial, and construction storm water discharges have not been estimated and allocations have not been assigned. Portions of the urban runoff load are uncontrollable. Implementation timetables are impractical. No credit is proposed for existing mercury control programs. Individual urban runoff allocations are based on population, not other factors. Compliance will cost millions of dollars. The TMDL violates the MEP standard by requiring urban runoff to actually achieve the allocations. (Comment Letter pages 19-20)*

***Response*:** Available information suggests that the TMDL and implementation plan are reasonably practicable and feasible. The specific points are addressed below:

- The bed erosion load is not necessarily understated. As explained in response to a Bay Area Stormwater Management Agencies Association comment on page 8, available information indicates that San Francisco Bay's southern reach experiences periods of erosion and accretion, and we do not know its current status. However, evidence does not suggest that bed erosion in the southern reach offsets urban runoff mercury loads.

- The load reductions necessary to achieve the urban runoff and Guadalupe River watershed allocations may appear to be disproportionate compared to other sources, but these reductions are needed because the sediment mercury concentrations for these sources are much higher than those for other sources and well above the proposed suspended sediment target. We considered a proportional allocations alternative (see Staff Report page 96-98), but found that it did not meet the project's objectives.

- Discharges from Caltrans facilities, industrial facilities not discharging directly to the Bay, and construction sites are implicitly included in the urban runoff source category and allocation although their exact contribution has not been determined. The Staff Report asserts on page 69 and A-9 the responsibility on the part of urban runoff management agencies to oversee these and other sources. This language has been further refined in response to comments (see page 19).

- The Guadalupe River watershed load estimate does not include any mercury contributions from urban or non-urban runoff; therefore, it does not relate to urban runoff programs. It also does not include any mercury associated with atmospheric deposition. Although a portion of the urban runoff load results from atmospheric deposition, we assume this load is at least in part controllable (storm drain systems capture and discharge this mercury to surface waters). Even if it were wholly uncontrollable, only 55 kg/yr of urban runoff mercury is associated with indirect deposition and subsequent runoff. The combined urban runoff allocation is 82 kg/yr. Therefore, the allocation accommodates all the mercury from atmospheric deposition. To the extent that mercury air emissions are reduced, such reductions would help urban runoff management agencies achieve their allocations.

- The Basin Plan Amendment must include a time frame for TMDL implementation. The time frames for achieving loading milestones must balance the need to protect beneficial uses with the feasibility of implementing control actions. Information has not been provided to identify more reasonable time frames. (Regarding footnote #36 of the Comment Letter, we are not obligated to respond to comments on informal Water Board staff presentations that are not part of the administrative record for the TMDL. Refer to page 114 for a discussion regarding the State Implementation Plan and the TMDL implementation time frame.)

- The proposed Basin Plan Amendment expressly provides for the Water Board to recognize mercury loads reduced through existing control efforts (see Staff Report page A-9). Credit may be considered for actions taken after 2001. The source assessment is based on data collected in 2001 and therefore reflects conditions as of 2001.

- Several options exist for breaking down the individual allocations for the urban runoff source category. We used population, assuming that human activities resulting in mercury discharges would be proportional to population. Breaking down the allocations on the basis of land area or perhaps other factors may also be reasonable. However, the comment does not explain why these other approaches might be more closely tied to mercury. The portion of urban runoff mercury related to atmospheric deposition (55 kg/yr out of 160 kg/yr) may be related to land area, but because runoff is greater from developed areas and these areas are developed by humans, we believe our population-based approach is sound.

- We evaluated economic costs associated with the TMDL and believe the urban runoff management agencies have overstated the foreseeable costs of TMDL implementation. (See our response to the similar Bay Area Stormwater Management Agencies Association comment on page 13).

- A TMDL that aims vaguely to "address" proposed allocations rather than seek "compliance" or "achievement" of the allocations would be contrary to the purpose of a TMDL (i.e., achieving water quality standards). The proposed Basin Plan Amendment is consistent with TMDL requirements in that it seeks to achieve water quality standards. Regarding the MEP standard, see our response to the previous comment, beginning on page 28.

II. Questions presented for peer reviewers were not properly formulated.
Comment Letter Pages 21-22

***Response*:** The comment asserts that we biased our peer review scientists by summarizing some of our conclusions as we provided background and context for their review. The commenter suggests that we told the reviewers to accept these conclusions as facts, but nothing in the letter we sent the reviewers could be construed in this manner (SFBRWQCB Letter to Kirchner, Sedlak, and Williamson, October 24, 2003). To the contrary, we asked the reviewers some pointed questions regarding issues we knew to be of scientific interest. For example, we specifically asked the following:

- There are several key assumptions put forth in this section to complete the linkage between mercury loads and fish tissue mercury concentrations. In light of available data, are these assumptions reasonable?
- Given the scarcity of information concerning relative bioavailability and the degree to which mercury from different sources undergoes methylation, is it reasonable for us to assume that all mercury sources are equally bioavailable?

We did not in any way restrict the scientific peer review. The review comments demonstrate that the panel understood their role, considered our specific questions, and felt free to offer feedback on all scientific matters of concern to them. They focused their review on whether the scientific portions of the proposed Basin Plan Amendment were based on sound scientific knowledge, methods, and practices (i.e., they reviewed the scientific foundation upon which the proposal is premised, including its scientific findings, conclusions, and assumptions). Therefore, there is no reason for the Water Board to retract the scientific peer review. Regarding the comments from Exponent, our responses to those comments begin on page 94.

III. The Staff Report fails to comply with CEQA.

Comment III.A*: The Staff Report's analysis of environmental impacts is inadequate because it concludes that the Basin Plan amendment would not have a significant impact on the environment. The project will have significant impacts related to minor construction, earthmoving activities, waste handling and disposal, vegetation and fisheries habitat, land use, air quality, and traffic. (Comment Letter pages 22-25)*

Response**:** CEQA requires identification of reasonably foreseeable environmental impacts. The possible direct and indirect physical changes in the environment noted in the Staff Report will not result in significant environment impacts as the commenter suggests. In arguing that there will be significant impacts, the commenter assumes implausible scenarios that are unlikely to be approved, much less undertaken, by storm water management agencies. For example, it is unreasonable to assume that urban runoff programs will seek to meet their allocations solely by physical sediment removal in storm drain facilities, resulting in 47,000 truck loads of sediment removal. The more reasonable and likely scenario is that storm water agencies will carefully target any sediment removal actions and use a variety of methods to comply with their allocations. Likewise, instead of blindly removing riparian soil in an effort to remove mercury, a more reasonable and likely scenario is that urban runoff management agencies will carefully consider the potential impacts of their actions and undertake projects that primarily benefit the environment.

The comment asserts that storm water detention and retention contributes to vector-borne diseases and refers to comments submitted regarding the Water Board's past consideration of the "C.3" new development permit requirements. These comments are irrelevant to this TMDL because they refer to requirements that have already been adopted and are unrelated to new requirements proposed as part of the TMDL.

The comment suggests that the project will result in indirect but reasonably foreseeable significant impacts related to land use, air quality, and traffic because the Basin Plan Amendment will drive up the cost of housing. However, we have no evidence that the Basin Plan Amendment will increase housing costs (which incidentally is not an environmental impact). Urban runoff management agencies have consistently reported to us that storm water fees are very difficult to increase. We believe that urban runoff management agencies have exaggerated their projected costs of TMDL compliance (see

page 13). Given the already high cost of Bay Area housing, these additional costs (if ever realized) would have little or no effect on overall housing costs. Indirect impacts, like land use, air quality, and traffic impacts, are therefore not reasonably foreseeable.

In footnote #43 of the comment letter, the commenter claims that we inappropriately delay meaningful analysis and dismiss potentially significant impacts by refusing to speculate on the specifics of project implementation. As discussed further in the response below, the Water Board is not required to engage in speculation or conjecture in its environmental review (Public Resources Code §21159).

***Comment III.B**: The Staff Report does not comply with CEQA because it defers mitigation until an undetermined later date and without any standard or guidance for the deferred mitigation. (Comment Letter pages 25-26)*

***Response*:** We are not deferring mitigation. The Staff Report, as a functional equivalent document under a certified regulatory program under CEQA, is akin to a programmatic Environmental Impact Report (Pub. Res. Code §21159). The specific projects the dischargers will implement and undertake to comply with their allocations are unknown at this time (the Water Board may not prescribe methods of compliance with its requirements) and the Water Board need not forecast the unknown or speculate on impacts (14 Cal. Code of Regs. §15144 and §15145). Similarly, the Water Board need not conceive of mitigation measures for unidentified impacts of unknown specific projects. Furthermore, when the dischargers formulate specific projects, they will need to undergo environmental review, and at that time, there will be enough specific project-level information to enable proper identification of impacts and mitigation measures. We do not think it is reasonably foreseeable that projects will be chosen that pose significant unavoidable adverse impacts.

***Comment III.C:** The alternatives analysis does not address the significant impacts of the proposed Basin Plan Amendment. The Staff Report should consider alternatives that allow longer implementation. (Comment Letter pages 26-27)*

***Response*:** CEQA requires the Water Board to consider a reasonable range of alternatives, "which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" (14 Cal. Code of Regs. §15126.6). The Staff Report includes eight alternative scenarios and fulfills this requirement. The Water Board is not required to consider every conceivable alternative, including the ones proposed by the commenter. Because the Basin Plan Amendment would not result in any significant adverse environmental impacts, none of the alternatives address significant impacts. However, some alternatives, like the faster implementation alternative, would result in environmental improvements (at least conceivably faster improvements than the proposed Basin Plan Amendment). The effects of a slower implementation alternative would be similar, but opposite, to those of the faster implementation alternative. However, such an alternative would not address any significant impacts and would not improve environmental conditions relative to the proposed Basin Plan Amendment.

Moreover, such an alternative would not meet some of the project's objectives (see Staff Report page 12), such as selecting a more environmentally protective option.

Comment: *The Water Board's economic analysis is insufficient. (Comment Letter pages 27-30)*

***Response*:** Our economic analysis complies with CEQA requirements (Pub. Res. Code §21159). It need not comply with Water Code §13241 because we are not proposing any new water quality objectives, but in essence it does meet these requirements. Our analysis considers, to the extent that information is available, the costs associated with complying with *existing* water quality standards (the intent of the TMDL). We considered in our analysis the per-unit cleanup costs projected by the U.S. Geological Survey for the Central Valley's mercury TMDLs (USGS 2003c), and it appears unlikely that a separate U.S. Geological Survey analysis prepared specifically for San Francisco Bay would provide substantially new or different information. Regarding the new information provided by the Santa Clara Valley Urban Runoff Pollution Prevention Program, refer to our responses to its similar comments on pages 13 and 22.

IV. TMDL's allocation and implementation requirements on urban storm water create an unfunded mandate in violation of the California Constitution.

Comment: *The WQO for mercury in South San Francisco Bay is not being exceeded and no TMDL is required. No federal mandate imposes WQBELs or similar requirements on municipal storm water dischargers, either in excess of the MEP standard or based on the proposed targets. Therefore, the costs associated with the TMDL are not federally mandated and may not be imposed without providing funding to the affected local government entities in accordance with Article XIII(B), §6, of the California Constitution. (Comment Letter page 30)*

***Response*:** Article XIII(B), §6, of the California Constitution prohibits a state agency from mandating a new program or higher level of service on any local government unless the state provides a source of funds to cover the costs of the program or service. Government Code §17513 and §17556(c), which implements Article XIII(B), excludes costs mandated by federal programs. The TMDL implements the federal Clean Water Act. South San Francisco Bay is impaired with respect to mercury bioaccumulation. As a matter of federal law, the Water Board must proceed with the TMDL to address this impairment. Whatever controls the Water Board is requiring are to achieve compliance with federal water quality standards. Accordingly, the TMDL implements a federal mandate and does not violate the California constitutional prohibition on unfunded mandates.

Comment *(Conclusion): The Water Board should direct its staff to redo the TMDL. (Comment Letter page 31)*

***Response*:** The Staff Report is reasonable and adequate. There is no need to substantially revise the TMDL.

Alameda Countywide Clean Water Program, James Scanlin

June 14, 2004, Comment Letter

The comment provides support for the Bay Area Stormwater Management Agencies Association comments. Specifically, it reiterates concerns about the technical and economic feasibility of implementing the allocations. We have responded to all these concerns (see pages 8 through 21 and specifically page 13).

Introduction
July 22, 2003, Comment Letter Pages 1-2

These comments relate to the June 6, 2003 Project Report, not the April 30, 2004 proposed Basin Plan Amendment and Staff Report. We responded to these informal comments in writing in January 2004. Both these comments and our responses will be part of the administrative record for the proposed Basin Plan Amendment.

Uncertainties
July 22, 2003, Comment Letter Page 2

We responded in January 2004 and no further response is necessary.

Feasibility
July 22, 2003, Comment Letter Pages 2-3

We responded in January 2004, and with our responses to comments from the Bay Area Stormwater Management Agencies Association (pages 8 to 21), no further response is necessary.

Disproportionate Reductions
July 22, 2003, Comment Letter Pages 3-4

Since receiving this comment in 2003, we have considered various alternative allocation schemes (see Staff Report page 93). None adequately meets the objectives of the proposed Basin Plan Amendment as listed on Staff Report page 12.

Regarding dredged material disposal, we have included a concentration-based allocation to ensure that dredged material disposed of in San Francisco Bay reflects ambient concentrations. If unusually high concentrations of mercury are dredged, they will not be disposed of in the bay.

Regarding air sources, our response to Bay Area Stormwater Management Agencies Association comments (page 13) corrects the notion that 55 kg/yr of mercury indirectly deposits on the watershed. About 55 kg/yr runs off the watershed into local tributaries

and San Francisco Bay. Otherwise, we responded in January 2004 and no further response is necessary.

Regarding adaptive implementation, we responded in January 2004 and no further response is necessary.

Santa Clara County Office of Development Services, Steve Homan

This comment supports those of the Santa Clara Valley Urban Runoff Pollution Prevention Program. Our responses to those comments (pages 21 to 22) and those of the Bay Area Stormwater Management Agencies Association (pages 8 to 21) also respond to this comment.

California Department of Transportation, David Yam

Cover Letter

Comment: *Caltrans objects to basing its wasteload allocation on a percentage of each urban storm water discharger's mercury load. It requests that the allocation be based on data specifically associated with its rights-of-way.*

Response: It is unnecessary to define the Caltrans allocation as a percentage of the urban runoff allocation. Caltrans should have the option to implement appropriate allocations or reductions apart from urban runoff management agencies. We will make the following modifications to the Staff Report and Basin Plan Amendment (also see our response to a related Bay Area Stormwater Management Agencies Association comment on page 19 and text changes proposed there).

Staff Report page 54:

> …The allocation for each municipality or county program implicitly includes any load contribution from current or future permitted discharges from public facilities, California Department of Transportation (Caltrans) roadways and non-roadway facilities and rights-of-way, and industrial facilities and construction sites located in the program area.

Staff Report page 55, Table 7.2, footnote "a":

> Allocations implicitly include all current and future permitted discharges within the jurisdictions of municipalities and unincorporated areas including, but not limited to, Caltrans roadways and non-roadway facilities and right-of-way, public facilities, industrial facilities, and construction sites.

Staff Report page 68:

v. Develop an equitable allocation-sharing scheme in consultation ~~cooperation~~ with Caltrans (see below) to address Caltrans roadways and non-roadway facilities in the program area and report the details ~~of the agreement~~ to the Water Board.

Staff Report page 69:

Within the jurisdiction of each urban runoff management agency~~storm water discharger~~, Caltrans manages and is responsible for discharges associated with California roadways and non-roadway ~~highways and related~~ facilities. ~~The percentage of each urban storm water discharger's mercury load that Caltrans should be responsible for, and the reductions needed from Caltrans runoff have not been determined.~~ Caltrans has a statewide permit issued by the State Water Resources Control Board that requires, among other things, submittal of a work plan that explains how the program will be implemented in each region. The permit also requires Caltrans to develop a program for communication with local agencies and coordination with other municipal urban runoff management programs where the programs overlap geographically with Caltrans roadways and non-roadway facilities. We propose that the following ~~proposed~~ elements be incorporated into the Caltrans regional work plan for the San Francisco region:

- Develop and implement a system to quantify mercury loads or loads reduced~~avoided~~ through control actions;
- Prepare an annual report that documents mercury loads or loads reduced~~avoided~~ through control actions; and
- Develop an equitable allocation-sharing scheme that reflects Caltrans load reduction responsibility in consultation ~~cooperation~~ with the urban runoff management agencies ~~storm water dischargers~~, and report the details ~~of the agreement~~ to the Water Board. Alternatively, Caltrans may choose to implement load reduction actions on a watershed or regionwide basis in lieu of sharing a portion of an urban runoff management agency's allocation, and the Water Board will consider a separate allocation for Caltrans. Caltrans may demonstrate progress toward attaining an allocation or load reduction in the same manner mentioned previously for municipal programs.

Staff Report page A-9 (proposed Basin Plan Amendment):

v. Develop an equitable allocation-sharing scheme in consultation ~~cooperation~~ with Caltrans (see below) to address Caltrans roadway and non-roadway facilities in the program area and report the details ~~of the agreement~~ to the Water Board.

Staff Report page A-9 through A-10:

> Within the jurisdiction of each urban ~~stormwater discharger~~ runoff management agency, Caltrans is responsible for discharges associated with roadways and non-roadway ~~California highways and related~~ facilities. ~~The percentage of each urban stormwater discharger's mercury load for which Caltrans should be responsible and the reductions needed from Caltrans runoff have not been determined.~~ Consequently, Caltrans shall be required to implement the following actions:
>
> i) Develop and implement a system to quantify mercury loads or loads reduced~~avoided~~ through control actions;
> ii) Prepare an annual report that documents mercury loads or loads reduced~~avoided~~ through control actions; and
> iii) Develop an equitable allocation-sharing scheme that reflects Caltrans load reduction responsibility in ~~cooperation~~ consultation with the urban ~~stormwater dischargers~~ runoff management agencies, and report the details ~~of the agreement~~ to the Water Board. Alternatively, Caltrans may choose to implement load reduction actions on a watershed or regionwide basis in lieu of sharing a portion of an urban runoff management agency's allocation. In such as case, the Water Board will consider a separate allocation for Caltrans for which they may demonstrate progress toward attaining an allocation or load reduction in the same manner mentioned previously for municipal programs.

1. Mercury concentration in roadway runoff
Attachment Page 1

Comment: *Available monitoring data appear to indicate that Department facilities are not a major source of the mercury entering the bay. Mercury concentrations measured during the statewide storm water quality characterization study found that mercury in roadway runoff averaged 37 ng/l (total). The CTR criterion for mercury is 51 ng/l and the Basin Plan's objective is 25 ng/l.*

Response: Caltrans facilities may not be a major source of mercury. Because the Bay is a mercury-impaired water body, all discharges, no matter how small, must be identified and given an allocation. One of the options available to Caltrans for demonstrating attainment of the allocation is to show that suspended sediment leaving its facilities are below the suspended sediment target.

2. Flexibility for Caltrans
Attachment Page 1

Comment: *Caltrans is concerned that some jurisdictions may assign it a sub-allocation based on an arbitrary value, such as percentage of flow, which may not represent its actual contribution. Caltrans proposes that the TMDL specifically state that its*

allocation will be based on data representative of Caltrans' actual contribution to the mercury load.

Response: Urban runoff management agencies do not have the authority to assign allocations or load reductions. We propose that those agencies consult with Caltrans regarding the manner of recognizing the contribution of Caltrans facilities within their geographic boundaries. The Water Board must approve any such proposal. Furthermore, the modified language on Staff Report pages A-9 and A-10 (see above for details) give Caltrans flexibility and autonomy regarding the manner in which it implements this TMDL's requirements.

3. Lack of feasible options for achieving allocations given to stormwater sources
Attachment Page 1-2

Comment: *Caltrans is concerned that it will be unable to demonstrate the required reductions (loads avoided) because of a lack of load reduction opportunities and because runoff concentrations appear to already be low. In the absence of appropriate discharger-specific controls, some permittees, such as Caltrans, will be faced with two alternatives: (1) provide retrofit treatment controls at runoff locations, or (2) purchase equivalent load reductions elsewhere. Caltrans believes neither of these likely outcomes have been adequately discussed in the TMDL or represented in the cost estimates. It proposes that the Water Board not proceed with the TMDL until realistic reduction alternatives are identified and assessed.*

Response: We propose to implement the TMDL adaptively; therefore, we will work with Caltrans to incorporate additional information as it becomes available and revise the mercury load estimates if appropriate. According to the proposed Basin Plan Amendment (Staff Report page A-9), Caltrans will be able to demonstrate consistency with the TMDL allocations by using one of the methods available to urban runoff management agencies:

- Quantifying the annual average mercury load reduced,

- Quantifying the mercury load using data on flow and water column mercury concentrations, or

- Quantitatively demonstrating that the mercury concentration of suspended sediment that best represents sediment discharged with urban runoff is below the suspended sediment target.

These options provide substantial flexibility in terms of meeting the proposed allocations. For example, a demonstration that suspended sediment discharged from Caltrans facilities is below the suspended sediment target is equivalent to a demonstration of attaining any applicable load allocation.

4. Background and other unavoidable loading
Attachment Page 2

Comment: *The TMDL appears to assume that background soil concentration values are approximately 0.06 ppm based on the Santa Clara sampling of agricultural areas. Caltrans believes this value may be low based on the University of Riverside's compilation of trace element concentrations in 50 different soils from around the state. The concern is that natural (uncontaminated) background soil mercury concentrations plus atmospheric deposition may be the major contributors to roadway mercury.*

Response: The comment refers to the sediment mercury concentration associated with open space (agricultural runoff was not analyzed). This sediment is subject to atmospheric deposition. Our estimated open space sediment mercury concentration is reasonable because we used actual local data. It is less appropriate to use soil concentrations from all over California to represent the sediment mercury concentration for open space that drains to San Francisco Bay. Furthermore, our value does seem consistent with sediment mercury concentrations (below 0.1 ppm) found in deep San Francisco Bay cores (see Staff Report page 22).

We assume that some portion of the indirect atmospheric deposition mercury load from Caltrans facilities is controllable because capturing this mercury is a consequence of choices made regarding facility design. However, the allocation scheme also allows a certain amount of the mercury from indirect deposition to be discharged because the allocation is based on the proposed sediment target (0.2 ppm), not the "background" concentration represented by open space runoff (0.06 ppm), which also contains some mercury from indirect atmospheric deposition.

5. Economic assessment
Attachment Page 2

Comment: *Caltrans believes the economic analysis for the Basin Plan Amendment may substantially understate potential TMDL costs. If achieving adequate load reductions requires construction of end-of-pipe treatment facilities or purchase of offsets, then the costs may be higher. Caltrans proposes that the TMDL specifically identify the costs of realistically available reduction alternatives.*

Response: On the basis of available information, we considered economic factors in accordance with the California Environmental Quality Act (see Staff Report page 103). The Porter-Cologne Water Quality Control Act §13241 also identifies economic analysis requirements. Our economic analysis would be adequate for purposes of §13241, but those requirements do not apply because we are not proposing any new water quality objectives. The comment does not provide any additional information regarding costs for treating storm water. We have estimated reasonably foreseeable costs of TMDL implementation and our original analysis is adequate.

6. Need to assess cumulative costs and engineering compatibility of this and other Bay TMDLs
Attachment Page 2-3

Comment: *Caltrans proposes that the Water Board estimate costs applicable to storm water discharges for achieving the expected allocations for currently listed constituents. It also proposes that the TMDL assess the compatibility of controls likely to be implemented for the whole suite of TMDLs.*

Response: On the basis of available information, we considered economic factors in accordance with the California Environmental Quality Act (see Staff Report page 103). We are only required to consider economics and impacts in the context of the rule being adopted, which is the San Francisco Bay Mercury TMDL. However, we anticipate that implementation of the San Francisco Bay Mercury TMDL and the costs associated with implementation will offer multi-pollutant benefits.

7. Need for a broader approach to mercury control including atmospheric deposition
Attachment Page 3

Comment: *The TMDL discusses atmospheric deposition as it directly affects the Bay and local watershed but does not propose any reductions in this deposition. The TMDL estimates that as much as 30% of the storm water load may result from atmospheric deposition. Since the TMDL acknowledges that deposition contributes to mercury concentration in surface soils, Caltrans believes the Water Board should more aggressively consider control opportunities.*

Response: Other commenters have expressed similar concerns. Refer to our responses on pages 12 and 117.

8. Estimate of Storm Water Loading
Attachment Page 3-4

Comment: *Caltrans believes future monitoring may result in substantial changes in the urban storm water runoff load estimate. The TMDL needs to address how changes will be addressed and reflected in the assigned allocations.*

Response: We state on Staff Report page A-16 (the Basin Plan Amendment) that we will review allocations and control actions. Any substantial changes to the TMDL will be made through a Basin Plan Amendment. We have clarified this section of the Basin Plan Amendment in response to this and other similar comments. Refer to our response on page 13.

Fred Krieger (no affiliation)

The comment relates to background mercury concentrations in soil and the controllability of atmospheric deposition. The comment asserts that neither should be included within

the urban runoff allocation. One concern expressed is that background mercury concentrations in some soils are so high that the sediment target of 0.2 ppm may not be achievable. We don't share this concern because the sediment mercury concentration for non-urban creeks is about 0.06 ppm, and this should represent natural background mercury concentrations typical of much of the Bay Area. Moreover, mercury concentrations buried at depth in Grizzly Bay, Richardson Bay, Triangle Marsh (near Lower South San Francisco Bay), and elsewhere in San Francisco Bay are generally less than 0.1 ppm (Hornberger et al. 1999; SFBRWQCB 2003f), suggesting that pre-industrial concentrations were well below 0.2 ppm. The comment does not provide any new information confirming that background concentrations are higher in some locations. Regarding the reference to the San Pablo Bay sediment core, the concentrations at depth (0.3 ppm to 0.4 ppm) correspond to conditions prior to 1952, not necessarily pre-industrial times.

We don't see any clear advantage to separating natural background mercury loads and atmospheric deposition loads from the urban runoff load and allocation. Since the urban runoff allocation is based on the sediment target of 0.2 ppm, it accommodates natural background mercury and mercury from atmospheric deposition. (The non-urban runoff sediment mercury concentration of 0.06 ppm includes natural background mercury and mercury from atmospheric deposition.) To reach the allocation, urban runoff management agencies will have to reduce their contributions, but they will not necessarily have to reduce natural background or atmospherically deposited mercury. Once captured by storm drain systems, mercury from atmospheric deposition is controllable, however. Therefore, efforts to control atmospheric deposition could offset the need to reduce other sources of mercury in urban runoff. (Also see the response, on page 12, to the similar Bay Area Stormwater Management Agencies Association comment.)

WASTEWATER

Bay Area Clean Water Agencies, James Kelly

Maintain the 17 kg/yr pooled allocation and associated growth increment from the previous TMDL report.
Cover Letter page 2 and Attachment 1 pages 1-2

In response to this and other comments, we have revisited the manner in which we estimated the current wastewater mercury loads (see page 5 for additional context). We now estimate current load as the upper 99% confidence limit of the mean municipal wastewater load from 2000 to 2003. This results in a current load estimate and group allocation of 17 kg/yr, which agrees with the allocation suggested in the comment. However, although 17 kg/yr is the same numeric value presented in the June 2003 Project Report, the method employed for the Project Report to arrive at that value was less appropriate to address inter-annual variability, and we had a smaller data set on which to base the calculation (we did not have 2003 data at that time). The purpose of revising the calculation method (use of the upper 99% confidence limit) is to better account for the inter-annual variability of the yearly load and small period of data availability, thus establishing a more statistically robust estimate of the mean load. We now propose an updated load estimate (the 99% upper confidence limit of the mean—17 kg/yr) and group allocation generated using the correct method to account for inter-annual variability and including the 2003 load data. Neither the estimate presented in the Project Report nor those in the previous or revised Staff Reports explicitly accounts for growth as the comment suggests.

We will change the Staff Report and Basin Plan Amendment to reflect the new calculation as follows:

Staff Report page S-2 (Table S.2):

Wastewater (municipal and industrial)	~~16~~ 20	~~16~~ 20
Total	1,220	~~702~~ 706

Staff Report page 10:

> Total maximum yearly mercury load to San Francisco Bay of ~~702~~ 706 kg, on average, which is roughly 60% of the existing load.

Staff Report page 19 (Table 4.1):

Wastewater	~~16~~ 20

Staff Report page 30:

> …Current load estimates were computed using available data on effluent mercury concentrations and effluent discharge volumes from 2000 through 2003. In order to account for the interannual variability of discharge given the relatively short data period, current loading for the two wastewater discharge groups (municipal and industrial) was estimated as the upper 99% confidence intervals about the mean. The combined mercury load for all municipal wastewater discharges to San Francisco Bay and its tributaries is about ~~14~~ 17 kg/yr. The combined load of the industrial dischargers and petroleum refineries is about ~~2~~ 3 kg/yr (LWA 2004; SFBRWQCB 2004b,c).
>
> Together, these municipal and industrial wastewater discharges account for a load of about ~~16~~20 kg/yr, or about ~~1~~2% of the bay's total mercury load.

Staff Report page 34:

> The sources of mercury in San Francisco Bay include bed erosion (about 460 kg/yr), the Central Valley watershed (about 440 kg/yr), urban storm water runoff (about 160 kg/yr), the Guadalupe River watershed (about 92 kg/yr), direct atmospheric deposition (about 27 kg/yr), non-urban storm water runoff (about 25 kg/yr), and wastewater discharges (about ~~16~~ 20 kg/yr).

Staff Report page 52 (Table 7.1):

Wastewater (municipal and industrial)	~~16~~ 20	~~16~~ 20	0
Total	1,220	~~702~~ 706	

Staff Report page 56:

> The proposed wasteload allocation requires that, as a group, municipal wastewater dischargers discharge no more than their current combined load of ~~14~~ 17 kg/yr (LWA 2004; SFBRWQCB 2004b,c).

Staff Report page 57, last line of Table 7.3 (changes to the individual allocations are addressed later):

Total	~~14~~ 17[b]

Staff Report page 63:

> To reach the proposed suspended sediment target and attain water quality standards, the proposed load and wasteload allocations are as follows: bed erosion, 220 kg/yr; Central Valley watershed, 330 kg/yr; urban storm water runoff, 82 kg/yr; Guadalupe River watershed (mining legacy), 2 kg/yr;

atmospheric deposition, 27 kg/yr; non-urban storm water, 25 kg/yr; and wastewater, ~~16~~ 20 kg/yr.

Staff Report page 74 (box):

Existing Load:	~~14~~ 17 kg Hg/yr
Allocation:	~~14~~ 17 kg Hg/yr (group total to be implemented)

Staff Report page 74 (text):

The watershed NPDES permit will explicitly prohibit the aggregate municipal wastewater mercury load from exceeding the group allocation of ~~14~~ 17 kg/yr.

Staff Report page 93:

The proposed total maximum yearly load is ~~702~~ 706 kg/yr.

Staff Report page 96:

Under this alternative, the proposed total maximum yearly load of ~~702~~ 706 kg/yr would be allocated proportionally among the mercury sources.

Staff Report page 97 (Table 9.1):

Urban Storm Water Runoff	160	82	~~100~~ 101
Wastewater	~~16~~ 20	~~16~~ 20	~~10~~ 13
Total	1,220	~~702~~ 706	~~702~~ 706

Staff Report page 110:

Larry Walker Associates (LWA) 2004. "Wastewater Mercury Load Summary," prepared for the San Francisco Bay Regional Water Quality Control Board, ~~April 19~~ May 5.

Staff Report page 113:

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) 2004b. "Calculation of Mercury Load Allocations for Wastewater Facilities," prepared by R. Looker, ~~April 20~~ August 26.

Staff Report page A-3 (the Basin Plan Amendment):

> The year 2003 estimate of total mercury inputs to the San Francisco Bay is about 1220 kg/yr. The sources of mercury in San Francisco Bay include bed erosion (about 460 kg/yr), the Central Valley watershed (about 440 kg/yr), urban stormwater runoff (about 160 kg/yr), the Guadalupe River watershed (about 92 kg/yr), direct atmospheric deposition (about 27 kg/yr), non-urban stormwater runoff (about 25 kg/yr), and wastewater discharges (about ~~16~~ 20 kg/yr).

Staff Report page A-4, Table 4-v:

Wastewater (municipal and industrial)	~~16~~ 20	~~16~~ 20

Staff Report page A-4:

> The mercury TMDL for San Francisco Bay is the sum of the load and wasteload allocations, ~~702~~ 706 kg/yr.

Staff Report page A-6, Table 4-x:

Total	~~14~~ 17 [b]

Staff Report page A-11:

> The group mass limit is the sum of the individual allocations for these facilities, ~~14~~ 17 kg/yr.

Restore the 5-year averaging period proposed in the previous project report.
Cover Letter page 2 and Attachment 1 page 1

We cannot restore the 5-year averaging period presented in the Project Report for wastewater loads. This averaging period was intended to account for the inter-annual variability of mercury loading. As mentioned above, the calculation method employed in generating the allocation already accounts for inter-annual variability. Accounting for inter-annual variability both in computing the allocation and in assessing compliance with the allocation as we had in the June 2003 Project Report would be inappropriate because that would effectively account for inter-annual variability twice. The approach presented in the Staff Report results in a group wasteload allocation that represents annual loads and a water quality based effluent limit (WQBEL) that is consistent with the assumptions and requirements of the wasteload allocation. The reasons we continue to employ a 5-year averaging period for loads from watersheds are two-fold: first, climatic (rainfall) variability will have a large impact on sediment delivery and mercury loads; second, this climatic variability was not accounted for in computing the yearly allocations for these sources.

Eliminate unnecessary and problematic individual mass allocations.
Cover Letter page 2 and Attachment 1 page 2

We cannot eliminate individual mass allocations because 40 CFR §130.2(h) defines wasteload allocations in terms of individual point sources of pollution:

> Wasteload allocation (WLA). The portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation.

As such, the individual allocations are legally necessary. However, we have addressed the concern cited in the comment in two ways. First, we have recomputed the current load estimate using the 99% upper confidence limit of the mean for the period from 2000 through 2003. Using this upper confidence limit provides an extra increment of confidence that we are employing a robust current load estimate for the group mass allocation. This confidence limit, after rounding to the nearest kilogram, results in a group allocation of 17 kg/yr. For consistency, we also employed this approach for the industrial and petroleum refinery categories. After correcting the erroneous load estimate for industrial facilities, the 99% upper confidence limit of the mean combined industrial and petroleum refinery load is 3 kg/yr.

Second, we have employed an alternative approach for allocating the group mass limit among the individual municipal facilities. We have used an allocation factor based 15% on fractional facility effluent volume for the period from 2000 through 2003 and 85% on fractional facility mercury loads for the period from 2000 through 2003 (SFBRWQCB 2004b)**.** By considering both flow and mercury load in computing individual facility allocations, we have attempted to arrive at equitable individual allocations that penalize neither small facilities nor those that have an exceptional level of treatment. We will revise Staff Report Table 7-3 (page 57) and Basin Plan Amendment Table 4-x (page A-6) as indicated below (we will also delete the column from Table 7-3 labeled "Percent of Total Mean Mercury Load, 2000-2003").

American Canyon, City of	CA0038768	0.12 ~~10~~
California Department of Parks and Recreation, Angel Island State Park	CA0037401	0.013
Benicia, City of	CA0038091	0.088 ~~072~~
Burlingame, City of	CA0037788	0.089 ~~069~~
Calistoga, City of	CA0037966	0.016 ~~013~~
Central Contra Costa Sanitary District	CA0037648	2.23 ~~1.97~~
Central Marin Sanitation Agency	CA0038628	0.18 ~~13~~
Delta Diablo Sanitation District	CA0038547	0.31 ~~25~~
~~Dublin San Ramon Services District~~	~~CA0037613~~	~~0.52~~
East Bay Dischargers Authority Dublin-San Ramon Services District (CA0037613) Hayward Shoreline Marsh (CA0038636) Livermore, City of (CA0038008) Union Sanitary District, wet weather (CA0038733)	CA0037869	3.67 ~~2.56~~[a]
East Bay Municipal Utilities District	CA0037702	2.57 ~~18~~
East Brother Light Station	CA0038806	0.001

Fairfield-Suisun Sewer District	CA0038024	0.22 ~~14~~
Las Gallinas Valley Sanitary District	CA0037851	0.17 ~~16~~
~~Livermore, City of~~	~~CA0038008~~	~~0.09~~
Marin County Sanitary District, Paradise Cove	CA0037427	0.001
Marin County Sanitary District, Tiburon	CA0037753	0.01 ~~007~~
Millbrae, City of	CA0037532	0.052 ~~042~~
Mountain View Sanitary District	CA0037770	0.034 ~~024~~
Napa Sanitation District	CA0037575	0.28 ~~24~~
Novato Sanitary District	CA0037958	0.079 ~~075~~
Palo Alto, City of	CA0037834	0.38 ~~26~~
Petaluma, City of	CA0037810	0.063 ~~048~~
Pinole, City of	CA0037796	0.055 ~~042~~
Contra Costa County, Port Costa Wastewater Treatment Plant	CA0037885	0.001
Rodeo Sanitary District	CA0037826	0.06 ~~055~~
Saint Helena, City of	CA0038016	0.047 ~~045~~
San Francisco, City and County of, San Francisco International Airport WQCP	CA0038318	0.032 ~~028~~
San Francisco, City and County of, Southeast Plant	CA0037664	2.68 ~~27~~
San Jose/Santa Clara WPCP	CA0037842	1.0 ~~0.49~~
San Mateo, City of	CA0037541	0.32 ~~26~~
Sausalito-Marin City Sanitary District	CA0038067	0.078 ~~068~~
Seafirth Estates	CA0038893	0.001
Sewerage Agency of Southern Marin	CA0037711	0.13 ~~11~~
Sonoma Valley County Sanitary District	CA0037800	0.041 ~~030~~
South Bayside System Authority	CA0038369	0.53 ~~44~~
South San Francisco/San Bruno WQCP	CA0038130	0.29 ~~24~~
Sunnyvale, City of	CA0037621	0.15 ~~083~~
US Naval Support Activity, Treasure Island WWTP	CA0110116	0.026 ~~23~~
~~Union Sanitary District, Wet Weather~~	~~CA0038733~~	~~0.001~~
Vallejo Sanitation & Flood Control District	CA0037699	0.57 ~~49~~
West County Agency, Combined Outfall	CA0038539	0.38 ~~32~~[c]
Yountville, Town of	CA0038121	0.04 ~~038~~

Consider and reference previous regional planning documents prepared by Water Board staff.
Cover Letter Page 2 and Attachment 1 Page 3

The two Water Board reports mentioned in the comment were cited in the June 2003 TMDL Project Report and are thus already part of the administrative record. Regarding the need to account for growth, refer to our response on page 51.

Consider and reference draft Clean Estuary Partnership reports.
Attachment 1 pages 3-6

We address several specific comments on this topic in turn below.

The entirety of Section 3, Mass Budget Approach, is based on the draft Mercury Source Assessment Report.
Attachment 1 page 4

Our Source Assessment is a refinement of the analysis we completed in June 2000 (SFBRWQCB 2000). The analysis has evolved over time with the completion of each new TMDL report. As participants in the Clean Estuary Partnership, we reviewed the partnership's draft Mercury Source Assessment Report, but we did not rely on it in whole or in part (thus we did not cite the draft report in the Staff Report). The draft Mercury Source Assessment Report compiles important information. However, we relied on primary sources to the extent possible, and cited the actual original documents that support the TMDL. We found the draft report to be useful in leading us to some of the studies we cited in the Staff Report, but we did not embrace all the original analysis proposed in it.

The draft Mercury Source Assessment Report and the Staff Report differ in important ways. For example, the draft Mercury Source Assessment Report ignores bed erosion as a source. Moreover, the draft Mercury Source Assessment Report relies on a questionable approach for estimating the typical sediment mercury concentration in San Francisco Bay. The Water Board is a Clean Estuary Partnership partner, and rather than insist that the draft report be substantially revised prior to completing the TMDL, we chose to complete our own source assessment. This approach offers the added benefit that the TMDL is more clearly based on our own independent judgment. We cited draft Clean Estuary Partnership reports only when they offered something that could not be readily supported through other sources.

Amend Figure 4.1 and Table 4.1 to include the uncertainty of each load estimate.
Attachment 1 Page 4

In the narrative discussion explaining each source estimate, we presented the calculation method, important assumptions, and underlying ranges or uncertainties to the extent that information is available. Expressing the ranges of the source estimates from all sources in a consistent manner is impossible because different calculation methods and data were used for each estimate. Several estimates were derived from other estimates, and without a consistent way of characterizing the ranges or uncertainties, we could not use standard methods to propagate the uncertainties for derived values. For this reason, we cannot put consistent and meaningful ranges or error bars on quantities presented in Figure 4.1.

Add text to Section 8, under the heading Wastewater, subheading Municipal Discharges (Page 74).
Attachment 1 Page 5

We have adequately complied with Water Code §13242. We will not add the recommended paragraph for three reasons. First, the paragraph includes information on previous estimates of wastewater loads that are irrelevant because our current estimates are based on updated information. Second, we already discuss on Staff Report page 56

how requiring load reductions would incur substantial costs (and we cite the draft Clean Estuary Partnership report), so there is no need to reiterate this point. Third, the paragraph contains projections of mercury loads based on an unsubstantiated 1:1 relationship between population and mercury loads (i.e., if population increases by 10%, mercury loads will increase by 10%).

This unsubstantiated relationship is based on an assumed 1:1 relationship between Bay Area population and municipal wastewater effluent volume. In fact, from 1985 to the present (2000-2003), the Bay Area population increased 25% (SFBCDC 1992, CDF 2003[1], ABAG 2004), but during the same period municipal wastewater effluent discharge to the Bay increased by less than 4% (LWA 2004[1], SFBCDC 1992). Furthermore, from the year 1997-98 to the present (2000-2003), the Bay Area population increased by 6% (CDF 2003[1],[2]), yet POTW effluent discharge to the Bay decreased by almost 10% (San Jose 2004, LWA 2004[1]).

These data illustrate that municipal wastewater effluent volume and Bay Area population are not related by a simple 1:1 correspondence. The effluent volume reduction in recent years probably reflects economic conditions as well as gains in water use efficiency. Based on this information, there appears to be no unambiguous relationship between municipal wastewater effluent volume and population. There is likewise no clear relationship between Bay Area population and mercury loads. Therefore, it does not follow that mercury loads will increase in proportion to Bay Area population increases. Further, Association of Bay Area Governments growth projections predict that the Bay Area population will increase by less than 14% for the 20-year period between 2005 and 2025 (ABAG 2003). This is much less population growth than occurred between 1985 and the present, when effluent volume increased by less than 4%. (We have no projected population estimates beyond 2025 so any attempt to account for population growth beyond 2025 would be speculative.) For this reason, we find no compelling evidence to suggest that, in the foreseeable future, wastewater facilities in aggregate will be unable to meet the load allocations computed from current load information.

The current estimated mean of annual mercury loading for the period of 2000-2003 is 11.4 kg/yr, with a 99% upper confidence limit of 17 kg/yr. There appears to be no immediate jeopardy for municipal wastewater dischargers in aggregate to exceed the group allocation. Because the permit will state that the individual wasteload allocations are only to be enforced as effluent limits if the group allocation is exceeded, if wastewater facilities in aggregate meet the group allocation, then no individual discharge will be in jeopardy of violating an effluent limit. Moreover, the adaptive implementation process will allow us to review at regular intervals the loads from wastewater facilities and any loading trends potentially related to population changes.

Change the text of Section 8, under the heading Wastewater, subheading Municipal Discharges (Page 74).
Attachment 1 Pages 5 and 6

We will not make the suggested change. The Fairfield-Suisun Sewer District study cited in the comment letter, while providing interesting preliminary information, does not provide sufficient detail for inclusion in the Staff Report.

Change the text of Section 8, heading Potential Sources, subheading Mercury Mines (page 79).
Attachment 1 Page 6

We will not make the suggested change for two reasons. First, the Staff Report is sufficiently clear as to our intended plan to address mercury mines. Second, the Water Board has not formally endorsed the plan mentioned in the cited report and may proceed in a somewhat different manner than outlined in the report. Although we read the draft report, we did not rely on it for TMDL purposes; therefore, there is no reason to cite it or include it in the administrative record. Regarding the point about making clear our resource needs to accomplish our mission, decisions concerning the resources necessary to carry out this mission and the allocations among various program areas take into account a wide array of factors. The Water Board allocates its resources dynamically, after reflecting on budgets and changing priorities.

Take steps to make the Clean Estuary Partnership draft reports final.
Attachment 1 Page 7

The comment does not contain any specific request pertaining to the content of either the Staff Report or Basin Plan Amendment. The Staff Report cites the sources of all information on which the TMDL is based. All cited references will be included within the administrative record for the TMDL. Therefore, any information needed to provide context for the TMDL has already been incorporated into the record. Because the draft Clean Estuary Partnership reports were prepared to support the preparation of the Water Board's TMDL reports, there is no need to revise or finalize the reports at this time since the TMDL Staff Report is now complete.

Incorporate a model watershed permit into the Basin Plan Amendment.
Cover Letter Page 3

Incorporating specific language in the Basin Plan Amendment would make it necessary to do a Basin Plan Amendment to then change to the permit language. Therefore, incorporating a model watershed permit into the Basin Plan Amendment is inappropriate. Water Board staff are currently developing draft language for this permit and will make it available as soon as possible.

Delta Diablo Sanitation District, Gary Darling

The proposed Basin Plan Amendment gives no credit for costly improvements in pretreatment, recycling, and household hazardous waste handling. The proposed Basin Plan Amendment penalizes the District for improved performance.
Comment Letter Page 1

It is commendable that Delta Diablo has made improvements to its facility. However, we currently have no established procedure for giving credit for the activities mentioned. However, we will work collaboratively with the Bay Area Clean Water Agencies (BACWA) and other stakeholders to establish such a system, and we mention this intent on Staff Report page 83. The comment does not provide any evidence that "the proposed Basin Plan Amendment penalizes the [Delta Diablo Sanitation] District for improved performance." We can only assume the comment refers to the manner in which allocations were computed based on the fraction of facility mercury load. As mentioned above in response to the BACWA comment about mass allocations (see page 49), we have recomputed the individual discharge allocations in a manner that takes into account both effluent volume and mercury load. In this way, we have attempted to arrive at equitable individual allocations.

To further clarify our intentions regarding a pilot offset program, we will change Staff Report page 83 as follows.

> …Credits could be used to offset annual loads and attain allocations for multiple sources. In addition, the Water Board could encourage and consider a pilot mercury mass offset program if it is demonstrated that such a program is a more cost effective and efficient means of achieving water quality standards and ~~T~~the relative potential for mercury from different sources to enter the food web and the potential for adverse local impacts have been evaluated. ~~relative bioavailability of mercury from different sources and the potential for local impacts will need to be considered as these watershed-based plans are developed.~~ These programs should recognize and reward ongoing efforts that are above and beyond those required by this TMDL.

We will similarly change Staff Report page A-16 (the Basin Plan Amendment):

> …Credits could be used to offset annual loads and attain allocations for multiple sources. In addition, the Water Board will encourage and consider a pilot mercury mass offset program if it is demonstrated that such a program is a more cost effective and efficient means of achieving water quality standards, and the ~~T~~the relative potential for mercury from different sources to enter the food web and the potential for adverse local impacts ~~will need to be considered~~ have been evaluated. These programs should recognize and reward ongoing efforts that are above and beyond those required by this TMDL. Until such ~~a~~ programs ~~is~~ are established, the Water Board will consider mercury source control and risk reduction activities on a case-by-

case basis to determine how they ~~may result in reducing loads to the Bay~~contribute toward achievement of TMDL goals.

In addition to explaining how the District's wasteload allocation changed from the June 2003 proposed amendment to the April 2004 proposed amendment, the District requests several other changes to the Basin Plan Amendment.
Comment Letter page 2

The June 2003 TMDL Project Report was not a proposed Basin Plan Amendment. Refer to the response to BACWA comments about group allocations and individual allocations on pages 45 and 49 above for an explanation of why the individual allocations changed from what appeared in the project report.

While there is no perfect scheme for allocating the group allocation among the individual facilities, in using both flow and mercury loads, we have chosen an equitable approach. Because the comment provides no specific manner to "establish POTW wasteload allocation that provides recognition for POTWs who have been investing in improvements that are resulting in decreasing mercury discharges," we will maintain the approach discussed in response to BACWA comment on page 49.

We cannot comply with the request to "include language similar to the Urban Stormwater Runoff and Guadalupe Watershed sections allowing dischargers to receive credit against their wasteload allocations for their efforts to reduce mercury…." Each wastewater treatment plant has a specific wasteload allocation. The primary means for showing compliance with the wasteload allocations is through a demonstration that mass discharges do not exceed the wasteload allocations. In contrast, for watershed-based allocations established for Guadalupe River watershed and urban runoff programs, it is very difficult to demonstrate through direct calculation that loads are below the allocation. Therefore, we provided flexibility for those watershed-based allocations to demonstrate that the allocations are being met. This flexibility is neither necessary nor appropriate for wastewater facilities. Because we disagree with the suggested revision, the other two related comments regarding time periods and changing "may" to "will" do not apply.

We cannot agree to employ a 5-year averaging period for municipal wastewater loads. Refer to the response to the similar BACWA comment on page 48.

Fairfield-Suisun Sewer District, Larry Bahr

The best performing Bay area wastewater treatment plants should not be penalized for their excellent performance.
Comment Letter page 2

We did not intend to penalize any treatment plants. Refer to the responses to the related BACWA comments about group allocations and individual allocations on pages 45 and 49 above.

Allocations must be set at levels that do not inhibit planned growth.
Comment Letter page 2

Neither the federal Clean Water Act nor its implementing regulations mandate that growth be considered, accommodated, or accounted for in setting allocations. Allocations are set at levels necessary to meet targets and achieve water quality standards (CWA §303[d][1][c]). We disagree that the allocation is a growth cap. The TMDL essentially caps mercury discharges. The TMDL does not restrict growth but requires growth to take place in a manner so as to not increase pollutant loads. Therefore, we disagree that either the individual or the group load allocations are growth limiting. Refer to the response to the BACWA comment on page 51 above, where we discuss the relationship between population growth, municipal wastewater effluent volume, mercury loads, and effluent limits.

Water Board staff should set the compliance determination averaging period as long as legally possible to avoid unintended violations of allocations.
Comment Letter page 2

The longest possible averaging period is one year for the reasons discussed in response to the similar BACWA comment on page 48 above.

The total allocation for all wastewater treatment plants should be set at a minimum of 17 kg/year to ensure adequate room for planned growth.
Comment Letter page 3

Refer to the earlier response to the similar BACWA comment on page 45 above for an explanation of the basis of the current calculation and how we have adjusted the group and individual allocations. As discussed above, neither the federal Clean Water Act nor its implementing regulations mandate that growth be considered, accommodated, or accounted for in setting allocations. The proposed 17 kg/yr group allocation does not explicitly accommodate growth.

The District requests that Board staff develop an implementation plan that formalizes periodic loading status/attainability reviews coupled with adaptive management to ensure that storm water load reduction estimates are reasonable and real and that they do not place proactive NPDES permit holders in jeopardy of permit violations.
Comment Letter page 3

We state on Staff Report pages 82 and A-15 that we will review the TMDL approximately every five years. We state on Staff Report pages 83 and A-16 that, as part of the adaptive implementation process, the Water Board will review information regarding the feasibility, effectiveness, and cost of actions to control mercury loads. Regarding the reasonableness of load reductions for urban runoff programs, refer to the response on page 13.

Livermore, City of, Darren Greenwood

The City of Livermore opposes the approach taken to allocate the mercury wasteload. No consideration was given to POTWs that have performed well.
Comment Letter page 1

Refer to the responses to the related BACWA comments about group and individual allocations on pages 45, 49, and 54.

The adoption of the current mercury wasteload allocation will not allow Livermore to implement its recently updated General Plan without exceeding its mercury allocation.
Comment Letter pages 1 and 3

Neither the federal Clean Water Act nor its implementing regulations mandate that growth be considered, accommodated, or accounted for in setting allocations. Allocations are set at levels necessary to meet targets and achieve water quality standards (CWA §303[d][1][c]). The TMDL does not restrict growth but requires growth to take place in a manner so as to not increase pollutant loads. Neither the individual nor the group allocations are growth limiting. Refer to the response to the BACWA comment on page 51 above, where we discuss the relationship between population growth, POTW effluent volume, mercury loading, and effluent limits.

There is inequity in the proposed individual wasteload allocations.
Comment Letter pages 1-2

Refer to the responses to the related BACWA comments about group and individual allocations on pages 45 and 49 above for an explanation of how we recomputed both the group and individual allocations in response to various comments.

The Water Board proposes to require mercury source control programs. However, BACWA has provided evidence that, for well-run treatment plants with comprehensive pretreatment and pollution prevention programs, the effluent mercury concentrations appear to be independent of influent mercury concentrations.
Comment Letter Page 2

If a facility is well run, it will likely not exceed both the mass and concentration triggers and will thus not be called upon to consider enhancements to treatment or source control. Therefore, for such a facility, current source control efforts will likely only be required to maintain current efforts. Nevertheless, to address this concern further, we will change Staff Report pages 75 and 77 (regarding commensurability of effort) as follows (changes shown regarding risk reduction are in response to comments made elsewhere [see page 109].)

- Develop and implement effective ~~mercury source control~~ programs to control ~~minimize significant~~ mercury sources and loading and reduce mercury-related risks to humans and wildlife (the level of effort will be

commensurate with the mercury load and performance ~~discharge volume~~ of the facility) and quantify the mercury load avoided or reduced and risk reductions resulting from the activities;

We will similarly change Staff Report pages A-11 and A-12.

- Develop and implement effective ~~mercury source control~~ programs to control mercury sources and loading and reduce mercury-related risks to humans and wildlife (the level of effort will be commensurate with the mercury load and performance of the facility) and quantify the mercury load avoided or reduced and risk reductions resulting from these activities;

It is unreasonable to consider the projected 14% Bay Area growth rate as applicable to all POTWs.
Comment Letter page 3

The individual wasteload allocation is only an enforceable limit if the group allocation is exceeded. Because the group allocation incorporates loads from the entire Bay Area, it is appropriate and reasonable to use regional growth projections to assess prospects for future group loads. Furthermore, there does not appear to be a 1:1 relationship between population growth and flow increases (see response to BACWA comment on page 51 above).

Increased water reuse may not offset growth and help the City of Livermore meet its proposed allocation.
Comment Letter page 3

While Livermore may have challenges in terms of finding opportunities for water reuse, increased water reuse at the regional scale is a way for POTWs in general to address increased flows, which will help the group stay below the mercury group allocation. If POTWs as a group do not exceed the group allocation, individual mass limits will not be enforced.

Mountain View Sanitary District, David Contreras

1. The Mountain View Sanitary District allocation will cause a compliance problem, especially in the wet years, because of increase wastewater flows.
Comment Letter Page 1

Refer to the response to the related BACWA comments about group and individual allocations on pages 45 and 49 above for an explanation regarding how we recomputed the group and individual allocations in response to comments from BACWA and others. We reiterate that an individual discharger will not violate its water quality based effluent limitation unless both the group and individual allocations are exceeded.

2. The Mountain View Sanitary District recommends that compliance be evaluated every five years using five-year averages to address concerns about higher waste loads during wet years.
Comment Letter Page 1

We cannot employ a 5-year averaging period for municipal wastewater loads. Refer to the earlier response to a similar BACWA comment on page 48 above.

3. The Mountain View Sanitary District would like an opportunity to work with Water Board staff to resolve its concerns.
Comment Letter Page 1

This concern is similar to those expressed by BACWA and others. We are working with BACWA to address these shared concerns. Refer to page 1.

San Jose, City of, Carl Mosher

POTW Concerns
Comments Page 1

The comment states that dramatic changes to San Jose's wastewater allocation are being proposed with little opportunity for review or discussion. According to the comment, the final allocation scheme is based on recent past performance, and therefore penalizes treatment plants that have implemented advanced treatment, water recycling, and water conservation programs for many years. In addition, the allocation scheme limits economic recovery, as it represents only the most recent data during a time of recession. To address these concerns, San Jose requests that Water Board staff re-examine the total POTW allocation and to develop alternative POTW allocations with BACWA and any interested POTW stakeholder to achieve an allocation scheme that is acceptable and equitable to all POTW stakeholders.

We regret not having had an opportunity to discuss the final group allocation and scheme to apportion the group allocation among individual facilities prior to distributing the April 30, 2004 draft Basin Plan Amendment and Staff Report. See page 1 and refer to our responses to BACWA comments about group and individual allocations on pages 45 and 49. We believe that the re-calculated group and individual allocations do not pose any immediate growth concerns. Also refer to our response to the BACWA comment about growth on page 51.

Urban Runoff Concerns
Comments Page 2

The comment provides support for the Bay Area Stormwater Management Agencies Association comments. Specifically, it reiterates concerns about the relationship between total sediment mercury and methylmercury; the inclusion of atmospheric deposition and instream and hillslope processes within the urban runoff load estimate; and the feasibility,

costs, benefits, and time frame for implementing the allocations. We responded to all these concerns on pages 10 through 13 and page 21.

The comment asks for more time so we can embark on a collaborative process. We have been working on this TMDL for about *8 years*, during which we have met frequently with stakeholders. We believe it is time to move forward with the TMDL and use adaptive implementation to resolve remaining uncertainties. The comment also proposes the formation of a legacy pollutant collaborative. We believe we can accommodate such collaboration through the Clean Estuary Partnership.

San Francisco Public Utilities Commission, Michael Carlin

1.Credit for treatment of stormwater by San Francisco's wastewater control facilities
Comment Letter page 2

The comment notes that a footnote on Table 7.2 regarding the individual allocation for San Francisco County area urban runoff program needs to be edited to reflect that the Bayside permits were combined in 2002 into a single permit. We will edit the footnote text for Staff Report Tables 7.2 and 4-w as suggested:

> …The~~is~~ treatment provided by the Bayside facilities (NPDES permit CA0037664) will be credited toward meeting the allocation and load reduction. ~~This allocation includes Bayside CSO (CA0038610) and Northpoint CSO (CA0037672).~~

2. Municipal wastewater allocation for San Francisco
Comment Letter page 2

The allocation for the San Francisco municipal wastewater permit is lower than the interim mass limit currently in the permit. The comment suggests that the limitation currently in the permit may be more appropriate. This comment is similar to several others. Refer to the responses to BACWA comments about group and individual allocations on pages 45 and 49 above.

In addition, San Francisco's Southeast Treatment Plant treats storm water. This additional load was taken into account during the process of calculating the interim permit limit. The commenter asserts that the more restrictive TMDL limit becomes a regulatory disincentive to its efforts to direct more captured run-off to the Southeast Treatment Plant.

We recognize the challenge of treating storm water through the combined sewer system. However, the method of allocating the group allocation to individual facilities implicitly accounts for this treatment by using the facility's effluent volume and mercury load. We need to allocate the group mass in a systematic fashion, and it is impossible to accommodate all special circumstances. Moreover, compliance with the individual mass

allocation depends mainly on whether or not the group complies with the group allocation.

3. Compliance with water quality-based effluent limits (for POTW effluent)
Comment Letter pages 3-4

The commenter is concerned that USEPA will not allow the TMDL allocations to be substituted for the site-specific concentration-based water quality based effluent limitations and proposes that the TMDL be held in abeyance until an approach is agreed upon. However, we intend the individual mass allocations to serve as water quality based effluent limitations for POTWs. We do not intend to apply any concentration-based effluent limits. Rather, we will employ mass-based and concentration-based triggers to ensure good ongoing operation and maintenance. We have demonstrated that the TMDL will result in attainment of the applicable water quality objectives. We believe these allocations can serve as water quality based effluent limitations instead of the concentration-based limits cited in the comment letter. In fact 40 CFR §130.2(h) explicitly identifies a wasteload allocation as a valid type of water quality-based effluent limitation.

4. Credit for mercury reductions by jurisdictions which have aggressively addressed mercury in the past
Comment Letter Page 4

The comment requests credit for mercury control efforts implemented prior to TMDL completion. Many jurisdictions besides San Francisco have also worked to reduce mercury discharges for a number of years. While we appreciate the proactive stance, it is unclear how we could offer credit for these past activities in an equitable fashion. We look forward to working with San Francisco and others to establish a system of credit for future activities. Note that 85% of the individual POTW allocation is based on mercury mass and 15% is based on effluent flow. Capturing storm water within San Francisco's sewer system increases both of these factors and therefore the allocation. The urban runoff allocation is based entirely on population. Therefore, if mercury-related efforts have resulted in reducing San Francisco's per capita contribution of mercury to the Bay relative to other jurisdictions, this has the effect of crediting those past activities.

5. Need to address atmospherically deposited mercury.
Comment Letter Page 4

The comment argues that the mercury load deposited to watersheds from the atmosphere is essentially outside the capability of storm water agencies to address. The TMDL does not assign any reduction to mercury from atmospheric deposition. Given the importance of this source, the commenter suggests that the TMDL specify measures for other state agencies and USEPA to address this source.

We assume that some portion of the indirect atmospheric deposition mercury load captured by storm drain systems is controllable. Since capturing this mercury is a

consequence of choices made regarding urban development and storm drain system design, a good portion of the mercury is controllable. However, the allocation scheme also allows a certain amount of the mercury from indirect deposition to be discharged because the allocation is based on the proposed sediment target (0.2 ppm), not the "background" concentration represented by open space runoff (0.06 ppm).

Furthermore, if all the mercury in storm drain systems were the result of atmospheric deposition, then we would expect the sediment mercury concentrations measured throughout the watershed to be relatively uniform. However, the mercury concentrations reported in the Joint Stormwater Agencies report vary over orders of magnitude, suggesting that local mercury sources contribute to the urban runoff load.

The implementation plan includes measures to determine the extent to which atmospheric deposition is controllable and to take actions to reduce the atmospheric deposition load in the future where possible (see Staff Report pages 71-73 and A-13). Such actions would reduce both direct and indirect atmospheric deposition loads. If necessary, urban runoff management agencies can facilitate these actions to help meet their allocations.

For more information, refer to responses on pages 12 and 117.

6. Apportionment based on population
Comment Letter page 4

Because sources of mercury in storm water runoff are not strongly correlated with population, the comment suggests that it may be more appropriate to base the apportionment partly on land area and partly on population. However, there is no perfect basis for apportionment of the allocations to individual jurisdictions. If we knew exactly where mercury sources were in the landscape, we may have proposed allocations on the basis of that knowledge. Earlier in the TMDL process, we considered using both area and population to allocate the loads, and the results were not substantially different than those based on population alone. This is because, at the program area level, there are not large differences in population density. In other words, the fraction of total Bay Area population in a program area is roughly the same as the fraction of total Bay Area drainage area, especially if the analysis is restricted to those areas that actually drain to the Bay. The other virtue of using population is that changes are easily tracked through time because the California Department of Finance updates the information yearly. Using area as well would entail keeping track of changes in jurisdictional areas, an administrative burden that would provide little additional useful information.

South Bayside System Authority, James Bewley

Comment: *The TMDL should explicitly acknowledge the need for future growth and development, and contain a WLA that can accommodate this. The POTW WLA should be kept as shown in the June 2003 draft (17kg/yr). The averaging period for POTWs should be set as five years. The Basin Plan amendments should be clear that the water quality*

based eff1uent limits (WQBEL) for POTWs are to be established by a watershed WLA, not in individual NPDES limits.

Response: The watershed permit will contain individual allocations for every POTW that will only be enforced if the group exceeds the group mass limit. For responses to the other issues raised in this comment, refer to the responses to BACWA comments about group allocations, averaging, individual allocations, and growth on pages 45, 48, and 51 above.

We disagree with the assertion that the TMDL should accommodate growth. Neither the federal Clean Water Act nor its implementing regulations mandate that growth be considered, accommodated, or accounted for in setting allocations. Allocations are set at levels necessary to meet targets and achieve water quality standards (CWA §303[d][1][c]). The TMDL does not restrict growth but requires growth to take place in a manner so as to not increase pollutant loads.

Sunnyvale, City of, Marvin Rose

In addition to offering a number of detailed comments, the City of Sunnyvale requested that the TMDL be removed from the June 16, 2004 Water Board agenda to allow stakeholders to work with Water Board staff to develop more acceptable allocations. The June 16 hearing took place as planned. However, because Water Board staff had not yet responded to all the written comments, the Water Board could not act on the Basin Plan Amendment to adopt the TMDL. As originally planned, the Water Board will take up the TMDL again at its September 15, 2004 meeting.

1. Eliminate the individual mass "allocations" for POTWs.
Detailed Comments pages 1-2

The comment states that the TMDL should stay with the June 2003 proposal to only use concentration triggers. However, the law requires all discharges to the Bay to have an individual allocation. Refer to the response to the BACWA comment on page 49 above for a discussion of how we have revised our approach to computing the individual allocations.

2. Revise the POTW Group Allocation to Include a Specific Allocation for Growth.
Detailed Comments pages 2-4

The comment suggests that the Staff Report and Basin Plan Amendment should acknowledge that the pooled allocation is intended to address current loads plus a reasonable growth increment. Unless the Water Board is able to overcome anti-backsliding concerns, the comment asserts that an additional allocation (or other appropriate means) should be reserved to accommodate growth through 2025.

We will not make the requested change to include a specific allocation for growth or acknowledge that we have accommodated growth. The pooled allocation is calculated

solely with the intent to arrive at a robust estimate of current loads taking into consideration inter-annual variability. Neither the federal Clean Water Act nor its implementing regulations mandate that growth be considered, accommodated, or accounted for in setting allocations. Allocations are set at levels necessary to meet targets and achieve water quality standards (CWA §303[d][1][c]). The TMDL does not restrict growth but requires growth to take place in a manner so as to not increase pollutant loads. Refer to the response to BACWA comments about group allocations and growth on pages 45 and 51 above.

3. Use a 5-year averaging period to assess compliance with the POTW group allocation.
Detailed Comments page 4

Refer to the response to the BACWA comment about averaging on page 48 above.

4. The report must recognize that there are very limited if any mass reduction options available to advanced secondary treatment plants such as Sunnyvale.
Detailed Comments page 5-7

The Staff Report page 56 already contains a similar statement; therefore, additional text is unnecessary. Also, refer to our response on page 57.

5. Provide definitive and retroactive credit for load reduction activities.
Detailed Comments page 7

Many jurisdictions in addition to Sunnyvale have been working to reduce mercury discharges for a number of years. While we appreciate the proactive stance, it is unclear how we could offer credit for these past activities in an equitable fashion. We look forward to working with Sunnyvale and others to establish a system of credit for future activities. Refer to our response to a similar Delta Diablo Sanitary District comment on page 54.

6. Provide more comprehensive and quantitative information on economic costs in the regulatory analyses section.
Detailed Comments page 7

The Staff Report already contains sufficient information to give decision-makers a sense of the TMDL's economic implications. The Lower Allocations alternative (Staff Report page 98) notes the costs associated with water reclamation. Providing additional economic information for alternatives that are not proposed and not under serious consideration is unnecessary. For more information, refer to other responses related to costs on pages 6, 13, and 36.

Le Boeuf, Lamb, Greene & MacRae (for City of Sunnyvale), Robert Thompson

1. The individual wasteload allocations (WLAs) to Sunnyvale and possibly other municipal POTWs leave no room for inevitable population growth.
Comment letter pages 1-2

Other stakeholders have expressed this concern, and our response is on page 51.

2. The assumption that Sunnyvale can offset growth through additional source control, plant improvements, pollution reduction or reclamation is unfounded.
Comment letter page 2

We set the wastewater allocation based on what is required to achieve water quality standards. No such assumption regarding offsetting growth is stated anywhere in the Staff Report or Basin Plan Amendment. However, other stakeholders have commented about growth concerns, and our response is on page 51.

3. The assumption that municipalities may obtain offsets from other mercury sources is unfounded.
Comment letter pages 2-3

We have not "assumed," as the comment suggests, that an offset program will definitely be developed and available to dischargers, and we admit that we do not have the details worked out at this time. The commenter correctly points out that such an offset program will be challenging. We are willing to meet the challenge of developing such a program in collaboration with all stakeholders. We have signaled this willingness in a revision to the Basin Plan Amendment language (see our response on page 54).

4. If the Water Board establishes individual waste load allocations for the municipal POTWs, it must consider the impact of federal NPDES regulations which may require those wasteload allocations to be incorporated as mass limits, leading to semi-permanent caps on mercury discharges extending beyond the year 2025.
Comment letter Pages 3-4

The proposed Basin Plan Amendment states that the allocations will be implemented via a watershed NPDES permit (rather than individual permits) that would regulate all municipal wastewater facilities. It would include a group mass limit as well as an individual mercury mass limit for each facility. The proposed Basin Plan Amendment also indicates that the Water Board will review all TMDL elements every five years.

5. If the individual wasteload allocations become NPDES permit limits, the Regional Board may not be able to revise them in the future without serious problems under federal anti-backsliding law, thereby making the proposed growth cap semi-permanent.
Comment letter Pages 4-6

Although the federal law cited in the comment generally prohibits increases in NPDES permit limits, it includes various exceptions. Clean Water Act §402(o) allows for relaxation of water quality based effluent limitations if the requirements of §303(d)(4) are met. §303(d)(4) applies different criteria for exceptions, depending on whether the receiving waters are in attainment of water quality standards. For non-attainment waters, such as San Francisco Bay, water quality based effluent limitations may be relaxed (revised) if the existing effluent limitation is based on a TMDL or wasteload allocation, and the cumulative effect of such revisions will ensure attainment of water quality standards.

The concern is that relaxation of water quality based effluent limitations in a permit could be challenged. The commenter acknowledges these anti-backsliding exceptions but expresses concern with meeting the burden of the latter criterion that the cumulative effect of revisions ensures attainment of water quality standards. However, the burden of ensuring attainment of water quality standards would not be a permit issue. By definition and design, a wasteload allocation in combination with other load and wasteload allocations cannot exceed a TMDL, and a TMDL, by definition and design, must ensure attainment of water quality standards. A wasteload allocation or revised wasteload allocation is subject to the cumulative effect assurance burden, but that burden is met via adoption or revision of a TMDL or wasteload allocation, which would occur through a Basin Plan Amendment. For example, in the future, a wasteload allocation could be relaxed (increased) as long as there was a commensurate decrease in another load or wasteload allocation. Consequently, as long as a revised (relaxed) water quality based effluent limitation is consistent with an existing or a revised wasteload allocation applicable to the discharge, the §303(d)(4) anti-backsliding exception would apply.

6. The use of a far-reaching "interpretation" of the narrative objective for bioaccumulate pollutants in the basin plan is illegal; the "interpretation" is simply the adoption of a new objective.
Comment letter page 6

Comment: *The proposed TMDL improperly relies on an informal "interpretation" of a Basin Plan policy statement rather than a properly adopted water quality objective. Federal law requires that a TMDL implement a numeric water quality standard. South San Francisco Bay is in attainment for the applicable numeric water quality standard, thus the TMDL exceeds federal law. (Comment letter page 6)*

Response: Federal law does not require that a TMDL implement a numeric water quality standard. The regulation cited by the commenter to support this assertion does not apply to TMDLs. The cited regulation defines the standards applicable to listing waters under Clean Water Act §307(a) rather than those applicable to the procedures under section 303(d) which govern TMDLs. The proposed TMDL implements a narrative criterion as expressly allowed under the TMDL regulations (40 CFR §130.7[b][3]).

The regulatory standard cited by the commenter is not the exclusive mercury standard applicable to South San Francisco Bay. The Basin Plan also establishes a narrative

standard that limits the discharge of substances such as mercury that can bioaccumulate in fish and other aquatic organisms. The §303(d) listing of South San Francisco Bay as impaired for mercury is based on impairment of uses, such as sport fishing, preservation of rare and endangered species, and wildlife habitat. The impairment was caused by bioaccumulation of mercury that occurs when small aquatic organisms take in methylmercury and pass it up through the food web, where it accumulates at increasing concentrations. Once a water body is listed as impaired, the state is required to develop a TMDL to attain the water quality standard applicable to the listing. The standard cited by the commenter does not apply to "bioaccumulation" (mercury passed through and concentrated within the food web). It instead addresses "bioconcentration" (direct uptake from water).

The TMDL is based on the Basin Plan's narrative water quality objective, which also applies to South San Francisco Bay. Thus, whether there is compliance with the CTR's water quality objective for mercury is irrelevant (see response on page 23). In any event, the commenter is incorrect in stating that South San Francisco Bay is in attainment of the CTR objective. Figure 2-4 on Staff Report page 11 shows exceedances of the CTR objective. Staff evaluation of Regional Monitoring Program data from south of the Dumbarton Bridge since 1993 indicate there have been 22 exceedances of the CTR objective (0.051 µg/l) (SFEI 2003b).

Comment: *The narrative objective for bioaccumulative pollutants may not be "interpreted" as proposed without the basis for such interpretation having been previously been approved by EPA as part of the standard itself. (Comment letter page 6)*

Response: Other commenters have made this point. See our response on pages 23 and 25.

Comment: *The narrative objective may not be applied to uncontrollable sources such as historic mining deposits, nor can it be applied to sources that, due to their comparatively minute contribution, do not "cause" the observed detrimental increases, such as the municipal wastewater treatment plants. (Comment letter page 7)*

Response: The Basin Plan's narrative bioaccumulative objective may be applied to mining deposits because that source is "controllable." The proposed TMDL discusses a number of control strategies for addressing the mercury resulting from mining activities in the Guadalupe River watershed.

The objective also applies to municipal wastewater treatment plants. Their mercury discharges cause part of San Francisco Bay's mercury impairment. The load from wastewater sources combined is currently about 17 kg/yr. If all of the mercury discharged from wastewater facilities were to become transformed to methylmercury and incorporated into sportfish, it would be enough methylmercury to contaminate nearly 100 million kilograms of fish at a concentration equivalent to the fish tissue target of 0.2 ppm. Recent mercury additions may be proportionally more responsible for human and wildlife mercury exposure than mercury already in the system (USGS 2003a). Although there is

some evidence that mercury can form stable complexes in wastewater effluent (Hsu and Sedlak 2003), the input of wastewater into San Francisco Bay's southern reach could be both an external source of methylmercury and an important contributor to mercury methylation through the supply of organic carbon and nutrients to the system (Conaway et al. 2003). Therefore, although the wastewater load is a relatively small part of the total load, it is reasonable to assert that wastewater sources cause at least a portion of the impairment. The Basin Plan includes provisions to implement the bioaccumulation objective that specifically apply to municipal wastewater treatment plants. The Water Board has consistently implemented those provisions through NPDES permits issued to municipal wastewater treatment plants.

Comment: *The narrative objective should be interpreted to have been originally intended as a policy statement to guide the Water Board in approaching then unidentified sources that could be shown to cause a local methylmercury problem. The Water Board should place the regulatory history of the narrative objective in the administrative record. (Comment letter page 7)*

Response: Chapter 4 of the Basin Plan includes provisions to implement the bioaccumulation narrative objective. Those measures are not directed toward unidentified sources. It is unnecessary to review the regulatory history of the provision to see from the Basin Plan that the objective is intended to apply to all controllable sources, such as municipal wastewater treatment plants. There is no statement in the Basin Plan suggesting that the narrative bioaccumulation objective is intended solely to address unidentified sources. Furthermore, we believe that the intent of the narrative bioaccumulation objective is to allow the Water Board to consider the effects of multiple bioaccumulative pollutants if necessary to protect beneficial uses.

7. The "interpretation" of the "narrative objective" requires compliance with sections 13241 and 13242 of the Water Code.
Comment letter page 8

Establishment of the numeric targets does not result in establishment of new water quality objectives. Although assigning a numeric value that must be implemented in NPDES permits may seem similar to establishing a water quality objective, there are differences. TMDLs (including numeric targets) are not themselves standards but are instead mechanisms to implement existing water quality standards. A numeric target in a TMDL can interpret a narrative objective (40 CFR §130.7[b][3]). The proposed mercury TMDL is based on the existing Basin Plan narrative objective for bioaccumlation. Water Code §13241 does not apply to the proposed TMDL. It sets forth requirements that apply to the adoption of water quality objectives. As noted above, the proposed TMDL does not include the adoption of new water quality objectives but instead implements an existing objective. Water Code §13242 applies to the proposed TMDL. It sets forth requirements for adopting implementation programs to achieve water quality objectives. The proposed TMDL meets those requirements.

8. The TMDL report does not address the CEQA requirement to consider the economic impacts of the proposed cap on mercury discharges.
Comment letter page 8

We agree that the cited statute, Public Resources Code §21159(a)(3), provides that the environmental analysis of the proposed TMDL must take into account economic factors. The Staff Report (pages 101-106) includes an analysis of economic factors. However, that analysis does not need to address a "cap on municipal growth" because no evidence supports the conclusion that the TMDL would cap growth (see page 51). CEQA regulations limit the economic impacts that must be analyzed to those related to a physical change (California Code of Regulations, Title 14, §15382).

9. The TMDL makes a scientifically indefensible assumption regarding the relationship between sediment mercury and fish tissue methylmercury.
Comment letter page 9

Refer to our response on pages 3 and 94.

10. There is no "necessity" for the municipal growth cap, within the meaning of the California Administrative Procedures Act.
Comment letter pages 10-11

The comment refers to Government Code §11349, which requires that state agencies demonstrate that their rulemaking actions are supported by substantial evidence that shows the need for the regulation. No evidence supports the conclusion that the TMDL would impose a growth cap (see page 51 of this response document), and there is no legal requirement to demonstrate the necessity of a growth cap that is not proposed. The Clean Water Act and its implementing regulations require that a TMDL be established and that it include allocations for point source discharges (such as the municipal wastewater discharges). The proposed Basin Plan Amendment would establish a wasteload allocation for municipal discharges.

<u>Partnership for Sound Science in Environmental Policy, Craig Johns</u>

Waste Load Allocations (WLA)
POTWs
Comment Letter Pages 2-3

Comment: *The POTW group WLA decreased from an allocation of 17 kg/yr (June 2003 Project Report) to 14 kg/yr (April 2004 Staff Report). This reduction puts the POTW community close to being out of compliance with the proposed WLA, and could put it out of compliance due to growth. It is imperative that the TMDL explicitly acknowledge the need for and accommodate future growth. In response to the scientific peer review, Water Board staff identified water recycling and plant optimization as improvements that could be required to accommodate growth. Yet, these are the same types of improvements that were identified in the alternatives analysis and not selected because of*

cost. A long-term average WLA of 16 kg/yr for the POTW community would allow for growth for 20 to 25 years.

Response: First, we have revised the municipal wastewater group allocation back to 17 kg/yr. Nevertheless, the response to the scientific peer review did not conclude that water recycling and plant optimization would be required. The response stated, "modest flow increases could be offset by water recycling and improved treatment efficiencies." Neither the federal Clean Water Act nor its implementing regulations mandate that growth be considered, accommodated, or accounted for in setting allocations. Allocations are set at levels necessary to meet targets and achieve water quality standards (CWA §303[d][1][c]). The TMDL does not restrict growth but requires growth to take place in a manner so as to not increase pollutant loads. For a more thorough discussion of the group allocation and growth, refer to the responses to the BACWA comments on pages 45 and 51 above.

Waste Load Allocations (WLA)
Industrial Wastewater Dischargers
Comment Letter Pages 3-4

Comment: *Measuring the compliance of the industrial wastewater community as a group, rather than individuals, will provide some additional flexibility to respond to economic conditions without requiring Basin Planning or NPDES permitting changes. Compliance with the WLA for all industrial wastewater dischargers should be measured as a group with a group allocation of 2 kg/yr.*

Response: We cannot eliminate individual mass allocations because 40 CFR §130.2(h) defines "wasteload allocation" in terms of an individual point source of pollution. However, we agree with the recommendation to combine industrial wastewater and petroleum refinery discharges into a single group. We will combine the 1 kg/yr allocation for petroleum refineries with the 2 kg/yr allocation for other industrial dischargers (revised to correct for C&H Sugar, as discussed on page 150 above) to create a combined 3 kg/yr group allocation for industrial facilities, including petroleum refineries. For the purpose of computing the individual facility wasteload allocations, however, the industrial and petroleum refinery portions of the total of 3 kg/yr will be apportioned separately for the two groups using the same method as described in the Staff Report. Therefore, the individual allocations for the petroleum refineries will remain unchanged, but the allocations for the industrial facilities will change because of the corrected C&H Sugar load. The 3 kg/yr pooled allocation for industrial facilities will be implemented in a fashion similar to the municipal wastewater pooled allocation. That is, the individual WLA for industrial wastewater facilities and refineries would only be enforced if the 3 kg/yr pooled allocation were exceeded.

We will change Staff Report Table 7.4 on page 58 and Table 4-z on page A-7 as follows:

C&H Sugar Co.	CA0005240	<u>1.56</u> ~~0.003~~
Crockett Cogeneration	CA0029904	<u>0.005</u> ~~0.011~~
The Dow Chemical Company	CA0004910	<u>0.044</u> ~~0.099~~

General Chemical	CA0004979	0.23 ~~51~~[a]
GWF Power Systems, Site I	CA0029106	0.002 ~~004~~
GWF Power Systems, Site V	CA0029122	0.003 ~~006~~
Hanson Aggregates, Amador Street	CA0030139	0.001
Hanson Aggregates, Olin Jones Dredge Spoils Disposal	CA0028321	0.001
Hanson Aggregates, Tidewater Ave. Oakland	CAA030147	0.001
Pacific Gas and Electric, East Shell Pond	CA0030082	0.001 ~~2~~
Pacific Gas and Electric, Hunters Point Power Plant	CA0005649	0.022 ~~049~~
Rhodia, Inc.	CA0006165	0.012 ~~027~~
San Francisco, City and Co., SF International Airport Industrial WTP	CA0028070	0.055 ~~0.12~~
Southern Energy California, Pittsburg Power Plant	CA0004880	0.008 ~~019~~
Southern Energy Delta LLC, Potrero Power Plant	CA0005657	0.003 ~~8~~
United States Navy, Point Molate	CA0030074	0.013 ~~30~~
USS-Posco	CA0005002	0.047 ~~0.11~~

We will change the text on Staff Report page 56 as follows:

> The proposed wasteload allocation for industrial wastewater discharges and petroleum refineries requires that, as a group, the petroleum refinery and industrial wastewater dischargers ~~(excluding petroleum refineries)~~ discharge no more than their current combined load of ~~1~~ 3 kg/yr (LWA 2004, SFBRWQCB 2004b).

We will change the text on Staff Report page 58 as follows:

> ~~As with the other industrial dischargers, the proposed wasteload allocation requires that, as a group, the refinery and wastewater dischargers discharge no more than their current combined load of 13 kg/yr (LWA 2004, SFBRWQCB 2004b).~~ Table 7.5 lists individual wasteload allocations for petroleum refineries.

We will change the text on Staff Report page 76 as follows:

> We propose that the wasteload allocations for the industrial wastewater discharges, including ~~of~~ the five Bay Area petroleum refineries (Chevron, ConocoPhilips, Shell, Ultramar Golden Eagle, and Valero), be implemented as a group mass limit of 3 kg/yr combined for these discharges. ~~The annual petroleum refinery group wasteload allocation is the sum of the annual loads for each refinery, 1 kg mercury per year.~~ The annual mass load for each facility will be computed according to methods described in the Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits (SFBRWQCB 1993). If the annual group mass load exceeds the group mass limit, the Water Board will consider enforcement against those dischargers ~~petroleum refineries~~ that exceeded their wasteload allocations (shown in Tables 7.4 and 7.5).

We will change the text on Staff Report page A-12 (the Basin Plan Amendment) as follows:

> The individual wasteload allocations for the industrial wastewater discharges from the five Bay Area petroleum refineries (Chevron, ConocoPhillips, Shell, Ultramar Golden Eagle, and Valero) ~~shall be implemented as a group mass limit. The group mass limit is the sum of the individual allocations for these facilities, 1 kg/yr, as~~ are shown in Table 4-y. The individual wasteload allocations for all other industrial wastewater facilities are listed in Table 4-z. The total group allocation for industrial and refinery wastewater facilities is 3 kg/yr and shall be implemented as a group mass limit ~~as individual mass limits~~. If the group mass limit is exceeded, the Water Board will pursue enforcement actions against those individual dischargers whose mass emissions exceed their individual wasteload allocations.
>
> The group ~~M~~mass limits and the following requirements shall be incorporated into NPDES permits for all industrial wastewater dischargers:

Annual v. Five-Year Average Compliance Determination
Comment Letter pages 4-5

Comment: *The Partnership for Sound Science in Environmental Policy supports a five-year averaging period because it would allow for flow variations. An annual averaging period will likely cause dischargers to be out of compliance portions of the time, especially during wetter seasons. Long-term averages are consistent with the major premise of the TMDL, in that it will take time to meet the mercury targets.*

Response: We must keep the one-year averaging period for wastewater sources because we have already accounted for inter-annual loading variations (due to climate or economic activity) in estimating the yearly load in terms of an upper confidence limit of the mean load over a multi-year period. In doing so, we have estimated the maximum yearly load accounting for variability. Therefore, to be consistent with the allocation, compliance should be checked by comparing yearly loads to the allocation, which already has variability included in its computation. Refer to the response to the BACWA comment on page 48 above for more discussion on this topic.

Watershed Permits, Individual WLAs, and Concentration Triggers
Comment Letter pages 5-6

Comment: *The method of computing individual POTW allocations is unfair.*

Response: Refer to the response to the BACWA comment on page 49 above.

Comment: *The Partnership for Sound Science in Environmental Policy is concerned that individual mass allocations will be implemented directly into wastewater NPDES permits and recommends that tables depicting individual WLAs should be deleted.*

Response: We intend to implement the individual wasteload allocations in NPDES permits as water quality based effluent limitations. However, a facility will not be in violation of its water quality based effluent limitations unless it exceeds its allocation and the total mercury mass from all such facilities exceeds the group allocation. See our response regarding individual allocations on page 49.

Comment: *Concentration triggers should be used in lieu of individual wasteload allocations.*

Response: Relying on the proposed concentration triggers would not result in a water quality based effluent limitation consistent with TMDL assumptions and requirements. Implementing the individual allocations as water quality based effluent limitations explicitly satisfies the consistency requirement of 40 CFR §122.44(d)(1)(vii), and 40 CFR §130.2(h).

Western States Petroleum Association, Kevin Buchan

The Western States Petroleum Association is concerned about how the proposed wasteload allocation for the industrial discharger group may limit dischargers' ability to produce and deliver petroleum fuel products to meet current and future market demands. The comment suggests that the requirements proposed for the refineries may be onerous considering that their aggregate mercury load is insignificant.

The requirements are not intended to be onerous. They are derived in the same way as the requirements we have proposed for all other wastewater facilities. We expect petroleum refineries and other industrial facilities to help address the remaining technical data gaps. Although petroleum refinery wastewater loads appear small, there is a large mass of mercury entering refineries in the form of crude oil that remains unaccounted for and may ultimately be released to San Francisco Bay. Refer to the response to the comment from Partnership for Sound Science in Environmental Policy regarding wasteload allocations on page 70 above.

To clarify the intent of the studies regarding the environmental fate of crude oil mercury, we will make the following changes to the text on Staff Report pages 77 and 78.

> …We propose that, in addition to the requirements above, Bay Area petroleum refineries shall be required to work collaboratively with the Water Board to investigate the environmental fate of mercury in crude oil and report findings to the Water Board within five years of the effective date of this Mercury TMDL implementation plan. These requirements may be implemented via the Water Board's authority under Section 13267 of the California Water Code or via petroleum refinery wastewater NPDES permits. ~~petroleum refineries evaluate the significance~~

~~of their atmospheric emissions within five years.~~ The report shall address the following ~~T~~two key questions ~~need to answered~~:

1. What are the potential pathways by which crude oil mercury could be discharged to the Bay from Bay Area refining facilities?~~How much mercury is in Bay Area refined crude oil? Previous estimates show that the mercury concentration in crude oil is variable enough that it is important to look into this issue (Wilhelm 2001).~~
2. ~~After the refining process, what is the fate of the mercury originally contained in crude oil?~~ What are the annual mercury loads associated with these discharge pathways?

We will make corresponding changes to the text on Staff Report Pages A-12 and A-13 (the Basin Plan Amendment):

> Bay Area petroleum refineries shall be required ~~Requirements~~ to work collaboratively with the Water Board to investigate the environmental fate of mercury in crude oil and report findings to the Water Board within five years of the effective date of this Mercury TMDL implementation plan. These requirements may be implemented via the Water Board's authority under Section 13267 of the California Water Code or ~~shall be incorporated into~~ petroleum refinery wastewater NPDES permits. The report shall address two key questions:
>
> 1. What are the potential pathways by which crude oil mercury could be discharged to the Bay from Bay Area refining facilities? ~~How much mercury is in crude oil processed in the Bay Area?~~
> 2. What are the annual mercury loads associated with these discharge pathways? ~~After the refining process, what is the environmental fate of the mercury originally contained in the crude oil?~~

GUADALUPE RIVER WATERSHED

Santa Clara County Parks and Recreation Department, Lisa Killough

Introductory Comments
Comment Letter Pages 1-2

The introductory comments refer to a number of issues we address individually below with respect to specific comments on those issues. They assert that the proposed Basin Plan Amendment is inadequately supported by available scientific information; does not evaluate alternatives in terms of cost effectiveness or potential environmental impacts; and does not assess whether allocations are attainable.

A panel of scientists has reviewed the TMDL, and we revised it as necessary to respond to the panel's concerns. We evaluated a number of alternatives (Staff Report pages 93 to 101), the costs of the proposed project (Staff Report pages 101 to 106), and its environmental impacts (Staff Report page 93 and Appendix B). The overall concern appears to be that the proposed Basin Plan Amendment could cost more than it is worth. However, the comment does not offer any less costly option that could attain existing water quality standards.

The comment notes that Santa Clara County and the Santa Clara Valley Water District have completed important mercury remediation projects, and it questions whether achieving the proposed Guadalupe River watershed allocation is feasible. These issues are addressed below on page 77.

Objective
Comment Letter Pages 2-3

The comment notes that, due to uncertainties in the linkage analysis, efforts to reduce total mercury may not reduce methylmercury. It asserts that no correlation exists between total mercury and methylmercury. However, we know that, while the relationship between total mercury and methylmercury is complex, methylmercury will not be formed in the absence of inorganic mercury. Our implementation plan calls for investigating ways to control mercury methylation (Staff Report pages 80 to 81 and 86 to 91), and through adaptive implementation, we intend to account for new information as it becomes available (Staff Report pages 82 to 83). The comment suggests that we should fully understand the mercury problem before the Water Board adopts the TMDL; however, we prefer the National Research Council's recommended approach of initiating actions now and modifying them when more information about the problem and the effectiveness of our initial actions becomes available (NRC 2001).

The comment notes that Central Valley Regional Water Quality Control Board staff, in its TMDL efforts, is focusing more on methylmercury than total mercury. Although Central Valley Regional Water Quality Control Board staff propose methylmercury-based targets and allocations in its *Cache Creek, Bear Creek, and Harley Gulch TMDL*

for Mercury Staff Report, its implementation plan is similar to ours in its focus on reducing total mercury discharges, controlling discharges of contaminated sediment, determining sources of methylmercury production, and developing plans to reduce methylmercury loads (CVRWQCB 2004). We considered methylmercury allocations in our alternatives analysis, and found them unworkable considering the limited available information and the complexities of San Francisco Bay (see Staff Report page 100).

The comment states that the proposed Basin Plan Amendment will result in extensive channel dredging, yet the proposal does not specify how allocations are to be achieved. We evaluated the potential impacts of reasonably foreseeable environmental changes resulting from channel maintenance and restoration (i.e., earthmoving and waste handling and disposal) in Staff Report Appendix B. Operations that would pose significant and unavoidable adverse environmental impacts are not reasonably foreseeable because the benefits of such projects may not outweigh their impacts, and lead agencies would be unlikely to propose and approve them.

The comment claims that our alternatives analysis (Staff Report pages 93 to 101) is inconsistent with the intent of the California Environmental Quality Act (CEQA). Although CEQA provisions related to environmental impact reports (EIRs) do not apply directly to our functional equivalent document (which we prepared in accordance with our administrative procedures), the CEQA Guidelines do provide direction regarding the alternatives analysis. According to California Code of Regulations §15126.6, an alternatives analysis should describe a range of reasonable alternatives that could feasibly attain most of the project's basic objectives but would avoid or lessen significant adverse impacts (our project poses none), and it should compare the relative merits of the alternatives. However, the analysis need not consider every conceivable alternative. Instead, it should consider a reasonable range of alternatives to foster informed decision-making and public participation. We believe our analysis is consistent with these guidelines.

Targets
Comment Letter Page 3

The comment questions whether mercury harms San Francisco Bay birds. On Staff Report page 8, we summarized evidence that mercury poses potential hazards to birds, mammals, and other wildlife. TMDL targets must be consistent with existing water quality standards, which means this TMDL's targets must protect San Francisco Bay's beneficial uses, including wildlife habitat and rare and endangered species. As explained on Staff Report page 37, a U.S. Fish and Wildlife Service study confirmed that our proposed fish tissue target would protect nearly all San Francisco Bay wildlife (USFWS 2003). Whether the California least tern would be protected is unclear. Therefore, we developed a bird egg target to ensure that the California least tern is protected. We acknowledge, however, that research is needed to refine the target (Staff Report page 38). Such refinement should take into account interspecies differences and differing foraging patterns to the extent feasible. The comment suggests that meeting the bird egg target

may not benefit wildlife due to other risk factors, but this concern does not eliminate the need to address mercury risks as we propose.

Water Body
Comment Letter Page 3

The comment points out that the TMDL focuses on San Francisco Bay as a whole. We are not proposing separate TMDLs for each bay segment. The Staff Report (page 14) contains our rationale for such simplifications. At this time, the information needed to support a more detailed and robust analysis is unavailable. However, considering San Francisco Bay's segments separately would not necessarily result in a different implementation plan. The sources would be the same, although parsed out by segment, and the targets would be the same because the same beneficial uses would need protection. Although the allocations would be parsed out by segment and source, we would likely base most of the allocations on the sediment target as proposed. This would require mercury reductions essentially the same as those we proposed. When a more detailed San Francisco Bay model is available, we will be able to better anticipate the effects of our efforts on San Francisco Bay's recovery, and if necessary, further consider the effects on individual bay segments. Until then, we believe our existing strategy is adequate.

Data
Comment Letter Page 3

The comment expresses concern that the mercury data reported for San Francisco Bay and the Guadalupe River watershed come from different studies and are based on different approaches. We relied, however, on available information, and the comment does not provide better information. Through the adaptive implementation process, we intend to gather more consistent and up-to-date data, and the newer data should also reflect changes resulting from sediment removal projects that have occurred since the existing data were collected.

Attainability and Fairness
Comment Letter Page 4

The comment objects to the proposed Guadalupe River watershed allocation being based on the proposed sediment target, and the high cost of meeting the allocation not being considered. TMDLs must be established at levels necessary to attain and maintain water quality standards (Code of Federal Regulations, Title 40, §130.7[c][1]). As explained on Staff Report page 54, the allocation is based on the sediment target, which in turn is consistent with water quality standards. We considered implementation costs on Staff Report pages 101 to 106. Developing and implementing the Guadalupe River Mercury TMDL is required by law, and we do not know whether or to what extent the San Francisco Bay TMDL will increase the costs of implementing the Guadalupe River TMDL. Nevertheless, we acknowledge that the costs of implementing the Guadalupe River TMDL will be substantial.

In a footnote, the comment notes that the proposed Basin Plan Amendment provides no way for Santa Clara County to receive credit for its efforts to remove mercury from the watershed between 1997 and 1999. The implementation plan (Staff Report pages 71 and A-10) states that compliance with the allocation can be demonstrated by quantifying annual average mercury loads reduced by implementing pollution prevention, source control, and treatment efforts, and that the Water Board may recognize loads reduced resulting from activities implemented after 2001. The intent of this provision is to recognize substantial source control efforts undertaken after the data on which the source assessment is based were collected. In the case of the Guadalupe River watershed, the source assessment is based on data collected between 1980 and 1989, well before the remediation that took place between 1997 and 1999. Therefore, we will modify the text on Staff Report pages 71 and A-10 as follows (the same text appears twice, once in the Staff Report and once in Appendix A, the proposed Basin Plan Amendment):

1. Quantify the annual average mercury load ~~avoided~~reduced by implementing pollution prevention, source control, and treatment efforts. The Water Board will ~~may~~ recognize loads ~~avoided~~ reduced resulting from activities implemented after 1996 (or earlier if actions taken are not reflected in the 2001 load estimate) to estimate load reductions ~~2001 as counting toward the load reductions consistent with the load allocation~~.

For consistency, we will similarly change the text related to other sources. We will change the text on Staff Report page 69 (in the first bullet item) as follows:

> …Loads reduced as a result of actions ~~The Water Board may recognize loads avoided resulting from activities~~ implemented after 2001 (or earlier if actions taken are not reflected in the 2001 load estimate) may be used to estimate load reductions ~~as counting toward the load reductions consistent with the wasteload allocation~~. New mercury load~~s avoided~~ reductions need to be distinguished from those currently being ~~avoided~~ achieved because the benefit of existing control programs is accounted for in the baseline load estimates on which the allocations are based.

We will change the text on Staff Report page A-9 (following item "vii") as follows:

> Loads reduced as a result of actions ~~The Water Board may recognize loads avoided resulting from activities~~ implemented after 2001 (or earlier if actions taken are not reflected in the 2001 load estimate) may be used to estimate load reductions. ~~as counting toward the load reductions consistent with the wasteload allocation.~~

Concluding Comments
Comment Letter Page 4

The concluding comments recommend that the Water Board not adopt the proposed Basin Plan Amendment for various reasons. We propose to address the remaining issues regarding uncertainty, fairness, and effectiveness through adaptive implementation. The comment incorrectly equates relying on adaptive implementation with postponing resolution for 5 to 10 years. We intend to pursue adaptive implementation immediately after TMDL adoption so we are able to resolve issues during the 5-year reviews (see Staff Report page A-17). The comment refers to an alternative phased strategy recommended in Santa Clara Valley Urban Runoff Pollution Prevention Program comments. We responded to that comment on page 8. We believe our adaptive implementation proposal is superior to a two-phase process that postpones all actions until the mercury problem is fully understood. We prefer to take reasonable initial steps based on available information and adapt our plan as the results of our initial actions become clear and more information becomes available.

URS Corporation (for Santa Clara County Parks and Recreation Department), Terrence Cooke

Mass Budget Single Box Model
Comment Letter Page 1

The comment points out that San Francisco Bay is far more complex than the simple box models we used to represent it. We agree that the hydrodynamic properties of the northern reach differ from those of the southern reach. However, our report does not address San Francisco Bay as two or more segments. At this time, the information needed to support such a multi-box analysis is unavailable, and it would require many more detailed assumptions than we used in our analysis. The result would be an analysis that looks more detailed but leads to conclusions that are just as uncertain as those based on our more simple approach. Our simpler analysis does not require that we over-interpret limited available information. The Staff Report (page 14) contains the rationale for our simplifications.

Considering San Francisco Bay's segments separately would not necessarily result in a different implementation plan. The sources would be the same, although parsed out by segment, and the targets would be the same because the same beneficial uses would need protection. Although the allocations would be parsed out by segment and source, we would likely base most of the allocations on the sediment target as proposed. This would require mercury reductions essentially the same as those proposed. Because our proposal has undergone a scientific peer review process, we are confident that the scientific portions of the TMDL are based upon sound scientific knowledge, methods, and practices.

Assimilative Capacity and Linkage Analysis
Comment Letter Page 1

The comment asserts that the assimilative capacity calculation is overly simplistic and inadequate to justify the proposed implementation plan. Our analysis (Staff Report page 49) meets the immediate needs of the TMDL and is adequate to identify appropriate initial implementation actions. When a more detailed San Francisco Bay model is available, we will use it to better plan our efforts. Because our proposal has undergone a scientific peer review process, we are confident that the scientific portions of the TMDL are based upon sound scientific knowledge, methods, and practices.

The comment states that allocations should be achievable and should take into account historic activities, sources, economic feasibility, and influence of downstream processes (e.g., methylmercury production). In proposing the allocations, our first concern was to ensure that the TMDL is established at a level necessary to attain and maintain water quality standards (Code of Federal Regulations, Title 40, §130.7[c][1]). Most of the allocations are based on the sediment target, which in turn is consistent with water quality standards. From the comment, it is unclear how we might better take into account historic activities, sources, economic feasibility, and the influence of downstream processes while still attaining water quality standards. Our proposal has been subjected to a scientific peer review process, so we are confident that the scientific portions of the TMDL are based upon sound scientific knowledge, methods, and practices.

Loss through Golden Gate
Comment Letter Pages 1-2

The comment notes that estimating the sediment load transported through the Golden Gate by subtracting known losses from total sources results in uncertainties, and we agree. However, our estimate is within the range of values estimated by others and is therefore reasonable (see Staff Report page 32). The comment does not offer a better alternative method for estimating the sediment load transported through the Golden Gate.

The comment suggests that the sediment mercury concentration associated with sediment transported through the Golden Gate should be estimated using Regional Monitoring Program (RMP) data from monitoring stations near the Golden Gate. On first glance, this appears reasonable; however, we based our estimate on data from all RMP stations throughout San Francisco Bay. Sediment mercury concentration data for RMP stations near the Golden Gate are higher than data for the rest of San Francisco Bay (SFEI 2003b), but they probably do not represent the sediment exiting the Golden Gate very well. RMP samples are collected from within roughly one meter of the surface. Because much of San Francisco Bay is relatively shallow and turbid, these samples usually represent the entire water column fairly well. However, near the Golden Gate, the water is much deeper, and the bulk of the sediment transported through the Golden Gate is well below the top meter. The top meter contains relatively low suspended sediment concentrations, which skew the apparent sediment mercury concentrations. Therefore,

we relied on sediment mercury concentration data from all of San Francisco Bay to estimate mercury loads transported through the Golden Gate.

Sediment Discharges from Local Tributaries
Comment Letter Page 2

The comment indicates that the Guadalupe River sediment load has decreased by about 15% since the reservoirs were completed in 1962. It suggests that land use changes could have reduced the Bay Area sediment load even more since the U.S. Geological Survey data we used to estimate the urban and non-urban runoff loads were collected (1906-1960) (see Staff Report page 25). The comment does not, however, provide any better information or offer a better method for estimating the local tributary sediment load. The U.S. Geological Survey study reported a sediment load of about 810 M kg/yr for the 1906 to 1966 period. It also reported a load of about 870 M kg/yr for 1957-1966, when far more urban development took place. According to the study, therefore, the sediment load during the latter portion of the 1906-1960 period was roughly 7% higher—not lower—than the entire period (USGS 1980). In any case, land use changes do affect sediment loads, and through adaptive implementation, the source assessment can be reevaluated when new and better data become available.

Mercury Discharges from Local Tributaries
Comment Letter Pages 2-3

The comment states that we assumed that bed sediment mercury concentrations in local tributaries are the same as mercury concentrations of suspended sediment discharged from local tributaries. Actually, because we relied on total sediment loads and not suspended sediment loads, we assumed that bed sediment mercury concentrations in local tributaries are the same as mercury concentrations of all sediment discharged from local tributaries (see Staff Report page 25). In any case, we made an assumption that may be refined as we collect more data through adaptive implementation. For now, however, the comment offers no better method for estimating the local tributary mercury load, and our method has been reviewed by a panel of scientific peers. The comment indicates that, if our sediment load estimate is overstated (as discussed above), then the mercury load estimate may be overstated. However, this too can be addressed through adaptive implementation as more information becomes available.

As for the Guadalupe River watershed mercury load estimate not accounting for remediation in Almaden Quicksilver County Park, we agree. Our load estimate is based on sediment mercury concentration data collected between 1980 and 1989. We propose modifying the text to account for recent remediation efforts, as discussed on page 77.

Suspended Sediment Target
Comment Letter Page 3

We agree that methylmercury production is a complex and poorly understood process (see Staff Report pages 46 to 47). However, inorganic mercury is a necessary precursor

to methylmercury, so the two forms of mercury are related. Since methylmercury is a relatively transient form of mercury (i.e., nonconservative), and since sediment-bound mercury is transported to methylating regions within San Francisco Bay, our focus is reducing total mercury to San Francisco Bay. When reliable and quantifiable information becomes available about the solubility and bioavailability of different forms of mercury, and about which forms are discharged by which sources, we may incorporate the information into the TMDL through adaptive implementation. The comment, however, offers no clear recommendation regarding how to account for solubility and bioavailability with existing information.

We do not contemplate remediation efforts that would substantially increase bioavailable mercury. The proposed Basin Plan Amendment does not require specific remediation actions. If a remediation project were proposed, it would be subject to environmental review, and if evidence at that time were to suggest that it would substantially increase bioavailable mercury, it would probably not be approved. As for the appropriateness of assuming that reducing total mercury in San Francisco Bay will reduce mercury concentrations within the food web, refer to our responses to Exponent comments on page 94.

Applied Ecological Solutions (for Santa Clara County Parks and Recreation Department), Adrian del Nevo

General Comments
1. Total Mercury Versus Methylmercury
Comment Letter Page 1

When we discuss mercury effects, the comment urges us to consistently specify whether they relate to total mercury or methylmercury. On Staff Report pages 6 to 8, we use the term "mercury" in the context of concentrations in fish, wildlife, and humans. Most mercury in fish, wildlife, and humans is methylmercury, which is a specific form of mercury. On Staff Report page 4, we explain that organic methylmercury is the most toxic form of mercury and the form taken into the food web. We also explain the process whereby inorganic mercury becomes methylmercury on Staff Report pages 46 and 47. We disagree that use of the more general term "mercury" affects our ability to propose meaningful management actions.

2. Past Mercury Sources
Comment Letter Page 1
The comment refers generally to inadequacies regarding information about past sources and consideration of road runoff and air contamination. It argues that our report fails to account for how sources change in space and time, and the degree to which mercury from different sources becomes bioavailable. However, our report is based on available information, and the comment offers no new information to improve our analysis. Moreover, our report reflects feedback we received during a scientific peer review process; therefore, we are confident in the scientific credibility of our allocation process and implementation proposal. Road runoff is a component of urban runoff, which we

address on Staff Report pages 23 to 25, 54, 67 to 69, and A-8 to A-9. We address atmospheric deposition on Staff Report pages 27 to 28, 55, 71 to 73, and A-13.

3. San Francisco Bay Water Circulation
Comment Letter Pages 1-2

The comment asserts that we inadequately consider San Francisco Bay's hydrodynamic complexities. The Staff Report (page 14) contains our rationale for our simple approach. We believe our simple analysis is reasonable because it does not require that we over-interpret limited available information. It is adequate because it allows us to identify and prioritize necessary actions. At this time, we do not see the value in waiting for new information on which to base a more detailed analysis.

The comment requests that we consider large river surge events (e.g., after the Sacramento River flood) and El Nino events but provides no information on which to base any consideration of these factors. As stated on Staff Report page 51, the load estimates and proposed allocations are intended to represent long-term averages and account for long-term variability to the extent that information is available. Regarding the comment's assertion that we should consider dredging and disposal operations, we estimated sources and losses related to dredging and disposal on Staff Report page 31, and proposed allocations and implementation plans on Staff Report pages 58, 78, and A-13.

Bird-Specific Comments
1. Wildlife Target Comment
Comment Letter Pages 2-3

The comment asserts that the links among mercury sources, uptake into the food web, and contaminant levels within prey and bird eggs must be unequivocal or our assumptions regarding mercury sources and their effects on wildlife are inappropriate and misleading. No applicable law or regulation requires this extreme burden of proof. We are required to complete a TMDL that protects beneficial uses based on available information and reasonable assumptions. The fact that some birds could be exposed to mercury at locations other than San Francisco Bay does not eliminate the need to ensure that San Francisco Bay mercury concentrations do not threaten birds and other wildlife that live or feed in San Francisco Bay.

Relatively little information is available from which to discern tolerable mercury exposures for wildlife. We relied on a recent U.S. Fish and Wildlife Service analysis that concluded that fish tissue mercury concentrations equal to our proposed target would be protective of nearly all Bay Area wildlife, including rare and endangered species (USFWS 2003). The one exception is the California least tern. Faced with little species-specific information about mercury effects on the California least tern, we used a mallard study to conclude that California least tern egg mercury concentrations should be kept below 0.5 ppm. We acknowledged that this target needs to be refined when more

information becomes available (Staff Report pages 36 to 39) and included measures to obtain such information in our implementation plan (Staff Report page 85).

2. Role of Other Contaminants
Comment Letter Page 3

The comment claims we cannot assume that mercury harms wildlife given existing gaps in our understanding of pollutant mixtures and their effects. It notes that solving the mercury problem may not restore beneficial uses because other pollutants, such as PCBs, may contribute to impairment. While this TMDL may not, by itself, restore all San Francisco Bay beneficial uses, by addressing one important pollutant, we are removing one obstacle to restoration and reducing risks incrementally. TMDL requirements, as set forth in the Clean Water Act, address pollutants one at a time. As the comment mentions, we are working on TMDLs for other San Francisco Bay pollutants as well as mercury. In combination with this TMDL, all the San Francisco Bay TMDLs together are expected to restore beneficial uses.

3. Data Based on Non-Hatched Eggs
Comment Letter Page 3

The comment notes that we only have mercury concentration data for California clapper rail eggs that failed to hatch, and therefore these data are biased. As shown in Staff Report Figure 2.3, this is also the case with the California least tern and Western snowy plover data. Because these birds are special-status species, any of their eggs that could hatch cannot be harvested. We agree that mercury concentrations in eggs that fail to hatch may not represent typical concentrations in all eggs. However, because we assume that mercury may contribute to hatch failures, we assume that mercury concentrations may be higher in eggs that fail to hatch. Comparing the higher mercury concentrations from eggs that failed to hatch with the proposed target leads to conservative (more protective) conclusions.

The comment questions whether mercury causes hatch failures. We want to avoid mercury concentrations high enough to inhibit reproduction. Therefore, we assume that mercury concentrations in eggs that hatch are acceptable. We also assume that, when we find mercury concentrations of 0.5 ppm or more in an unhatched egg, mercury may have contributed to the hatch failure. To ensure that mercury causes only a negligible number of hatch failures, we intend to evaluate target attainment by computing the 99^{th} percentile egg mercury concentration and comparing it to 0.5 ppm. This approach is conservative, and using eggs that fail to hatch probably biases the results toward the eggs containing the most mercury. As the comment recommends, we intend to consider bird egg mercury data for ecologically similar species to the extent feasible (see Staff Report page 85).

As stated in the response above (page 83), we are not required to provide “conclusive” findings. Our analysis is based on existing information and reasonable conclusions. It also reflects feedback we received during a scientific peer review process. The comment calls for collecting eggs from locations less subject to predation because predation may

pose the greatest risk to special-status species. While predation may be an important risk factor for special-status species, collecting eggs from locations less prone to predation will not ensure that mercury does not contribute to detrimental effects on birds and other wildlife. We assume that predators do not distinguish high and low mercury concentration eggs.

4. Pathway Approach and Other Issues
Comment Letter Pages 3-4

The comment states that we did not use a pathway approach, did not account for differences among species and individuals within species, and relied on logically unrelated data and assumptions. The comment is unclear regarding what a "pathway" approach would entail. Our Linkage Analysis (Staff Report Section 6, pages 45 to 50) explains the general path that mercury from various sources takes to enter the San Francisco Bay sediment, fish, and birds. It describes how mercury from the various sources binds to sediment; is transported to methylating regions, converted into methylmercury, and taken up into the food web; and bioaccumulates within fish and other aquatic organisms that are prey for wildlife and humans. We accounted for species-specific issues to the extent that information is available (Staff Report pages 36 to 39, 48 to 49, and 85). Our analysis is reasonable and reflects feedback we received during the scientific peer review process.

5. Feeding Ecology
Comment Letter Page 4

The comment asserts that the data we provided regarding shorebird feeding ecology are inadequate to evaluate the degree of mercury exposure. However, because mercury is found in bird eggs, birds are clearly exposed to mercury. We discussed the links between mercury sources and bird eggs in the Staff Report (pages 45 to 49). We proposed a bird egg target as a way of measuring exposure as directly as possible. Moreover, we called for measuring the amount of mercury in bird prey on Staff Report page 85 and proposed to incorporate such information as it becomes available through adaptive implementation.

6. Ability of Birds to Limit Exposure
Comment Letter Page 4

The comment says we did not consider how birds limit their mercury exposure (e.g., by dropping their feathers). We recognize that many birds exposed to mercury rid themselves of it as they molt, which limits their mercury exposure. However, our proposed bird egg target is based on a direct measure of mercury where it counts—in bird eggs. Regardless of how birds take up and release mercury, the most sensitive indicator of bird embryo mercury exposure is the amount of mercury that reaches the egg (CDFG 2002). Therefore, proposing a bird egg target is reasonable and accounts for ways birds might limit their mercury exposure.

Allen Matkins Leck Gamble & Mallory (for Buckhorn, Inc.), David Cooke

The comment expresses concern about how we estimated the Guadalupe River watershed mercury load (see Staff Report page 26). It notes that the Santa Clara Valley Water District estimated the Guadalupe River watershed sediment load to be less (34 M kg/yr) than the U.S. Geological Survey estimate we used (44 M kg/yr). We consider both estimates to be reasonable considering how difficult it is to estimate long-term average sediment loads. However, because we relied on the U.S. Geological Survey data to estimate the urban and non-urban storm water runoff loads, for the sake of consistency, we also relied on the U.S. Geological Survey data when we estimated the Guadalupe River watershed load.

The comment questions the sediment mercury concentration data we used because the data are very limited and reflect samples collected near downtown San Jose, an area that does not reflect tidal activity occurring downstream. We agree that the data represent relatively few samples. Efforts are currently underway through the Regional Monitoring Program and Clean Estuary Partnership to better estimate Guadalupe River sediment and mercury loads. The results of these studies will be incorporated into the TMDL through adaptive implementation. We deliberately chose samples that were upstream of tidal influences because we wanted to estimate the Guadalupe River watershed load without the dilution effects of tidal activity. In doing so, however, our method does not account for sediment removal efforts downstream of the sampling location. In the Staff Report (page 26), we recognized the need to balance these issues.

The comment notes that the proposed Basin Plan Amendment does not account or offer credit for remediation activity that occurred after 1980-1989, when the sediment samples we relied upon were collected. The proposed Basin Plan Amendment offers credit only for loads reduced since 2001. We agree that recognizing major remediation efforts is appropriate, and in response to similar comments, we propose to change the Basin Plan Amendment text (see page 77, above).

Seyfarth Shaw (for Guadalupe Rubbish Disposal Company), Todd Maiden

1. Legacy Sources
Comment Letter Pages 1-2

The comment asks that we consider the difficulties of addressing mercury legacies when we propose allocations. While it vaguely refers to costs and social disruptions, it offers no clear means to address these issues in light of mercury mining legacies. It notes that geological and historical circumstances result in elevated background mercury concentrations, perhaps suggesting that existing parties not directly associated with the mining legacy should bear little responsibility for reaching the allocations. Unfortunately, the mining industry is gone, and the burden of reducing mercury discharges to San Francisco Bay and protecting its beneficial uses falls to those who remain.

Regarding the potential for TMDL-related remediation to increase the bioavailability of mercury in sediment, when a remediation project is proposed, it is subject to environmental review. If evidence at that time suggests that the project would increase bioavailable mercury, its proponents would probably not pursue it for purposes of demonstrating a reduction in total mercury discharges. We evaluated potential TMDL-related environmental impacts to the extent possible in Staff Report Appendix B. Our analysis does not, however, speculate on the specific types of projects that could be proposed. Nevertheless, since TMDL-related projects would be intended to benefit the environment, it seems unreasonable to assume that they would pose significant and unavoidable adverse impacts.

The comment notes that we propose no actions to address bed erosion. While we acknowledge that bed erosion is probably San Francisco Bay's largest mercury source, we are currently unaware of any existing mechanism to address this source, which is buried below the bay floor. Moreover, the comment does not provide any new insight we can apply to this situation.

2. Dredged Material Disposal
Comment Letter Page 2

The comment suggests that more could be done to address mercury sources associated with sediment dredging and dredged material disposal. As for dredging exposing sediment that is otherwise covered and unavailable for transport or methylation, we believe that the extent to which this is a source must be considered together with dredged material disposal, which buries exposed sediment (a loss). Regardless of how one conceptualizes dredging and disposal operations as sources and losses, the two processes together represent a net loss because some material is disposed of out-of-bay. To determine the extent to which dredging and disposal operations could expose mercury to open water, sunlight, and aeration, and increase methylation, the proposed Basin Plan Amendment requires the dredgers to conduct studies to better understand how their operations could affect mercury fate, transport, and biological uptake (see Staff Report page A-13).

The comment recommends that we do more to address mercury associated with dredged material disposal, specifically suggesting that we adopt more stringent disposal standards or require more dredged material to be shipped out-of-bay. By proposing a concentration-based allocation, we are proposing that dredged material containing elevated mercury concentrations not be returned to San Francisco Bay. Also, to reduce mercury loads associated with dredged material disposal, we assume that the Long Term Management Strategy for the Placement of Dredged Material will continue to be implemented, which will substantially reduce the amount of dredged material disposed of in San Francisco Bay.

As a point of clarification, the comment refers to methylation of mercury-laden sediment as the single largest source of San Francisco Bay mercury. In contrast, we estimate that

bed erosion is the largest mercury source of inorganic mercury. Methylation is a critical process in terms of bioaccumulation.

3. Alternative Allocations
Comment Letter Pages 3-4

The comment claims that we did not explain our rationale for the proposed allocations; however, Staff Report pages 51 through 59 provide a rationale for each allocation. The comment also claims that we should consider all reasonable allocation schemes, including 22 possible allocation schemes suggested by the USEPA. However, we are not required to consider all possibilities. We considered a reasonable range of project alternatives that included proportional allocations (Staff Report page 96), lower allocations (Staff Report page 98), and methylmercury allocations (Staff Report page 100). Our reasons for rejecting many of the 22 suggested allocation schemes are provided in Table 2.

As for the Proportional Allocations Alternative being disproportionate, we disagree, although we did treat the bed erosion allocation as uncontrollable and determined it separately from the others. This is reasonable because we cannot currently identify specific actions to address this natural process.

The comment says the allocation scheme must address costs of mitigation in areas with elevated background mercury concentrations, credits for previous actions to reduce loads, and differences between point and non-point sources. While we could consider these factors, we are not required to address them specifically. By regulation, TMDLs must be established at levels necessary to attain and maintain water quality standards (Code of Federal Regulations, Title 40, §130.7[c][1]). The proposed allocation scheme is the most reasonable approach to meet this requirement.

4. Deferred Analysis
Comment Letter Pages 4-6

The comment notes that the California Environmental Quality Act and the Porter-Cologne Water Quality Control Act require consideration of economic costs. This is partly correct. As explained on Staff Report pages 101 to 102, the California Environmental Quality Act (Public Resources Code §21159) requires an environmental analysis of reasonably foreseeable methods of compliance, which must take into account a reasonable range of factors, including economics. However, the Porter-Cologne Water Quality Control Act requires consideration of economics only when the Water Board adopts water quality objectives, and we have proposed no new water quality objectives. Therefore, the Porter-Cologne Water Quality Control Act requirements do not apply.

The comment asserts that our economic analysis (Staff Report page 101) is too cursory to be of value. We provide some additional information on page 6. However, if we knew the number of sites that would need to be cleaned up, their sizes, and the most likely cleanup methods, the analysis could be more robust, but we do not have this information.

TABLE 2
POSSIBLE ALLOCATION SCHEMES

	Allocation Scheme	Reason for Rejection
1	Equal percent removal	Alternative considered and rejected (Staff Report page 96)
2	Equal effluent concentrations	NOT REJECTED. Used for Central Valley watershed, urban runoff, and Guadalupe River watershed allocations
3	Equal total mass discharge	Unreasonable because small sources would get excessive allocations
4	Equal mass discharge per capita	Unclear how to apportion population among sources
5	Equal reduction of raw load (e.g., pounds per day)	Unreasonable because small sources would require excessive reductions
6	Equal ambient mean annual quality	NOT REJECTED. Used for Central Valley watershed, urban runoff, and Guadalupe River watershed allocations
7	Equal cost per pound of pollutant removed	Requires cost information that is unavailable
8	Equal treatment cost per unit of production	Requires cost information that is unavailable
9	Equal mass discharged per unit of raw material used	Not applicable because most mercury sources are not industrial and do not use “raw” material
10	Equal mass discharged per unit of production	Not applicable because most mercury sources are not industrial and do not “produce” material
11	Percent removal proportional to raw load	Unreasonable because reductions needed to reach proposed targets relate to existing concentrations, not source size
12	Larger facilities to achieve higher removal rates	Not applicable because many sources are not “facilities”
13	Percent removal proportional to community income	Unclear how to apportion population among sources, much less account for differences in community incomes
14	Effluent charge (dollars per pound)	Requires cost information that is unavailable
15	Effluent charge above some load limit	Requires cost information that is unavailable
16	Seasonal limits based on cost-effectiveness	Requires cost information that is unavailable
17	Minimum treatment cost	Requires cost information that is unavailable
18	Best available technology plus some municipal inputs	Relates to industrial discharges, which are less than 0.2% of total load
19	Assimilative capacity divided to require equal efforts	Difficult if not impossible to ascertain what constitutes “equal efforts”
20	Treatment level proportional to plant size	Relates to municipal discharges, which are about 1% of total load
21	Equal percent between best practicable technology and best available technology	Relates to industrial discharges, which are less than 0.2% of total load
22	Different treatment levels for different streamflows and seasons	Relates to industrial discharges, which are less than 0.2% of total load

We did provide information about a range of possible types of activities that could be necessary to implement the TMDL. We based our analysis on available information, and the comment offers no new information for us to consider.

We stated that the Central Valley and Guadalupe River watershed mercury TMDLs are legally mandated; therefore, they will be developed and implemented with or without the San Francisco Bay Mercury TMDL. How much implementing these TMDLs will cost is unknown. The comment suggests that we should estimate these costs even though we do not know the actual measures to be implemented. To provide additional economic information about unknown measures would require speculation, which would be inappropriate. Public Resources Code §21159(a) states:

> …In the preparation of this analysis, the agency may utilize numerical ranges or averages where specific data is not available; however, the agency shall not be required to engage in speculation or conjecture….

We agree that the costs of implementing these TMDLs will be substantial. We recognize that the Central Valley and Guadalupe River watershed mercury TMDLs must relate to the San Francisco Bay Mercury TMDL, and these other TMDLs are, in a sense, components of the San Francisco Bay Mercury TMDL. However, in the context of environmental analysis for reasonably foreseeable methods of compliance with a rule or regulation requiring the installation of pollution control equipment, or a performance standard or treatment requirement, Public Resources Code §21159(d) states:

> Nothing in this section shall require the agency to conduct a project level analysis.

Therefore, we are not required to speculate on the individual projects that contribute to the implementation of the overarching Basin Plan Amendment.

As for the titles of remediation options being vague, we used titles from the U.S. Geological Survey report on which Staff Report Table 9.2 is based. That report provides examples and additional information and is part of the administrative record for this Basin Plan Amendment (USGS 2003c).

As for bed erosion, efforts to control dredging and dredged material disposal may be useful in speeding San Francisco Bay's recovery but will not likely affect bed erosion in any meaningful way. This is not to say that we foresee no role for the dredgers. Refer to our responses on pages 4 and 87.

5. Unknown Mercury Sources
Comment Letter Page 6

The comment suggests that the margin of safety is excessive because we acknowledge the potential to discover mercury sources that we cannot confirm now (see Staff Report pages 33 and 79). However, we provided no explicit margin of safety for these potential

sources (see Staff Report page 61). We have not proposed reserving any allocation to address them, even though we discuss the possibility that they could exist (see Staff Report pages 59, 83, A-4, and A-13). In essence, we assigned them an allocation of 0 kg/yr.

6. Other Comments
Comment Letter Pages 6-7

The comment refers generally to comments submitted by the Santa Clara Urban Runoff Pollution Prevention Program, Santa Clara County, and Buckhorn (via Allen Matkins Leck Gamble & Mallory). Our responses to these comments begin on pages 21, 75, and 86.)

Santa Clara Valley Water District, David Chesterman

Comment*: District staff believes the proposed Basin Plan Amendments place too much emphasis on controlling mercury in sediment entering the Bay. The District recommends adding further text to recognize the importance of control of the upper watershed sources (mines and mining wastes), to encourage control of watershed processes that result in the production of bioavailable mercury, and to acknowledge the relatively greater bioavailability of atmospheric sources. The District suggests that the Water Board shift the emphasis from mercury in sediment to mercury in its methylated form, which has significantly greater bioavailability.*

In particular, the District would like to incorporate the following elements in the proposed TMDL:

- *Development of a watershed-wide mercury management strategy that will focus efforts on most effective control measures and guide individual future permitting actions,*
- *Encourage actions that reduce methyl mercury production in addition to or instead of mass removal of mercury in sediment,*
- *Provide flexibility for considering testing and evaluation of new techniques and control measures as a form of implementation to encourage innovation,*
- *Consider allowing equal credit for actions that isolate mercury sources from the Bay by eventual burial rather than by removal,*
- *Encouraging actions to address upper watershed sources (mines and mining wastes) of mercury as a priority, to avoid compromising actions taken in the lower watershed.*

Response: The proposed Basin Plan Amendment (Staff Report page A-5) states that there are four objectives for the implementation plan – one of which is reducing mercury loads to the Bay. The TMDL also calls for control of mercury methylation, but we do not currently have enough information to shift emphasis primarily to control of methylmercury. As we adaptively implement the TMDL, we intend to move in that direction as we learn enough to take those steps. We also have acknowledged the

possibility (Staff Report page A-13) that mercury deposited from the atmosphere may be more bioavailable and that this issue warrants investigation.

We did not intend to imply in the Basin Plan Amendment language pertaining to the Guadalupe River watershed that the watershed-based efforts cited in the comment are incompatible with the stated goals of the TMDL. To clarify our intent, we will revise the Basin Plan language on Staff Report Page A-10 (under "Guadalupe River Watershed [Mining Legacy]") as follows.

> The Guadalupe River Watershed Mercury TMDL will provide a watershed-wide mercury management strategy. Efforts are already underway in the watershed to take early actions to reduce mercury loads, and more are planned. A high priority for the watershed-based strategy is to control upper watershed sources associated with the mining legacy to avoid compromising actions taken in the lower watershed. The strategy will also feature measures intended to reduce methylmercury production and risks to humans and wildlife. An essential component of the strategy will also involve testing and evaluation of new techniques and control measures, the benefits of which may apply throughout the Bay. As the mercury load, methylation, and reductions resulting from these efforts are quantified by the dischargers identified through the Guadalupe River Watershed Mercury TMDL process, the Water Board will consider how the reductions achieved will be counted toward fulfillment of the load reductions required to meet the Guadalupe River watershed load allocation.
>
> The Guadalupe River watershed mining legacy mercury load allocation is expected to be attained within 20 years after the Water Board begins implementing the Guadalupe River Watershed Mercury TMDL. As a way to measure progress, an interim loading milestone of 47 kg/yr of mercury, halfway between the current load and the allocation, ~~shall~~ should be achieved within ten years. If the interim loading milestone is not achieved, dischargers shall make reasonable and measurable progress toward achieving the ten-year load reduction through implementation of the watershed-wide strategy.
>
> ~~The~~ Progress toward (a) the interim loading milestone, or (b) attainment of the allocation, shall be demonstrated by the dischargers identified through the Guadalupe River Watershed Mercury TMDL ~~shall demonstrate compliance with their allocations~~ using one of the methods listed below.
>
> 1. Quantify the annual average mercury load ~~avoided~~ reduced by implementing (a) pollution prevention activities, (b) source ~~control,~~ and treatment controls, and (c) if applicable, other efforts to reduce methylation or mercury-related risks to human and wildlife consistent with the watershed-based strategy. The Water Board may recognize loads avoided resulting from activities implemented after 2001 as counting toward the load reductions consistent with the load allocation.

As indicated below, we will change Staff Report pages 70-71 correspondingly:

> The Guadalupe River Watershed Mercury TMDL will provide a watershed-wide mercury management strategy and will be the primary regulatory vehicle for achieving water quality goals in the watershed and reducing loads to the bay. Implementation measures will likely include mining waste removal actions and extensive slope stabilization measures in the New Almaden Mining District (a steeply sloped upper watershed area); creek restoration activities throughout the watershed, including removal of overbank mining waste deposits; removal of accumulated sediment from surface water conveyance facilities (which will likely reduce loads to the bay of multiple pollutants in accumulated sediment); a monitoring program to evaluate methylation controls; methylation control measures in reservoirs and possibly in other portions of the watershed; measures intended to reduce mercury-related risks to humans and wildlife; and monitoring programs to refine our understanding of sources and effects. Ultimately, the Water Board expects the implementation plan for the Guadalupe River Watershed Mercury TMDL to integrate implementation efforts relative to that TMDL with the implementation efforts for the San Francisco Bay Mercury TMDL.
>
> …As such, we propose that the sources of mercury from the Guadalupe River watershed mining legacy be reduced to achieve the load allocation within 20 years, and as a way to measure progress, an interim loading milestone of 47 kg/yr mercury, halfway between the current load and the allocation, ~~will~~should be achieved within 10 years. During the first 10 years of implementation, the dischargers identified through the Guadalupe River Watershed Mercury TMDL process should make reasonable and measurable progress toward the ten-year load reduction through implementation of the watershed-wide strategy~~achieving the 10-year allocation~~….
>
> We propose that dischargers identified through the Guadalupe River Watershed Mercury TMDL demonstrate progress toward (a) the interim loading milestone, or (b) attainment of the allocation ~~compliance with their allocations~~ by using one of the methods listed below.
>
> 1. Quantify the annual average mercury load reduced~~avoided~~ by implementing (a) pollution prevention activities (b), source ~~control,~~ and treatment controls, and (c) if applicable other efforts to reduce methylation or mercury-related risks to humans and wildlife consistent with the watershed-based strategy .

Exponent (for Santa Clara Valley Water District), Gary Bigham

Introduction and Summary of Conclusions
Comment Letter pages 1-2

The comment asserts that the TMDL focuses excessively on total sediment mercury, rather than methylmercury, and ignores the best available science. We note that a panel of scientific peers has reviewed the TMDL and considered its scientific basis. As part of the scientific review, the panel addressed the following specific questions, among others:

a) Are the linkages between sources and the numeric targets clearly stated and scientifically sound?
b) Have we presented a plausible argument that reducing sources of mercury will result in attainment of proposed targets?
c) There are several key assumptions put forth in this section to complete the linkage between mercury loads and fish tissue mercury concentrations. In light of available data, are these assumptions reasonable?

We considered the scientific peer review and responded, changing the text as necessary prior to the public review process.

The comment acknowledges that we recognized many scientific complexities in our linkage analysis but asserts that we did not take them into account. However, the comment does not offer quantitative information sufficient for us to support alternative assumptions or calculations. Because we understand that the San Francisco Bay environment is complex, we propose to implement the TMDL adaptively, incorporating new and relevant information as it becomes available.

We provide specific responses below pertaining to (1) the relationship between total mercury and fish and wildlife mercury (pages 95-97), (2) a preference for methylmercury targets (pages 96), and (3) differences in bioavailability among mercury sources (pages 97-98).

Mercury Concentrations in Leopard Shark are Probably Not Related to Mercury in San Francisco Bay Sediment
Comment Letter pages 2-3

The comment suggests that mercury concentrations in San Francisco Bay fish may not be elevated compared to those in fish from other areas. In particular, San Francisco Bay leopard shark mercury concentrations are similar to those of sharks caught elsewhere. The concern is that efforts to control mercury concentrations in San Francisco Bay fish and wildlife may be unwarranted if San Francisco Bay mercury sources are not responsible for elevating these concentrations.

The comment does not fully support its contention. Although it compares San Francisco Bay leopard shark mercury concentrations with those of other sharks, the other sharks do

may not be comparable because of their size and feeding habits. A valid comparison would need to account for shark age, size, and feeding habits. Although the study the comment cites does not discuss sizes, the comparison species are generally bigger than San Francisco Bay's leopard sharks; therefore, they likely have accumulated more mercury. In addition, while leopard shark eat bottom-dwelling organisms lower in the food web, the comparison sharks named in the study may eat larger fish and other animals higher in the food web, thereby ingesting relatively more mercury.

For purposes of this TMDL, we are not concerned with how San Francisco Bay fish compare to those caught elsewhere. We are concerned with how mercury concentrations in San Francisco Bay fish compare with concentrations deemed protective of human health and wildlife. The purpose of this TMDL is to protect San Francisco Bay beneficial uses, which is not to say that similarly high mercury concentrations do not exist in fish and wildlife elsewhere.

Linkage Between Total Mercury in Sediment and Methylmercury in Fish is Inadequate Scientific Background
Comment Letter pages 3-4

The comment describes the bioaccumulation process: (1) sediment-bound mercury becomes dissolved mercury, (2) dissolved mercury is converted to methylmercury, and (3) methylmercury bioaccumulates within the food web. While the comment provides more detail than the Staff Report, it does not contradict the Staff Report or provide information sufficient to support a more quantitative linkage analysis.

Inadequate Linkage Between Total Mercury and Methylmercury in Sediment
Comment Letter pages 5-7

The comment questions the relationship between total mercury and methylmercury in sediment. In particular, it challenges our assumption that at any particular San Francisco Bay location, the mercury methylation rate is probably roughly proportional to sediment mercury concentrations in sediment. We cited a U.S. Geological Survey study of 21 basins (USGS 2003b). The U.S. Geological Survey researchers found that the total mercury and methylmercury data (adjusted for organic content) suggested that mercury load (as reflected by total mercury accumulation in sediment) has a logarithmic effect on methylation. The same paper found that methylmercury production appears proportional to total mercury concentrations at low sediment total mercury levels (less than 1 ppm), but at high total mercury levels, little additional methylmercury is produced with additional total mercury. In this matter, we rely on the expertise of the U.S. Geological Survey, which uses a scientific peer review process prior to publication. Other scientists have arrived at similar conclusions (Benoit et al. 1998; Hintelmann and Wilken 1995).

The comment contains analysis that goes beyond the U.S. Geological Survey conclusions. It plots U.S. Geological Survey data of less than 1.0 ppm total sediment mercury, discarding the data from 1.0 ppm to 30 ppm. With this truncated data set, the comment concludes that sediment methylmercury concentrations are weakly negatively

correlated to total sediment concentrations. We reject this conclusion because it counters the U.S. Geological Survey's conclusion, and it relies on dubious data truncation.

The comment exaggerates the importance we placed on the U.S. Geological Survey study as a basis for our linkage analysis. The U.S. Geological Survey examined data from 106 sites from 21 basins. The study does not evaluate 106 sites with exactly the same environmental conditions, where total mercury concentrations could be varied and the corresponding methylmercury concentrations measured. To our knowledge, no such study has been undertaken. Such a study could be used to quantify the relationship between total mercury and methylmercury; however, its conclusions would only be valid for the specific environmental conditions evaluated. Therefore, even if such a study were available, its relevance to San Francisco Bay would be questionable because conditions in San Francisco Bay vary substantially from location to location and at different times. Therefore, in the absence of any quantifiable method to describe the relationship between total mercury and methylmercury, we assume that environmental factors that drive methylation in San Francisco Bay will remain the same and therefore changes in total mercury concentrations will result in directly proportional changes in methylmercury concentrations.

Inadequate Linkage Between Total Mercury in Sediment and Fish Tissue
Comment Letter pages 7-10

The comment states that no studies show any correlation between sediment mercury concentrations and fish tissue. To effectively complete such a study, scientists would need to compare fish tissue mercury concentrations among sites with exactly the same environmental conditions, while varying only total sediment mercury concentrations. The lack of such a study does not mean that no such relationship exists. It is unreasonable to assume that fish exposed only to sediment mercury would not accumulate any mercury within their tissues, especially fish such as leopard shark whose diet primarily includes benthic organisms. The comment states that methylmercury better predicts fish tissue mercury concentrations. We acknowledge that this may be the case in many ecosystems, including San Francisco Bay, because methylmercury production is an intermediate step in the process of converting inorganic sediment-bound mercury to fish tissue mercury. Likewise, the comment states that dissolved mercury better predicts fish tissue mercury concentrations, but dissolving sediment-bound mercury is also an intermediate step in the process.

We could have chosen a dissolved mercury or methylmercury concentration as a TMDL target, but we opted for fish tissue and bird egg mercury concentration targets because they more closely relate to the beneficial uses we intend to protect. The Staff Report includes a Methylmercury Allocations Alternative and finds it unworkable and inconsistent with some project objectives. Because a linkage analysis must link sources to targets, if we proposed methylmercury targets, we would still need to describe the relationship between total mercury (most of which is sediment-bound) and methylmercury. Likewise, the assimilative capacity and allocations would need to be based on a similar linkage analysis. The Central Valley Regional Water Quality Control

Board, which has proposed methylmercury targets, is also proposing total mercury load reductions (as we have proposed) and actions to control mercury methylation to the extent feasible (as we have proposed) (CVRWQCB 2004).

Adsorbed Inorganic Mercury is Not the Same as Mercuric Sulfide with Respect to Methylation Potential
Comment Letter pages 10-11

The comment points out that mercury from the Central Valley watershed and urban runoff is mostly inorganic mercury bound to sediment, whereas much of the mercury from the Guadalupe River watershed is mercury sulfide, a mineral made up of mercury and sulfur, where the mercury is incorporated into and tightly bound to sulfur within the material, not just attached to the outside of a sediment particle. The comment suggests that this difference affects the potential for (or at least the rate of) methylation.

While the comment suggests that we should account for these differences in our allocations, it provides no quantitative basis for doing so. Speciation of mercury in suspended sediments entering San Francisco Bay has not been determined for each source. Moreover, the comment acknowledges that, over time, mercury sulfide can be converted to chemical forms more prone to methylation. Guadalupe River sediment that enters San Francisco Bay is likely to stay for a relatively long time, particularly since mixing in San Francisco Bay's southern reach is relatively slow. Mercury concentrations in fish tissue have been measured in samples from several creeks and reservoirs in the Guadalupe River watershed in May 2003. Average tissue concentrations in several locations exceeded 1 ppm (TetraTech 2004). These data suggest that mercury of mining origin is becoming methylated in the reservoirs and creeks and becoming incorporated into the food web. Therefore, we maintain that mercury sulfide is an important contributor to the bioaccumulation problem in San Francisco Bay.

"New" Mercury from Point Sources and Tributaries is a More Significant Source for Methylation than "Old" Mercury
Comment Letter pages 12-13

The comment points out that newer mercury in a water body may be more readily available for methylation than mercury that has been there longer. We pointed out this possibility in the Staff Report (page 89), but currently little information corroborates these preliminary studies, and no information quantifies the difference between new mercury and older mercury in San Francisco Bay. Without detailed information, we cannot take this factor into account in our proposed allocations. Given the relatively long duration much sediment-bound mercury is likely to be in the bay (much longer than the durations of the studies the comment cites), the fact that older mercury may take time to become bioavailable may not be an important consideration. We have proposed to continue to study this issue and incorporate reasonable changes through adaptive implementation.

Dissolved Mercury Loads are a More Significant Source for Methylation than Sediment-Bound Mercury Loads
Comment Letter page 13

The comment points out that dissolved mercury may be more readily available for methylation than sediment-bound mercury. This is not surprising since desorbing sediment-bound mercury is one of the first steps in the methylation process. However, no studies quantify the difference between dissolved mercury and sediment-bound mercury in a way that can be applied broadly to San Francisco Bay mercury allocations. In fact, there is some evidence that mercury in wastewater effluent can form very strong dissolved complexes that may influence its availability for uptake (Hsu and Sedlak 2003). Given the relatively long duration much sediment-bound mercury is likely to be in San Francisco Bay (much longer than the one-week duration of the study the comment cites), the fact that sediment-bound mercury may take time to become bioavailable may not be an important consideration. We are requiring sources to evaluate the bioavailability of their discharged mercury and will incorporate any reasonable changes suggested by such evaluations through adaptive implementation.

DREDGING AND DISPOSAL

Port of Oakland, Jim McGrath

Wasteload Allocation to Dredgers—definition of ambient
Comment Letter Page 1

Comment: *The Port is concerned that an allocation based on the ambient in-Bay concentration, while appearing reasonable, may be fraught with statistical problems in implementation. Specifically, material that is well within the scatter of data about ambient sediment quality may be rejected for in-Bay disposal.*

Response: The Port makes a valid point that no clear-cut mercury concentration constitutes the San Francisco Bay ambient concentration. By using a measure of central tendency like a mean or a median to represent Bay ambient concentrations, approximately half of all samples would be above this threshold. Thus, we need to find a threshold such that, if a sample were found to be above it, we would reasonably assert that the sample was above the ambient concentration. To accomplish this, we propose to define this ambient threshold mercury concentration as the 99th percentile mercury concentration of the previous 10 years of sediment samples collected through the Regional Monitoring Program for Trace Substances (RMP). The current value of this percentile is 0.55 ppm (SFEI 2003b). Each year, a new 10-year data window will be analyzed to determine this threshold. Because dredged material comes from San Francisco Bay, RMP stations outside the Bay (e.g. Sacramento River, San Joaquin River, Guadalupe River, and Standish Dam stations) will not be considered for determining San Francisco Bay ambient threshold. Because there are high concentrations in Guadalupe River and Standish Dam samples, exclusion of these stations tends to lower the 99th percentile.

Establishing an ambient threshold for dredged material disposal that may be numerically higher than the suspended sediment target is not inconsistent with the requirement to meet the suspended sediment target. The bed sediment mercury concentration and the suspended sediment mercury concentration are distinct quantities. Because dredged material predominantly consists of material already in San Francisco Bay, to the extent that progress is made toward reducing the suspended sediment concentrations, the mercury concentration in dredged sediment will decrease as well—eventually reaching the suspended sediment target when the sediment target is reached on average in the bay.

To clarify this ambient mercury concentration, we will change the text at the top of Staff Report page 59 as follows:

> …The mercury concentration of dredged material disposed of in the bay must be at or below the baywide ambient mercury concentration. <u>The ambient threshold concentration is the 99th percentile mercury concentration of the previous 10 years of bed sediment samples collected through the RMP. The current value of this percentile is 0.55 ppm. Each year, a new 10-year data</u>

window will be analyzed to determine this threshold. Because dredged material comes from the bay, RMP stations outside the bay (e.g. Sacramento River, San Joaquin River, Guadalupe River, and Standish Dam stations) will not be considered for determining the Bay ambient threshold. We do not expect that this disposal determination threshold will conflict with any existing suitability determinations utilized by the Dredged Material Management Office (DMMO) because specific numeric sediment quality criteria have not been developed for the Bay Area (USACE 2001).

Consistent with this change, we will also change the text on Staff Report page 78 as follows:

The proposed allocation for sediment dredging and disposal requires that the mercury concentration in dredged material disposed of in the bay not exceed the 99th percentile mercury concentration of the previous 10 years of sediment samples collected through the RMP (excluding stations outside the bay, for example, Sacramento River, San Joaquin River, Guadalupe River and Standish Dam stations)~~baywide ambient median suspended sediment mercury concentration from all RMP bay monitoring stations~~. Prior to disposal, the material should be sampled and analyzed according to the procedures outlined in available guidance (USEPA et al. 2001).

We will augment the reference on Staff Report page 116 as follows:

U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, San Francisco Bay Regional Water Quality Control Board, and State Water Resources Control Board 2001. *Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region, Management Plan 2001,* July, pp. ES-9, 1-4 to 1-9, 6-1 to 6.3, and H-1 to H-5.

Finally, we will change the text on Staff Report page A-13 (the Basin Plan Amendment). (Refer to our response on page 132 for an explanation of the additional changes shown here.)

The allocation for sediment dredging and disposal is both mass-based and concentration-based. ~~requires that t~~The mercury concentration in dredged material disposed of in the Bay shall not exceed the ~~Baywide ambient median suspended sediment mercury concentration from all RMP Bay monitoring stations.~~ 99th percentile mercury concentration of the previous 10 years of sediment samples collected through RMP (excluding stations outside the Bay like the Sacramento River, San Joaquin River, Guadalupe River and Standish Dam stations). Prior to disposal, the material shall be sampled and analyzed according to the procedures outlined in the 2001 U.S. Army Corps of Engineers document "Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region."

Wasteload Allocation to Dredgers – monitoring requirements
Comment Letter Page 2

Comment: *The second concern of the Port, about the concepts in the report involving regulation of dredging, comes from the language at the bottom of Staff Report page 78 and continuing on to page 79 that provides:*

> *…we propose requirements in the dredging permits to investigate the potential for dredging to enhance mercury uptake. The requirement can be satisfied by supporting or conducting investigations that result in this information being made available to the Water Board beginning with the first adaptive implementation review.*

The Port says that since dredgers do not create the in-Bay contaminants they must dredge, it is reasonable only to ask that they investigate whether or not dredging and subsequent disposal could increase the potential for uptake of mercury from dredging and in-Bay disposal.

Response: The Port acknowledges that it is reasonable to ask dredgers to investigate *whether* dredging and disposal activities *could increase the potential* for mercury uptake. The intent expressed on Staff Report pages 78-79 appears consistent with the Port's comment. The proposed Basin Plan Amendment (Staff Report page A-13) requires that dredgers determine *if* dredging and disposal activities increase the potential for mercury uptake. Therefore, no text change is necessary.

Assumptions and Adaptive Implementation—factors influencing biological uptake
Comment Letter Page 2

Comment: *The Port notes that the Staff Report (page 59) identifies the assumption that mercury, whether inorganic, elemental, chemically bound, or not bound, is equally likely to be converted to methylmercury and thus likely to enter the food chain. The Port requests that the TMDL also consider grain size and mineral composition, which might provide physical as well as chemical barriers to uptake.*

Response: Regarding the relative bioavailability of mercury from different sources to San Francisco Bay, we will modify the text on Staff Report page 89 as follows:

> <u>What is the relative bioavailability of mercury from different sources to San Francisco Bay?</u>
> Based on currently available information, we employ the simplification that mercury from all sources to the bay is equal in terms of bioavailability. Moreover, the mercury already in the system is just as bioavailable as mercury recently introduced. There is emerging evidence that mercury newly-deposited from the atmosphere is more bioavailable than mercury already in the system (Benoit et al. 2003, USGS 2003a) and that watershed mercury

sources vary in chemical availability (CDFG 2001). Factors such as particle size of mercury-containing sediment as well as mineral composition of the sediment may influence biological uptake of mercury.

Assumptions and Adaptive Implementation – specificity in adaptive implementation
Comment Letter Page 2-3

Comment: *The Port urges greater specificity in the adaptive implementation program, particularly regarding the assumptions about the active sediment layer, and the potential for erosion and subsequent uptake of mercury enriched sediment. A high priority work item should be to identify the areas of highest shear stress in the Bay, where sediment also contains high mercury concentrations and could be transported to methylating regions. The highest priority area should be the deposits in Suisun Bay, and the second highest priority area should be San Pablo Bay.*

Response: We will change the text on Staff Report page 87. To avoid excluding other areas for consideration, we will refer to the Port's suggested criteria for establishing priorities rather than the priorities themselves.

Will erosion of mercury-laden sediment from certain regions of the bay affect water quality?
The source assessment estimates that 460 kg/yr of mercury that was buried below the active layer is introduced into the system via erosion of overlying sediment. In Section 7, Allocations, this process was estimated to continue for about 110 years at its current rate before exhausting the excess mining legacy mercury in bay sediment. If this source continues for many decades, it will impede progress toward TMDL targets because of its magnitude. It is particularly important to focus attention on regions of the bay that contain high mercury concentrations subject to physical conditions that could mobilize sediment, and where mobilized sediment could be transported to methylating regions. The U.S. Geological Survey has ongoing modeling and observational studies looking into this question, and we expect an improved answer within ten years. Resolution of this management question will influence estimates concerning how long it will take to reach TMDL targets, and this may influence decisions regarding frequency of certain monitoring activities as well as decisions about actions to control ongoing sources.

Assumptions and Adaptive Implementation – pilot projects guiding implementation
Comment Letter Page 3-4

Comment: *The Port notes that physical, chemical, and biological examination of the accreted marshes and mudflats along the perimeter of San Pablo Bay, and of recent wetland restoration efforts near the mouth of Petaluma Creek, can provide valuable clues to the forces that have shaped the system and the fate of the mercury present in the system.*

The Port recommends using insights gained through testing of the existing marshes in the North Bay to develop the aspects of the adaptive implementation program concerning the relationship between mercury concentrations in sediment and the food web, and before defining further regulatory measures aimed at addressing control of mercury methylation.

Response: The text on Staff Report pages 86-87 under the subheading "Where is methylation occurring in the system and what are the controlling factors?" is consistent with the Port's suggestion; therefore, no change is necessary. The Staff Report does not provide an exhaustive or prescriptive guide to the manner in which these technical uncertainties will be resolved. However, the intent of mentioning them in the Staff Report is to identify the uncertainty, why it is important to the TMDL, generally how it will be resolved, and how long it may take to resolve. To the extent that we can provide useful insights into the direction such studies may or should take, it is appropriate to do so. In this case, we feel that the theme of the suggested change is already implied in the present text.

Areal Variation of Mercury Enrichment and Loading from Erosion
Comment Letter Page 4

Comment: *The report's estimate for bed erosion may not account for all of the mass of mercury that might have been discharged into the Bay as a result of mining and rendering gold ore. The Port urges that specific work be targeted to provide a better estimate of the mass of mercury that might be subject to erosion.*

Response: The text on Staff Report pages 87 under the subheading "Will erosion of mercury-laden sediment from certain regions of the bay affect water quality?" is consistent with the Port's suggestion. Therefore, no change is necessary to reflect this comment.

Create Flexibility in Implementation
Comment Letter Page 4

Comment: *The Port urges the Board to consider a flexible policy framework that would allow load reductions through innovative measures. For example, it might be substantially cheaper for urban runoff dischargers to sequester mercury sediment already in the system—perhaps by removing near shore deposits in some areas, capping sediment in other areas, or removing sediment from an eroding stream.*

Response: The Port appropriately suggests that removal or sequestration of mercury already in the system could be as important as reducing ongoing loading. The suggestion is an extension of the envisioned watershed management approach mentioned on Staff Report pages 83 and A-16. We do not yet have such a program in place. To clarify our intention to consider removal and sequestration as appropriate candidate measures as we develop a more comprehensive, Baywide strategy, we will make the following change to Staff Report page 83:

> Load and wasteload allocations have been assigned to individual entities. However, assigning loads to watersheds could be a useful future approach for managing pollutant loads, particularly if net environmental benefits can be realized. Such a program would only involve watersheds in the San Francisco Bay region that drain to the bay. Such an approach could involve urban runoff management programs, wastewater facilities, and other responsible parties in a watershed accepting joint responsibility for load reductions. For example, credit for mercury loads avoided by diverting urban storm water to treatment facilities may be shared by cooperating agencies. Trading pollution credits to another bay-draining watershed and establishing credit for removal or sequestration of mercury already in the bay may also be possible.

We will make a similar change on Staff Report page A-16 (the Basin Plan Amendment).

> Load and wasteload allocations have been assigned to individual entities. However, assigning loads by watersheds could be a useful approach for managing pollutant loads, particularly if net environmental benefits can be realized. ~~Such a~~ A watershed-based allocation program would only involve watersheds in the San Francisco Bay region that drain to the Bay. Such an approach could involve urban runoff management programs, wastewater facilities, and other dischargers in a watershed accepting joint responsibility for load reductions. An acceptable watershed allocation program may include incentives for agencies to implement load reduction activities and account for avoided mercury loads as well as incentives for strategic removal or sequestration of mercury already in the system. Credits could be used to offset annual loads and attain allocations for multiple sources….

Integrate the TMDL Effort with Other Water Quality Programs - LTMS
Comment Letter Page 5

Comment: *To implement the TMDL, it may be necessary to recognize the TMDL program in some of the Water Board's other program areas and modify some of the policy framework. One Port suggestion is to integrate the restoration goals of the LTMS with the TMDL program. Currently, the LTMS calls for 40% of the sediment generated through dredging to be reused in wetlands. Management of mercury methylation in wetlands might dictate certain approaches in wetland design or in the timing of wetland restoration that might require adjustment of this goal, at least during the initial stages of adaptive implementation.*

Response: Because the TMDL and LTMS programs both deal with dredged material, they must be integrated in an appropriate fashion. Such integration is implicit in any situation in which multiple programs overlap in scope. Whether the policy framework must be modified or LTMS reuse goals should be adjusted is speculative at this point because we do not know if managing methylmercury is inconsistent with the reuse goal. Therefore, it is inappropriate at this time to make a specific change to the TMDL.

Integrate the TMDL Effort with Other Water Quality Programs – wetland restoration
Comment Letter Page 5

Comment: *The Port asks that we consider using wetland restoration sites to sequester mercury-laden sediment and reduce risks.*

Response: There is a potential to use wetland restoration sites to sequester mercury-laden sediment. We will change the text on Staff Report page 80 to suggest this possibility while pointing out that a cautious approach is necessary.

> Although wetlands are not a source of inorganic mercury to the bay, they may contribute substantially to methylmercury production and biological exposure. Plans for extensive restoration of wetlands in the San Francisco Bay region raise the concern that mercury methylation may increase, thereby increasing the amount of mercury entering the food web (LFR 2002). <u>On the other hand, such restoration presents a potential opportunity to accelerate achievement of TMDL targets and to reduce ecological risks through carefully considered sequestration of mercury-laden sediment in restored wetlands.</u>
> Implementation tasks related to wetlands focus on managing existing wetlands and ensuring that new constructed wetlands are designed such that methylmercury production and subsequent transfer to the food web are minimized.

Integrate the TMDL Effort with Other Water Quality Programs – non-cover criteria
Comment Letter Page 5

Comment: *The Port asks that we consider modifying the wetland non-cover criteria for mercury and PCBs.*

Response: The comment does not relate primarily to the mercury TMDL, but rather to adjustment of non-cover criteria. There are many factors to consider in making this sort of change, and the TMDL is only one. We will work with Water Board water quality programs to ensure that regulatory decisions are consisted with this TMDL.

Integrate the TMDL Effort with Other Water Quality Programs – CTR
Comment Letter Page 6

Comment: *The Port asks that we consider modifying the CTR provisions to allow higher concentrations as part of either sediment cleanup or habitat restoration.*

Response: USEPA promulgated the CTR, and it is not within our authority to revise it. Moreover, this comment does not relate primarily to the mercury TMDL. Again, there are many factors to consider in making this sort of change, and the TMDL is only one. We will work within the various Water Board water quality programs to ensure that regulatory decisions are consisted with this TMDL.

Integrate the TMDL Effort with Other Water Quality Programs – contaminated sites
Comment Letter Page 6

Comment: *The Port asks that we consider the habitat value of contaminated sites at the Bay Margin. Some sites have substantial habitat value despite elevated levels of mercury or other contamination. The Port suggests a careful look at remediation sites to determine whether the levels of contamination constitute sufficient ecological risks to warrant habitat loss through remediation.*

Response: Bay margin site cleanups already include consideration of habitat value and ecological risk in determining cleanup goals, and the TMDL does not preclude this from continuing. Therefore, it is unnecessary to reiterate the need for such consideration in the TMDL.

Bay Planning Coalition, Ellen Johnck

Comment: *We are concerned about how the RWQCB defines ambient conditions in the context of a concentration-based allocation. As applied to dredged material disposal decision-making, this definition of ambient must be (1) scientifically accurate, reflecting the variable and dynamic conditions of the Bay; (2) integrated with and consistent with the philosophy and regulatory decision-making guidance applied by the Dredged Material Management Office (DMMO) – the collection of regulatory agencies that permit dredging activities in the Bay – and their determination of suitability for in-bay disposal; and (3) achievable in terms of analytical methodologies.*

Response: Other commenters have raised a similar concern and our response is on page 99. Note that TMDL allocations and their implementation need not, by law or statute, comply with the conditions set forth in the comment. However, it is likely that the definition of "ambient" proposed to implement the concentration-based allocation does accomplish these goals. See page 99.

Comment: *We recommend that you return to the LTMS implementation strategy as a basic tool for the purpose of the TMDL as distinguished from relying on a concentration-based limitation.*

Response: We anticipate that when the LTMS is fully implemented, the net effect of dredging and disposal activities will be a larger net loss of mercury than at present (prior to full LTMS implementation). However, if the TMDL were to rely exclusively on LTMS implementation as the means to assign and implement the allocation for dredged material disposal, the LTMS disposal goals would become regulatory requirements in dredged material disposal permits. In such case, exceedance of the LTMS in-bay disposal targets could constitute permit violations and, thus, reduce flexibility in the manner of accomplishing the LTMS goals. The TMDL can achieve water quality standards without making the LTMS a regulatory requirement so the reduced flexibility in LTMS implementation is not justified.

Comment: *The Mercury TMDL implementation plan proposes the imposition of new requirements on dredging permits "…to investigate the potential for dredging to enhance mercury uptake into the food web." We would be opposed to additional permit requirements, as permittees are already contributing to the Bay scientific knowledge base through their mandatory financial contributions to the S. F. Estuary Institute's Regional Monitoring Program (RMP). While we understand the need to determine the impact of mercury on Bay health, we recommend that it may be more appropriate that general studies be conducted and funded by established programs such as the RMP.*

Response: We do propose adoption of the cited permit requirements as requirements. The Water Board recognizes that permittees are already supporting monitoring and special studies through the RMP, and continued support of such efforts will likely satisfy the requirements to investigate the role of dredging in food web mercury uptake. To clarify that the special studies called for here and elsewhere in the implementation plan can either be conducted by the dischargers themselves or through jointly-funded efforts (e.g., RMP), we will make the following changes throughout the Staff Report.

Staff Report page 68:

iv) Conduct or cause to be conducted studies aimed at better understanding mercury fate, transport, and biological uptake in San Francisco Bay and tidal areas.

Staff Report page 75:

- Conduct or cause to be conducted studies to better understand mercury fate, transport, and biological uptake in San Francisco Bay and tidal areas (this requirement can be satisfied by supporting or conducting investigations that result in this information being made available to the Water Board beginning with the first adaptive implementation review);
- Conduct or cause to be conducted studies to evaluate the presence or potential for local effects on fish, wildlife, and rare and endangered species in the vicinity of wastewater discharges; and

Staff Report page 77:

- Conduct or cause to be conducted studies to understand mercury fate, transport, and biological uptake in San Francisco Bay and tidal areas (this requirement can be satisfied by supporting or conducting investigations that result in this information being made available to the Water Board beginning with the first adaptive implementation review);
- Conduct or cause to be conducted studies to evaluate the presence or potential for local effects on fish, wildlife, and rare and endangered species in the vicinity of industrial wastewater discharges; and

Staff Report page A-9:

i) Conduct or cause to be conducted studies aimed at better understanding mercury fate, transport, and biological uptake in San Francisco Bay and tidal areas;

Staff Report page A-11:

- Conduct or cause to be conducted studies aimed at better understanding mercury fate, transport, and biological uptake in San Francisco Bay and tidal areas;
- Conduct or cause to be conducted studies to evaluate the presence or potential for local effects on fish, wildlife, and rare and endangered species in the vicinity of wastewater discharges; and

Staff Report page A-12:

- Conduct or cause to be conducted studies aimed at better understanding mercury fate, transport, and biological uptake in San Francisco Bay and tidal areas;
- Conduct or cause to be conducted studies to evaluate the presence or potential for local effects on fish, wildlife, and rare and endangered species in the vicinity of wastewater discharges; and

Staff Report page A-13:

As part of this demonstration, the Waste Discharge Requirements for such operations shall include requirements to conduct or cause to be conducted studies to better understand how their operations affect mercury fate, transport, and biological uptake.

ENVIRONMENTAL COMMUNITY

San Francisco Baykeeper / Waterkeepers, Sejal Choksi

Introductory Comments
Comment Letter Page 1

The introductory comments refer to a number of issues we address individually below with respect to specific comments on those issues.

I.A. At-Risk Communities (and One-Box Model)
Comment Letter Pages 1-3

The comment addresses uncertainties associated with the modeling effort and the need to study and manage risks to San Francisco Bay fish consumers. We acknowledge that the one-box models we used to evaluate sediment and mercury sources and losses and foreseeable changes over time are simple. However, they allow us to identify and prioritize reasonable solutions without over-interpreting limited available data (see Staff Report pages 14-17 and 59-60). The information we have is not without uncertainty, and we have not attempted to understate the uncertainty. The models are sufficient, however, to determine that meeting water quality standards in San Francisco Bay is reasonably foreseeable (if the allocations are achieved), even though meeting standards will take many years. As a point of fact, our plan does not rely solely on natural attenuation to reduce mercury concentrations. We propose actual load reductions. At the same time, we cannot readily control certain processes, like bed erosion, which will continue to be a mercury source for many years.

We recognize the need to minimize risks to fish consumers until the proposed targets are achieved (see Staff Report page 81). We assume that subsistence fishers are at risk due to mercury impairment, and therefore, we do not need to study these risks in much further detail. We would prefer to focus attention on reducing such human health risks. That's why we included risk management actions in the proposed Basin Plan Amendment (see Staff Report page A-15). We agree that San Francisco Bay mercury impairment results in economic costs to the Bay Area because it compromises commercial and sport fishing. Addressing the mercury impairment offers economic benefits (see Staff Report page 106). We have incorporated risk management concepts into revisions made in response to other comments (see page 28). We will also change the text in the following ways (other related changes appear on page 111).

Staff Report page 69:

- Quantify the annual average mercury load ~~avoided~~ reduced by implementing (a) pollution prevention activities, and (b) source and treatment controls~~, and treatment efforts~~. The benefit of efforts to reduce mercury-related risks to wildlife and humans should also be quantified. The Water Board will recognize such efforts as progress toward achieving

the interim milestone and the mercury-related water quality standards upon which the allocations and corresponding load reductions are based.

Staff Report page A-9, following item "vii" (these revisions include those called for on page 77):

1) Quantify the annual average mercury load ~~avoided~~ reduced by implementing (a) pollution prevention activities, and (b) source and treatment controls~~, and treatment efforts~~. The benefit of efforts to reduce mercury-related risk to wildlife and humans should also be quantified. The Water Board will recognize such efforts as progress toward achieving the interim milestone and the mercury-related water quality standards upon which the allocations and corresponding load reductions are based. Loads reduced as a result of actions ~~The Water Board may recognize loads avoided resulting from activities~~ implemented after 2001 (or earlier if actions taken are not reflected in the 2001 load estimate) may be used to estimate load reductions. ~~as counting toward the load reductions consistent with the wasteload allocation.~~
2) Quantify the mercury load as a rolling five-year annual average using data on flow and water column mercury concentrations.
3) Quantitatively demonstrate that the mercury concentration of suspended sediment that best represents sediment discharged with urban runoff is below the suspended sediment target.

As for the correlation between total sediment mercury and mercury in fish tissue, a number of other stakeholders have expressed this concern. See our responses on pages 3 and 94.

I.B. Actions to Achieve Standards
Comment Letter Pages 4

This comment reiterates the need to focus on risk management (see above) and discusses (1) mine cleanups, (2) sediment remediation and mercury methylation, and (3) human health and wildlife risk mitigation.

Regarding mines, the comment requests that we take action to clean up mines that could discharge mercury to San Francisco Bay. It specifically mentions the New Almaden mine, the New Idria mine, and mines in Napa County and Marin County. We addressed the New Almaden mine through the Guadalupe River watershed load estimate, allocation, and implementation plan (see Staff Report pages 26, 54, 70, and A-10). We intend to drive significant reductions in mercury loads by implementing the Guadalupe River Mercury TMDL now in development. The New Idria mine lies within the jurisdiction of the Central Valley Regional Water Quality Control Board, which will oversee any cleanup at that site. Discharges from the New Idria mine may contribute to the Central Valley watershed load, for which we have proposed an allocation and implementation actions (see Staff Report pages 22, 53, 66, and A-8). As discussed on Staff Report

page 33, we don't know whether historic mines in Napa and Marin County are discharging mercury to San Francisco Bay, but we intend to find out. Our proposed implementation plan (Staff Report pages 79 and A-14) focuses attention on these mines to make sure that they do not contribute mercury to San Francisco Bay. We agree that various cleanup technologies are available, but we cannot select the strategy to be applied to each potential mine cleanup project.

Regarding cleanup of existing mercury-laden sediment and minimizing methylation, the comment says the Basin Plan should include innovative new techniques. As for sediment cleanups, we cannot specify the methods or means that dischargers may employ to meet their allocations. Dischargers may choose from the entire suite of available technologies, which is expected to expand with time. As for mercury methylation, we acknowledge that opportunities to reduce methylation exist, and we intend to promote them as more information becomes available (see Staff Report pages 80 to 81). Through the adaptive implementation process, we intend to incorporate innovative new ideas when appropriate (see Staff Report pages 82 and A-15).

Regarding human health and wildlife risks, the comment says we should mitigate existing risks by restoring wildlife habitats and assisting people who consume bay fish with dietary change and health monitoring. Our proposed implementation plan addresses risk management and wetland development (see Staff Report pages 80 to 83 and A-15). To clarify our commitment to mitigate human health and wildlife risks, we will change the Staff Report and Basin Plan Amendment as follows (other related changes appear on page 109):

Staff Report page 65:

> In addition to controlling mercury loads, a second objective of the implementation plan is to reduce the amount of mercury transformed to methylmercury, the most toxic form of mercury and the form most readily available for uptake by organisms and consequent risk to humans and wildlife exposed to methylmercury. Based on the discussion presented in Section 6, Linkage Analysis, intervention is possible at ~~two~~three points along the linkage between sources and targets. One point of intervention is the reduction of sources of mercury to San Francisco Bay. The second point of intervention is the reduction of the amount of mercury transformed to methylmercury. Improving our understanding and control of methylation will be important if load reduction efforts are to be effective. Controlling methylation should also guard against locally enhanced biological uptake near discharge locations. A third point of intervention is possible with respect to human risk in that methylmercury exposure can be reduced by limiting consumption of fish containing high concentrations of mercury.

Staff Report pages 81-82:

> Another implementation activity is to collaborate with other California agencies to help manage the risk to consumers of mercury-contaminated fish from San Francisco Bay. We envision a multi-phase process to develop a regional risk management strategy. The first phase should focus on identifying specific risk-management needs, the appropriate measures to address those needs, and the associated costs and mechanisms to implement the measures. In this effort, we will work with the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, and other organizations including dischargers that pursue risk management as part of their mercury-related programs. The risk management activities will include the following:
>
> 1. Providing multilingual fish-consumption advice to the public. Fish-consumption advisories can be effective for reducing exposure of humans to methylmercury. Existing and future monitoring data should be analyzed to determine what species of fish contain the highest amount of methylmercury. It may even be appropriate to develop information on replacement food sources for those subsisting on Bay fish. The ~~F~~fish consumption ~~advisories~~ advice ~~will be~~ prepared using such information should be communicated through a variety of mechanisms: direct outreach to the community, broadcast and print media, and signs posted at popular fishing locations.
> 2. Regularly informing ~~Transferring information to~~ the public about monitoring data and findings of environmental health professionals about the hazards of eating mercury-contaminated fish. It may be appropriate also to distribute information to health care providers serving impacted communities about how to recognize mercury-related health impacts. Monitoring data, combined with information from special studies, can be used to identify priority areas and target groups for outreach and education efforts, which should also communicate the health benefits of eating fish that contain less mercury. Here too the information needs to be conveyed to consumers of Bay fish through a variety of media and languages.

Staff Report pages 83 and A-16 (after item #3):

> 4. Are effective risk management activities in place to reduce human and wildlife exposure to methylmercury? If not, how should these activities be modified or enhanced?

Staff Report page A-5 (the Basin Plan Amendment):

> The San Francisco Bay mercury TMDL implementation plan has four objectives: (1) reduce mercury loads to achieve load and wasteload allocations, (2) reduce methylmercury production and consequent risk to

humans and wildlife exposed to methylmercury, (3) conduct monitoring and focused studies to track progress and improve the scientific understanding of the system, and (4) encourage actions that address multiple pollutants.

Staff Report Page A-15:

In this effort, the Water Board will work with the California Office of Environmental Health Hazard Assessment ~~and~~, the California Department of Health Services, and dischargers that pursue risk management as part of their mercury-related programs. The risk management activities will include the following:

- Providing multilingual fish-consumption advice to the public to help reduce methylmercury exposure through community outreach, broadcast and print media, and signs posted at popular fishing locations;

We believe that the proposed level of emphasis on bay margin contaminated sites is appropriate, particularly since we have not confirmed that any such sites are substantial sources of mercury to San Francisco Bay (see Staff Report pages 33, 79, and A-14). As for strategies to hasten the pace of investigations and remediation, the proposed Basin Plan Amendment includes such requirements in its implementation plan for urban runoff, municipal wastewater, sediment dredging and disposal, and "new sources" (see Staff Report pages A-8 to A-15).

I.C. Message (Required Load Reductions)
Comment Letter Pages 5-6

The comment suggests that our efforts to keep dischargers "happy" compromise public health and the environment. We have met numerous times with both dischargers and the environmental community, and we take seriously the comments we receive from all stakeholders. Reviewing all stakeholder comments reveals that both dischargers and the environmental community have important concerns about the proposed TMDL. However, the proposed Basin Plan Amendment and Staff Report reflect our independent judgment and the proposed actions are within our jurisdiction.

The comment notes that we have not called for wastewater dischargers to reduce their loads. Reducing wastewater discharges is unnecessary because they are a relatively small contributor to the overall mercury load, most mercury in wastewater is already removed, and most importantly, San Francisco Bay can attain water quality standards without reducing wastewater loads.

The comment is incorrect when it states that dischargers that exceed their allocations will only need to write a report and not pay any fines. The Basin Plan does not specify enforcement actions the Water Board might take using its discretion and authorities. We cannot anticipate what enforcement actions the Water Board will deem appropriate if allocations are exceeded, but the report to which the proposed Basin Plan Amendment

refers relates to proposed wastewater concentration triggers. Exceeding a trigger would not necessarily indicate that water quality standards are violated. The triggers are intended to serve as an early warning system to identify any mercury discharges that could be rising before actually exceeding the allocations. When triggers are exceeded, we call for a study to find out why mercury concentrations are high and what can be done (see Staff Report pages 75, 77, A-11, and A-12).

The comment states that all allocations should be zero until assimilative capacity is reached. Although allocations must be set to achieve water quality standards, they need not be zero, particularly when meeting the allocations will likely result in the eventual attainment of water quality standards. Moreover, allocations of zero cannot possibly be achieved. We considered lower allocation and faster implementation alternatives to the proposed Basin Plan Amendment (Staff Report pages 98 to 101), but these options do not meet the project's objectives. Lowering the allocations could result in regulatory requirements more stringent than necessary to address the water quality problem and require possibly unnecessary implementation activities. Moreover, lower allocations may be less feasible than the proposed Basin Plan Amendment or could be unreasonably costly for limited environmental benefit. Implementing the TMDL faster without improving our understanding of the system could also be unreasonably costly for limited environmental benefit.

I.D. Safety Net
Comment Letter Pages 6-7

These general statements about TMDL requirements being the Clean Water Act's safety net will be included in the administrative record. They do not require a response.

II.A. Implementation Time Frame
Comment Letter Pages 7-8

The comment objects to the 120-year implementation time frame. The proposed Basin Plan Amendment calls implementation actions to be phased in over a 20-year time frame. As discussed on Staff Report page 98, San Francisco Bay already contains so much mercury that it will take decades to reach the proposed targets, even if all mercury sources could be eliminated immediately. If the proposed TMDL is implemented, we expect San Francisco Bay to meet water quality standards within roughly 120 years (see Staff Report page 59). However, our expectation is based on an assumption that substantial load reductions can be achieved during the 20 years following TMDL adoption (see Staff Report pages 66 to 81). This is an aggressive schedule in light of the magnitudes of the necessary reductions.

The Clean Water Act does not dictate a time frame for recovery. The comment asserts that the TMDL violates State Implementation Plan requirements, but the State Implementation Plan applies to National Pollutant Discharge Elimination System (NPDES) permits for wastewater, not Basin Plan Amendments. As stated on page 19 of the State Implementation Plan, compliance with effluent limitations based on California

Toxic Rule numeric objectives (not TMDL allocations) is required within five years. The State Implementation Plan allows up to 20 years to develop TMDLs and comply with wasteload allocations derived from them. For this TMDL, allocated reductions will be phased in as soon as possible. Where reductions are very large, the TMDL calls for them to be phased in over time (50% in 10 years; 100% in 20 years). However, because we have not proposed that wastewater discharges be reduced, wastewater dischargers will be expected to comply with their allocations right away. Urban runoff permits do not contain numeric limits, and such limits are not currently proposed. Therefore, the State Implementation Plan's 20-year compliance schedule does not apply. Nevertheless, the TMDL implementation plan calls for the allocated reductions to be phased in over 20 years.

II.B. Allocations Without Assimilative Capacity
Comment Letter Pages 9-10

The comment asserts that wastewater and urban runoff allocations should be zero until assimilative capacity becomes available. We considered this alternative allocation scheme (Staff Report page 98), and found that it does not meet the project's objectives. It could result in regulatory requirements more stringent than necessary to address the water quality problem and require possibly unnecessary implementation activities. We agree that allocations are to be set at a level necessary to achieve standards. We propose real reductions: 24% for the Central Valley watershed, 48% for urban runoff, and 98% for the Guadalupe River watershed mining-related discharges. (Reducing wastewater discharges is unnecessary because they are a relatively small contributor, most mercury in wastewater is already removed, and San Francisco Bay can attain water quality standards without reducing wastewater loads.) However, regardless of whether we pursue the proposed allocations or a zero allocation alternative, San Francisco Bay will not meet water quality standards for many years. Therefore, the speed of recovery must be balanced against the feasibility of implementing the allocations, even if feasibility is not the primary aim.

The comment criticizes our proposal to evaluate compliance with some allocations using five-year averages. Because bioaccumulation is a long-term process that occurs over a number of years, short-term fluctuations in mercury inputs will not affect long-term trends in fish and wildlife concentrations. The use of five-year averages accounts for inter-annual variability in mercury inputs. If a source exceeds its allocation in one year, it must be smaller in the following years if it is to comply with the allocation over a five-year period. Five-year averaging offers no long-term advantages to dischargers, only short-term flexibility.

The comment objects to the lack of any implementation actions targeting bed erosion, but it offers no suggestion regarding what actions might be reasonable to pursue. Given the scale of bed erosion, we are currently unaware of any reasonable methods available to address this natural process. Addressing it could require substantial dredging of the bay floor, capping the floor with erosion-resistant material, or causing extreme sediment flows into the bay to ensure deposition. All these options would be phenomenal

engineering feats. None is feasible, and none is reasonable in light of the severe environmental harm that would be posed to San Francisco Bay's beneficial uses. The comment is incorrect in stating that we do not expect to see reductions in this source for 20 to 30 years. If fact, we conservatively assume that no reduction will occur for about 110 years (see Staff Report page 60).

The comment requests that the Basin Plan Amendment state that wastewater effluent limits based on the TMDL are not to replace more stringent water quality based effluent limitations or performance based limitations currently in place. We are not proposing this requirement because the Clean Water Act requires that water quality based effluent limitations be consistent with the assumptions and requirements of TMDL allocations. Allocations need not be based on existing water quality based effluent limitations or performance based effluent limitations. Allocations must be based on what is necessary to attain water quality standards. Therefore, wastewater effluent limitations based on the TMDL can replace existing limitations, even if the new limitations are less stringent than existing ones. (Refer to our response regarding backsliding on page 65.)

II.C. Individual and Aggregate Allocations
Comment Letter Pages 10-12

The comment asserts that the TMDL must name individual contributors within the Central Valley and Guadalupe River watersheds as sources and give them allocations. It also expresses concern that the individual source allocations for wastewater and urban runoff will not be enforced. The reason we did not assign allocations to individual contributors to the Central Valley and Guadalupe River watershed sources is not because of a lack of knowledge as the comment suggests. We did not break out these watershed sources any further because doing so would be unnecessary and inappropriate.

The Central Valley watershed is outside the Water Board's jurisdiction, and the individual contributors to this source are not, strictly speaking, sources of San Francisco Bay mercury. For example, wastewater treatment plants in the Central Valley watershed discharge mercury to Central Valley creeks and rivers, which in turn are San Francisco Bay mercury sources. More importantly, we grouped the sources according to how we intend to oversee TMDL implementation. Addressing the Central Valley watershed as a whole is a reasonable way to track this source while leaving the responsibility for meeting the TMDL allocation in the hands of the Central Valley Regional Water Quality Control Board, which is responsible for managing discharges in that region and is completing a number of mercury TMDLs.

Regarding the Guadalupe River watershed, the same rationale for not identifying individual contributors applies. These contributors discharge mercury to the river and its tributaries, not directly to San Francisco Bay. As with the Central Valley watershed, our Guadalupe River Mercury TMDL will assess the individual contributing sources and propose targets and allocations for these contributors.

Contrary to the comment, we are proposing individual allocations for Bay Area wastewater and urban runoff (see Staff Report pages A-5 to A-7). These allocations will be enforceable, and we will consider enforcement if the group allocations are exceeded. If the group allocations are not exceeded, then the combined loads are consistent with the TMDL assumptions and individual enforcement may not be an effective use of public resources. Contrary to the comment, group allocations will not remove incentives for individual reductions. They will, however, stimulate incentives for multi-party cooperation.

The comment interprets the Clean Water Act to require that permit limits be less than or equal to allocations, but this interpretation goes beyond the language of the Clean Water Act, which uses the term "consistent with." Regarding the report required if concentration triggers are exceeded, as discussed on page 113 above, the triggers are intended to serve as an early warning in the event that efforts are needed to avoid exceeding allocations. When specific concentration triggers are exceeded, dischargers will be required to explain why and propose measures to reduce effluent mercury concentrations.

II.D. Allocations to All Sources (i.e., Air Sources)
Comment Letter Pages 12-14

The comment calls for reducing the direct atmospheric deposition allocation. We are proposing an allocation equal to the existing load (Staff Report page 55). We are not seeking a load reduction because (1) it is not needed to meet the targets and (2) efforts are underway that will hopefully reduce atmospheric mercury concentrations. Load reductions are not required just because they may be feasible, particularly if the load reductions are not needed to meet proposed targets. Moreover, the comment does not indicate what a reasonable alternative allocation might be or how one might select it.

The Staff Report calls for investigating options for reducing atmospheric deposition (Staff Report pages 71 to 73 and A-13). It does not say that atmospheric deposition is uncontrollable. For example, it recognizes that crematoria emissions may decline over time as the use of amalgam dental fillings declines. It calls for investigating the fate of mercury in crude oil because crude oil processed in the Bay Area contains about 400 kg/yr of mercury and only about 1 kg/yr is discharged in wastewater (Staff Report pages 77 and A-12). Without a better understanding of the potential for refineries and automobile operations to release mercury into the air, allocating a specific mercury load is unreasonable. As for cement manufacturers, we chose not to propose load reductions at this time.

The comment asserts that the Water Board is authorized to control sources of atmospheric deposition. While the extent to which this is true could be debated, the important thing is that the State of California is authorized to control sources of atmospheric deposition, and working with our sister agencies (i.e., the California Air Resources Board and the Bay Area Air Quality Management District) is a sensible approach for controlling mercury emissions, if necessary.

The comment refers to the Pena Blanca Lake (Arizona) TMDL, where an allocation was reserved for atmospheric deposition. This is essentially what we have proposed. Although atmospheric deposition load reductions will be pursued where possible, we have not assumed that they will be realized. This results in a conservative allocation scheme because it does not assume that possible load reductions would actually occur.

In response to this comment, we are revising our proposal to clarify that the Water Board will consider assigning allocations and load reductions to individual air sources if such sources are found to contribute substantially to atmospheric deposition loads. We will revise the text on Staff Report page A-13 (the Basin Plan Amendment) as follows:

> …The load allocation does not allow an increase of current loads, and does not require a reduction from this source category at this time. ~~However, recent~~ Recent scientific studies suggest that mercury newly deposited from the atmosphere may be more available for biological uptake than mercury already present in an aquatic system….

We will make the following changes to both Staff Report page 73 and page A-13:

- The Bay Area Air Quality Management District should conduct a local mercury emissions inventory, investigate the significance of local mercury air emissions, ~~and~~ evaluate the effectiveness of existing ~~potential~~ control measures, and the feasibility of additional controls.

If local air sources are found to contribute substantially to atmospheric deposition loading to the Bay and its surrounding watershed, the Water Board will consider assigning allocations and load reductions to individual air sources and work with the Bay Area Air Quality Management District to ensure allocations are achieved.

II.E. Allocations to Other Watersheds
Comment Letter Pages 14-15

The comment requests that we allocate loads to specific Central Valley watershed dischargers. As discussed above on page 116, these contributors to the Central Valley watershed load are not technically sources of San Francisco Bay mercury since they do not discharge directly to San Francisco Bay. Therefore, we can reasonably group together all individual contributors to the Central Valley watershed source. Our approach makes sense because there is no need to go beyond our jurisdictional limits when the Central Valley Regional Water Quality Control Board will address these dischargers through its TMDLs. Our watershed-based allocation scheme also makes sense considering how we anticipate implementing the San Francisco Bay TMDL.

The comment expresses a concern that the Central Valley Regional Water Quality Control Board may not adopt TMDLs that meet the San Francisco Bay Regional Water

Quality Control Board's targets and allocations. This is unlikely because we have discussed our TMDL with Central Valley Regional Water Quality Control Board staff, and because the State Water Resources Control Board and USEPA must approve the Central Valley TMDLs. These agencies will ensure consistency with the San Francisco Bay TMDL.

The ability of the Central Valley Regional Water Quality Control Board to greatly accelerate its TMDLs is doubtful since its work is already underway and is already a high priority. Adopting the Central Valley TMDLs at the same time as the San Francisco Bay TMDL would greatly delay San Francisco Bay TMDL implementation. We are eager to adopt the San Francisco Bay TMDL so we can start enhancing our efforts to protect San Francisco Bay's beneficial uses.

Although the jurisdictional issue does not apply to the Guadalupe River watershed, the other issues pertaining to this source are essentially the same as those for the Central Valley watershed. For TMDL purposes, individual mercury dischargers within the watershed are not technically sources of San Francisco Bay mercury since they do not discharge directly to San Francisco Bay. Adopting the Guadalupe River Mercury TMDL at same time as the San Francisco Bay TMDL would delay San Francisco Bay TMDL implementation. We are diligently working on the Guadalupe River Mercury TMDL and see no reason to hold up the San Francisco Bay TMDL. Again, our watershed-based allocation scheme makes sense considering how we anticipate implementing the San Francisco Bay TMDL.

II.F. "Daily" Loads
Comment Letter Pages 15-16

The comment claims the Clean Water Act requires TMDLs to be expressed as daily loads. Code of Federal Regulations, Title 40, §130.2(i) states that TMDLs may be expressed in terms of mass per time, concentration, or any other appropriate measure. TMDLs need not be expressed as daily loads, and many TMDLs around the country are not expressed as daily loads. Our TMDL is expressed as an annual load with the understanding that the annual load represents a long-term average because the effects of mercury bioaccumulation occur over many years. Evaluating certain annual loads using a five-year average accounts for inter-annual variations. The use of five-year averages does not allow individual discharges to increase without posing serious consequences for future compliance. (We do not propose to use five-year averages to evaluate attainment of the wastewater allocations because those load estimates already account for inter-annual variability.)

Contrary to the comment's statements, the Clean Water Act does not require allocations to be expressed as daily mass limitations when incorporated into NPDES permits. Permit limitations must be consistent with TMDL allocations, but need not be the same as TMDL allocations, and as explained above, TMDL allocations need not be daily limits. The comments offer no rationale for requiring short-term limits in permits. Because mercury bioaccumulation is a long-term problem, and because we have expressed the

loads and allocations as annual loads, we see no reason to use shorter reporting periods. Small load fluctuations are likely to have no effect on overall mercury bioaccumulation within the food web. For wastewater, we do propose daily and monthly triggers as an early warning system to avert possible allocation exceedances (Staff Report pages 75, 77, A-11, and A-12).

The comment suggests that providing dischargers credit for load reductions implemented prior to TMDL adoption amounts to allowing backsliding. "Backsliding" refers to permit conditions that are less stringent than those preceding them, not changes in Basin Plan requirements. The proposed Basin Plan Amendment does not allow loads to increase. However, credit for loads reduced prior to TMDL adoption is reasonable in some cases, particularly where the source assessment is based on data collected long before TMDL adoption. For example, when the load estimate is based on data collected prior to 2001 (the case with urban runoff) and the discharger has since undertaken actions to reduce the load, credit for this early implementation is fair and reasonable because the source assessment did not otherwise account for such actions.

The comment objects to allowing discharges that meet the sediment target when assimilative capacity is unavailable. However, because sediment discharges that meet the target may bury higher-mercury sediment, and thereby reduce the potential for exposure, they contribute to the bay's recovery. The concern here appears to be the same as the one discussed above on page 115, specifically that all allocations should be zero until the targets are met. As explained above, this is unreasonable, infeasible, and unnecessary.

II.G. Margin of Safety
Comment Letter Pages 16-17

The comment asserts that the TMDL's inherent margin of safety is inadequate because allocations could be lower. Lowering the allocations would be equivalent to providing an explicit margin of safety by reserving a portion of the total maximum load. The comment assumes that additional reductions are possible and needed. The numerous comments from wastewater and urban runoff stakeholders question the feasibility of the proposed allocations (see page 13), much less the zero allocation scheme this comment promotes. More importantly, additional reductions are unnecessary to meet the targets, although they could speed the bay's recovery. TMDL requirements do not dictate San Francisco Bay's recovery rate under the TMDL.

The purpose of the margin of safety is to ensure that, when faced with uncertainties, targets will be met. We have shown that foreseeable sediment mercury concentrations will not only decrease to the sediment target but will likely continue to decline below the target (see Staff Report page 60). For this reason and the others explained on Staff Report page 61, the margin of safety is adequate.

II.H. Bird Egg Target
Comment Letter Pages 17-18

The comment misstates the proposed bird egg target as 0.5 ppm, which is the lowest mercury concentration where adverse effects have been observed in birds. The target is actually a concentration below 0.5 ppm. We prefer to propose a target equal to a concentration where no adverse effects have been observed (as the comment suggests), but a "no observed effects concentration" is not available. We propose to refine the bird egg target when such information becomes available.

Regarding the California clapper rail, a recent U.S. Fish and Wildlife Service report determined that the California clapper rail and all other Bay Area rare and endangered species, except perhaps the California least tern, would be protected if fish tissue mercury concentrations were to meet our proposed fish tissue target (USFWS 2003). Therefore, the proposed bird egg target applies only to the California least tern. Meeting the sediment mercury target (on which the allocations are based) will require a much greater reduction (about 50%) than meeting the bird egg target (at least 25%). Therefore, lowering the bird egg target will not necessarily affect allocations or speed San Francisco Bay's recovery. The recovery time relates to the success of implementation, and we recognize that it will take decades to reach the proposed targets.

II.I. Credits and Trading
Comment Letter Page 18

The comment lists a number of concerns about possible trading, credit, or offset programs. No such program currently exists, and we are not currently working to develop one. However, as stated on Staff Report page A-16, we propose that the Basin Plan be amended to allow us the flexibility to develop a watershed allocation program that includes incentives for agencies to work together to implement load reduction activities. We don't share the concern that dischargers could be confused and might act irresponsibly if we acknowledge the possibility of developing such a program. In response to some related comments, however, we are revising our proposal to clarify that the Water Board will encourage and consider a pilot mercury mass offset program under the specific condition that such a program is a more cost effective and efficient means of achieving water quality standards. For additional information, see our response on page 54.

III.A. California Environmental Quality Act
Comment Letter Pages 18-22

The comment claims that we inadequately complied with the California Environmental Quality Act (CEQA). We prepared the Staff Report in accordance with our administrative procedures, and it is a functional equivalent document, replacing the CEQA-required negative declaration or environmental impact report. Our analyses address the project's potential environmental impacts (Staff Report page 93 and

Appendix B), possible alternatives (Staff Report pages 93 to 101), and economic considerations (Staff Report pages 101 to 106).

The comment is correct in stating that CEQA defines significant effects as any substantial or potentially substantial adverse change. This means an activity would have a significant effect if it had the potential to degrade existing environmental quality. Both CEQA and our administrative procedures require that we answer the question "Will the project result in environmental conditions that are significantly worse than they are now?" In the case of the proposed Basin Plan Amendment, however, no foreseeable changes would significantly degrade environmental quality compared to existing conditions. In fact, the Basin Plan Amendment is designed to improve conditions by setting forth a plan to protect existing beneficial uses that are otherwise impaired. Although the comment lists a number of issues that supposedly suggest that the Basin Plan Amendment would leave beneficial uses unprotected, in no case does the Basin Plan Amendment worsen existing conditions. It would have no effect on the existing number of San Francisco Bay beneficial uses to be protected. The comment notes that the proposed Basin Plan Amendment would leave many impacts (e.g., water quality impairment) unmitigated for many years. However, the project would not cause or contribute to these existing conditions, and in time, it would eliminate them.

The comment claims that the Staff Report fails to identify and mitigate significant environmental impacts, but the Environmental Checklist (Staff Report Appendix B) explains why adopting the Basin Plan Amendment would not result in any significant adverse environmental impacts. The Staff Report considers the potential for impacts to human health and ecological resources (see Staff Report pages B-16 to B-23). Although the comment expresses a desire that we evaluate the risks associated with continued impairment, CEQA does not require this. Nevertheless, the problem statement (Staff Report pages 6 to 8) summarizes these risks. Further review of existing risks to communities that eat fish, swimmers, and threatened and endangered species, or existing cumulative risks related to mercury throughout California, is unwarranted at this time for the purpose of adopting the mercury TMDL.

Although the comment asserts that the Staff Report fails to adequately describe the environmental setting, under CEQA, the description of the setting need be no longer than necessary to understand the significant project effects. The Staff Report (pages 4 to 13 and B-12 to B-15) sufficiently describes the proposed project and existing San Francisco Bay conditions to allow consideration of potential environmental impacts. Describing pollution and beneficial uses throughout the rest of California is unnecessary because such issues are beyond the scope of this TMDL.

If we were to identify significant adverse environmental impacts that could not be mitigated, then before the Water Board could adopt the proposed Basin Plan Amendment, it would have to adopt findings to the effect that the project's benefits outweigh its unavoidable impacts (i.e., a statement of overriding considerations). However, the project would not cause any significant unavoidable adverse environmental impacts, so a statement of overriding considerations is unnecessary. Nevertheless, our analysis of

economic considerations (Staff Report pages 101 to 106) facilitates some understanding regarding the balance between economic considerations and the potential for environmental benefits.

III.B. Adaptive Management
Comment Letter Pages 22-23

We agree with the comment to the extent that adaptive implementation will require a commitment of Water Board staff and resources to be successful. However, the comment describes our adaptive implementation approach as potentially using uncertainties associated with the mercury problem to excuse inaction. The proposed Basin Plan Amendment sets forth a number of actions, not the least of which is calling for substantial reductions in Central Valley watershed, urban runoff, and Guadalupe River watershed mercury loads. The comment states that uncertainty should not be used as a reason to postpone cost-effective measures to prevent environmental degradation, but it offers no evidence to suggest that additional measures not already included in the Basin Plan Amendment would be feasible, much less cost-effective. As for references to stakeholder involvement and disclosure, we intend to implement the TMDL with the same type of openness we have demonstrated throughout this Basin Plan Amendment process. We have held numerous stakeholder meetings, particularly through the Mercury Watershed Council forum, and we disclose all information available to us.

III.C. Key Points
Comment Letter Pages 23-24

The key points summarize previous comments, referring to discharges being allowed to continue, cleanup efforts being inadequate, and the TMDL being impossible to enforce. These concerns are addressed above on pages 110, 113, and 116. The comment lists the following actions for us to take, and we have responded above to these concerns:

- Assign individual daily allocations of zero. (See our responses on pages 113, 115, and 119.)
- Manage atmospheric deposition, Central Valley watershed, and Guadalupe River watershed sources. (See our responses on pages 117 and 118.)
- Assign penalties for not complying with allocations and use fines for cleanups. (See our response on page 113.)
- Implement actions to address bed erosion. (See our response on page 115.)
- Manage risks to humans and wildlife. (See our responses on pages 109 and 110.)
- Delete references to a pollutant trading program. (See our response on page 121.)

Save the Bay, David Lewis

Comment: *The commenter notes that the TMDL is to be reviewed approximately every five years to evaluate new information relative to adaptive implementation. The commenter states that this proposed review schedule may be too rigid to provide timely response to new information that could be acted on relatively quickly with benefit to the*

Bay. The commenter suggests a review schedule should be devised that is more sensitive to the potential for new information related to mercury contamination and removal in San Francisco Bay. This could be accomplished by ramping the review over a twenty-year period, perhaps having more frequent review in the first ten years. Alternatively, instead of a set time period, the review could be triggered by new data of significance to the control of mercury or regarding the process of mercury methylation in wetland sediments.

Response: Decisions regarding the TMDL review schedule must balance essentially three factors: (1) the need to respond quickly to relevant information; (2) the pace at which relevant information is likely to be generated; and (3) available staff resources for conducting the reviews and taking the appropriate steps to respond accordingly. Regarding the first factor, we want to act as quickly as possible to incorporate relevant information into the TMDL plan when it becomes available. However, regarding the second factor, the studies necessary to address the remaining scientific complexities will likely take place over many months to years. For reasons having to do with spatial extent and degree of mercury contamination, San Francisco Bay will not likely respond quickly to measures to reduce mercury loads or methyl mercury production. This suggests that new, reliable, and relevant scientific information upon which to adapt the TMDL will not be available continuously, but rather periodically over time. Regarding the last factor, when new, reliable, and relevant information supports an adaptation to the TMDL and implementation plan, most substantive changes to the TMDL must be made through a Basin Plan Amendment, a relatively resource and time consuming process. Therefore, the proposed schedule to adapt the TMDL to new information approximately every five years is an appropriate balance of these three factors.

FEDERAL AGENCIES

U.S. Environmental Protection Agency, Alexis Strauss

Introductory Comments
Comment Letter Page 1

The introductory comments refer to a number of issues we address individually below with respect to specific comments on those issues.

Concerns About TMDL Provisions
1. Compliance with Numeric Water Quality Standards
Comment Letter Pages 1-2

USEPA questioned whether the proposed targets are sufficient to attain water quality standards, particularly the Basin Plan's four-day average total mercury objective of 0.025 µg/l. The proposed targets are consistent with water quality standards, including the total mercury objective of 0.025 µg/l that applies north of the Dumbarton Bridge. The comment notes that the criteria document on which the Basin Plan objective is based, *Ambient Water Quality Criteria for Mercury—1984*, states that this concentration should not be exceeded more frequently than once every three years. The Basin Plan, however, does not refer to this exceedance frequency. This frequency is typically associated with the protection of aquatic life. The criterion, however, is based on human consumption. Therefore, the appropriateness of the exceedance frequency in this context is questionable.

The criteria document does include information useful in applying the objective. As indicated on Staff Report page 40, the objective is derived from the U.S. Food and Drug Administration's action level for mercury in commercial fish and shellfish (1.0 ppm) and a bioconcentration factor of 40,000. Because the proposed fish tissue target (0.2 ppm) is only one fifth of the U.S. Food and Drug Administration action level, it is consistent with the objective. The criteria document provides additional guidance:

> …existing discharges should be acceptable if the concentration of methylmercury in the edible portion of exposed consumed species does not exceed the FDA action level.
>
> …If the four-day average concentration exceeds 0.025 µg/L more than once in a three-year period, the edible portion of consumed species should be analyzed to determine whether the concentration of methylmercury exceeds the FDA action level.

As explained in the Staff Report (pages 84 and A-3), we intend to measure methylmercury concentrations in consumed fish and compare the observed concentrations with the proposed fish tissue target, which is far lower than the U.S. Food

and Drug Administration action level. In this way, we will ensure that San Francisco Bay meets water quality standards.

2. Individual Waste Load Allocations
Comment Letter Page 2

The comment asks that we clarify our intent to propose that the Water Board adopt the individual wasteload allocations listed in Tables 4-w, 4-x, 4-y, and 4-z (Staff Report pages A 5 to A-7). We propose to adopt these individual wasteload allocations, and for clarity, we will revise the table titles in the proposed Basin Plan Amendment as follows:

> Table 4-w: Individual Wasteload Allocations for Urban Storm Water Discharges
>
> Table 4-x: Individual Wasteload Allocations for ~~Individual~~ Municipal Wastewater Discharges
>
> Table 4-y: Individual Wasteload Allocations for ~~Individual~~ Petroleum Refinery Wastewater Discharges
>
> Table 4-z: Individual Wasteload Allocations for ~~Individual~~ Industrial (Non-Petroleum Refinery) Wastewater Discharges

We will also modify the titles of Tables 7.2, 7.3, 7.4, and 7.5 on Staff Report pages 55 and 57 to 59, as well as the table of contents.

> Table 7.2: Proposed Individual Wasteload Allocations for Urban Storm Water Runoff Discharges
>
> Table 7.3: Proposed Individual Wasteload Allocations for ~~Individual~~ Municipal Wastewater Discharges
>
> Table 7.4: Proposed Individual Wasteload Allocations for ~~Individual~~ Petroleum Refinery Wastewater Discharges
>
> Table 7.5: Proposed Individual Wasteload Allocations for ~~Individual~~ Industrial (Non-Petroleum Refinery) Wastewater Discharges

3. Apparent Allowance for Growth in Industrial Point Source Discharges
Comment Letter Pages 2-3

The comment points out that we rounded the wasteload allocations for the industrial wastewater groups in a manner that could be construed to allow these loads to increase. In response to comments received from the municipal and industrial wastewater community, we have recomputed current performance levels for industrial and petroleum refinery wastewater discharges using the 99% upper confidence limit of the mean over

the period 2000-2003. This approach results in group mass allocations of 3 kg/year for industrial and petroleum refinery wastewater discharges combined after rounding to the nearest kilogram. (We neglected to include the load from C&H Sugar in the April 30 report, so the combined industrial and wastewater load is higher than previously stated—see page 150.) We find it reasonable and appropriate to round to the nearest kilogram in light of the very small contribution to total loading from these discharge categories. The load for the combined industrial and petroleum refinery wastewater group is 3.2 kg/yr, so we round the allocation *down* to 3 kilograms for the purpose of allocating to individual facilities. More importantly, we consistently rounded to the nearest kilogram for every other source category. Expressing allocations in whole kilograms is appropriate and convenient considering that the total load is over 1,200 kilograms. We find it appropriate to combine the mass limits to form a group mass limit of 3 kg/year that would apply to the all refinery and other industrial wastewater discharges combined.

In the future, wasteload allocations may be adjusted such that some loads may increase and others decrease as long as such changes are consistent with the requirement that the TMDL results in attainment of applicable water quality standards. Of course such modifications would be performed through a Basin Plan Amendment process subject to State Board, Office of Administrative Law, and USEPA approval. In the meantime, individual wasteload allocations will appear in NPDES permits for wastewater discharges but will be enforced only if the group mass allocation is exceeded.

Concerns About NPDES Permitting Provisions
1. Absence of Individual Water Quality-Based Effluent Limitations
Comment Letter Page 3

The comment questions whether permits will include individual water quality-based effluent limitations (WQBELs). The individual wasteload allocation, expressed as a yearly mass limit, will constitute the WQBEL for each wastewater facility when we implement the TMDL through NPDES permits. The sum of the individual wasteload allocations will be the group mass allocation. The individual WQBEL for each facility will be an enforceable limit if and only if the group mass allocation is exceeded. Because the individual WQBELs are equivalent to the individual wasteload allocation and sum to the group allocation, they are manifestly and explicitly consistent with the assumptions and requirements both of the individual wasteload allocations and group wasteload allocation.

The statement that the "Water Board will consider enforcement against those facilities that exceeded their individual allocation" is in the Staff Report (page 74) and not part of the proposed Basin Plan Amendment. However, the statement is only intended to express that the Water Board has discretion regarding enforcement.

2. Storm Water Provisions
Comment Letter Pages 3-4

The comment communicates two concerns: (1) that evaluating compliance with allocations using five-year averages is inconsistent with NPDES regulations, and (2) that relying only on narrative requirements for NPDES permits requires more proof that allocations will be met. The five-year averaging period is appropriate for storm water discharges because the high inter-annual variability of the Bay Area climate results in high inter-annual variability in storm water loads (SFEI 2003b). The storm water mercury load estimates are based on long-term sediment load estimates and bed sediment mercury concentrations that likely integrate conditions over several years. The group allocation is based on a long-term sediment load estimate and the suspended sediment target. Hence, the allocation represents a long-term average, so mercury loads used to assess compliance with the allocations should similarly be long-term average loads.

The five-year averaging period is consistent with NPDES regulations because it is impracticable to assess storm water loads on a daily, weekly, or monthly basis. Storm water loads are most pronounced in the rainy season and, in contrast to the continuous discharge of wastewater, are extremely episodic. It is impracticable to define a typical daily, weekly, or monthly storm water load. Moreover, it is impracticable to define a typical yearly load without considering the high degree of inter-annual variability. Because we do not yet have sufficient information to quantify the degree of inter-annual variability as we do for wastewater, we have instead chosen to assess compliance with an averaged load to account for this variability.

We expect that, for storm water, implementing all technically and economically reasonable control measures will be sufficient to implement the wasteload allocations. The Basin Plan Amendment does more than merely propose narrative requirements for storm water discharges. The amendment defines the acceptable quantitative methods that storm water programs will use to demonstrate achievement of the numeric allocations or progress toward such allocations. In essence, the Water Board places upon the discharger the burden of proving that a BMPs approach is sufficient to implement the allocations. The Water Board cannot specify the actual measures or BMPs such programs must implement to meet the allocations, nor would it be possible to do so because of the variety of approaches that may be employed to address such sources. Discretion regarding which approach is appropriate for an individual discharge and program area should remain with the discharger.

3. Averaging Period for Municipal, Industrial and Storm Water Discharges
Comment Letter Page 4

The comment requests that the averaging period for storm water discharges be changed from five years to one year to be consistent with the averaging period for wastewater discharges. The discussion in response to the previous comment concerns the impracticability of employing daily, weekly, monthly, or yearly loads for storm water discharges. Storm water allocations represent yearly loads averaged over a number of

years. Thus, assessing compliance using data averaged over a specific number of years is manifestly and explicitly consistent. Storm water discharges are by their very nature short-term spikes in loads. That is why it is impracticable to assign meaningful short-term allocations to such discharges. (Code of Federal Regulations, Title 40, §122.45(d) [cited in the comment] is not relevant to storm water discharges because they are not continuous discharges.)

The NPDES permits for wastewater sources will contain a method for determining compliance with the annual limits. As stated above, the individual allocations will constitute the individual WQBELs and will thus be consistent with the assumptions and requirements of the wasteload allocations. It is unnecessary to assess compliance with the annual allocations on a monthly, weekly, or daily basis. In fact, such interim compliance determination would be inconsistent with the requirements and assumptions of the allocations, which are expressed as yearly loads.

4. Pollution Prevention Language
Comment Letter Pages 4-5

The comment expresses a concern that required pollution prevention measures will be commensurate with discharge volumes. We share an interest in ensuring that strong pollution prevention efforts are maintained. However, we prefer to sustain our current pollution prevention language that links level of effort to the discharge volume of a facility for the following reasons. First, large facilities emit more pollutants so there is potentially more to be gained from pollution prevention efforts taken by large facilities. Second, discharge volume is a proxy for size of the program area, which, in turn, is a proxy for the resources available to a facility to accomplish its treatment, source control, and pollution prevention. The idea that level of effort should be commensurate with facility size is an implicit reference to an effort underway to identify appropriate source control activities for facilities of different size categories. This identification effort is based on the recognition that it is unreasonable to require the same level of effort from a small facility as it is a large facility. Therefore, it is appropriate that facilities be compared to other comparably sized facilities to assess the sufficiency of their pollution prevention program efforts. Moreover, our proposed language is consistent with the language the comment suggests in that the concept of feasibility implies consideration of resources available to address source control. For clarity, we will revise the text to also account for plant performance, as indicated on page 57.

U.S. Environmental Protection Agency, David Smith

After the close of the public comment period, USEPA provided some additional comments. We are including these comments in the administrative record. Our responses are below.

Pollutant Trading

Comment: *Permit limits need to be consistent with WLAs [wasteload allocations], changes in the individual mass limits in the permits would not be permissible absent changes in the individual WLAs in the TMDL. We have carefully reviewed the EPA trading policy and noted EPA's position regarding trading of bioaccumulative toxins such as mercury. The policy states that "EPA does not currently support the trading of pollutants considered by EPA to be persistent bioaccumulative toxics (PBTs)." We would recommend against attempting to provide for post-approval adjustments of WLAs in the mercury TMDL to accommodate trading of mercury discharges.*

Response: We do not propose any mechanism for adjusting wasteload allocations other than revising the TMDL through a Basin Plan Amendment.

Dredging and Disposal

Comment: *It appears that the treatment of dredged deposits in the Hg TMDL is not consistent with treatment of dredged deposits in the PCB TMDL. The PCB TMDL sets the allocation for dredged deposits based on dredge spoil volumes projected in the Long-Term Management Strategy for Placement of Dredge Material in the San Francisco Bay Region (LTMS) and the sediment targets set by the TMDL analysis, an approach that appears to be more protective than the approach proposed in the mercury TMDL. The mercury TMDL appears to set a concentration based allocation based on undefined "ambient" concentration. We recommend that you consider whether the mercury TMDL and dredged material allocations should be modified to reflect the more protective approach proposed in the PCB TMDLs.*

Response: We believe our approach is protective. The PCBs Project Report is intended to generate discussion, and the approach has not been fully considered or adopted. Unlike the mercury TMDL, a PCBs-related Basin Plan Amendment and Staff Report have not yet been drafted. The PCBs TMDL and the mercury TMDL are not substantively different in their assumptions and expectations. We believe it to be reasonably foreseeable that the dredgers will implement the LTMS on a voluntary basis, with or without the mercury TMDL. The PCBs TMDL is based on the same assumption; therefore, it is not more protective.

Comment: *The PCB TMDL analysis properly raises the concern that that disposal of dredged material is likely to spread the previously buried sediments and may result in increased availability of the pollutant. This possibility should also be addressed in the mercury TMDL.*

Response: We addressed this concern in the proposed Basin Plan Amendment (see Staff Report page A-13), and we will clarify the text as follows:

> The process of dredging and disposing of dredged material in the Bay may enhance biological uptake and methylmercury exposure. To address this

concern, permitted dredging and disposal operations shall demonstrate that their activities are accomplished in a manner that does not increase bioavailability of mercury. As part of this demonstration, the Waste Discharge Requirements for such operations shall include requirements to conduct or cause to be conducted studies to better understand how their operations affect mercury fate, transport, and biological uptake.

Comment: *It is unclear what "ambient concentration" means in the mercury TMDL. This concept, if retained, should be more carefully defined in the TMDL documents so that it can be implemented effectively in the future.*

Response: See the response to a Port of Oakland comment for clarification regarding what we mean by "ambient" concentration (page 99). Because dredged material predominantly consists of material already in the bay, to the extent that progress is made toward reducing the suspended sediment concentrations, the mercury concentration in dredged sediment will decrease as well—eventually reaching the suspended sediment target when the sediment target is reached on average in the bay. Our intent is to allow dredging and disposal to continue (subject to Dredged Material Management Office review and consistent with the LTMS) unless the mercury concentration in dredged material is clearly above ambient conditions. In such cases, out-of-bay disposal is appropriate.

Comment: *It is unclear whether the treatment of the dredged deposits in the mercury TMDL is consistent with the LTMS.*

Response: The proposed Basin Plan Amendment does not affect existing Basin Plan text concerning the LTMS. As discussed on Staff Report pages 31, 58, and 78, we believe it to be reasonably foreseeable that dredgers will implement the LTMS on a voluntary basis, with or without the mercury TMDL.

Comment: *The mercury TMDL appears to allow deposit of dredged material in concentrations greater than the TMDL's numeric sediment target. Why is this permissible and protective? How does this approach ensure that no adverse localized effects will occur in the future as a result of deposition of dredged materials containing mercury concentrations greater than the numeric target?*

Response: The mercury concentration in dredged material disposed of in San Francisco Bay can exceed the suspended sediment target as long as it is consistent with the allocation (and remains a net loss). Moreover, in this case, the dredged material mercury concentration, which reflects *bed* sediment, cannot be compared directly to the *suspended* sediment target. In the context of dredged material disposal, "baywide ambient mercury concentration" refers to bed sediment, not suspended sediment. We expect that as San Francisco Bay approaches the suspended sediment target, mercury concentrations in dredged material will also approach the target. See the response to a Port of Oakland comment for clarification regarding what we mean by "ambient" concentration (page 99).

Comment: *The proposed concentration-based allocation approach may not meet TMDL requirements because this source is not included in the formal TMDL load or wasteload allocations. Under EPA regulations, the TMDL (loading capacity) is the sum of the allocations. This source should be explicitly included in the allocations.*

Response: The TMDL is the sum of the allocations for each source. Dredging and disposal is a net loss; therefore, it is not included in the sum. To clarify that the allocation for dredging and disposal (which always occur together), we will explicitly state that the allocation for this combined process is 0 kg/yr and revise the text in the following places:

Staff Report Table S.2, page S-2:

Sediment Dredging and Disposal	net loss	0 ≤ ambient concentration

Staff Report Table 7.1, page 52:

Dredging and Disposal	net loss	0 ≤ ambient concentration

Staff Report page 58:

> …To ensure that dredging and dredged material disposal (which always occur together) continue to represent a net loss of mercury from the bay, both a mass-based and a concentration-based allocation are ~~is~~ proposed.

Staff Report page 63:

> To reach the proposed suspended sediment target and attain water quality standards, the proposed load and wasteload allocations are as follows: bed erosion, 220 kg/yr; Central Valley watershed, 330 kg/yr; urban storm water runoff, 82 kg/yr; Guadalupe River watershed (mining legacy), 2 kg/yr; atmospheric deposition, 27 kg/yr; non-urban storm water, 25 kg/yr; ~~and~~ wastewater, 16 kg/yr; and dredging and disposal, 0 kg/yr.

Staff Report page 78 (box):

> ~~Projected net loss~~ Allocation: ~~- 430 kg Hg /yr~~ 0 kg Hg/yr

Staff Report page 78 (text) (refer to our response on page 99 for an explanation of the additional changes):

> The proposed allocation for sediment dredging and disposal is both mass-based and concentration- based. ~~requires that the~~ The mercury concentration in dredged material disposed of in the bay must not exceed the 99th percentile mercury concentration of the previous 10 years of Bay sediment samples collected through RMP (excluding stations outside the Bay like the Sacramento River, San Joaquin River, Guadalupe River and Standish Dam stations) ~~Baywide ambient median suspended sediment mercury concentration from all RMP Bay monitoring stations~~.

Staff Report page 96:

> Table 9.1 lists the alternative allocations, and Figure 9.1 illustrates differences among current loads, proposed allocations, and the proportional alternative. (The dredging and disposal allocation is not shown because dredging and disposal is a net loss.)

Staff Report Table 4-v, page A-4 (Basin Plan Amendment):

Sediment Dredging and Disposal	net loss	0 ≤ ambient concentration

Staff Report Table 4-v, page A-4 (footnote "c"):

> [c] Sediment dredging and disposal often moves mercury-containing sediment from one part of the Bay to another. The dredged sediment mercury concentration generally reflects ambient conditions in San Francisco Bay sediment. This allocation is both mass-based and concentration-based. The allocation will be implemented by confirming both that the combined effect of dredging and disposal continues to be a net loss and that the mercury concentration of dredged material disposed in the Bay must be at or below the Baywide ambient mercury concentration. This allocation ensures that this source category continues to represent a net loss of mercury.

Staff Report page A-13 (refer to our response on page 99 for an explanation of the additional changes):

> The allocation for sediment dredging and disposal is both mass-based and concentration- based. ~~requires that the~~ The mercury concentration in dredged material disposed of in the Bay shall not exceed the 99th percentile mercury concentration of the previous 10 years of Bay sediment samples collected through RMP (excluding stations outside the Bay like the Sacramento River, San Joaquin River, Guadalupe River and Standish Dam stations).~~Baywide~~

~~ambient median suspended sediment mercury concentration from all RMP Bay monitoring stations~~.

Comment: *Treatment of dredged deposits in the Mercury TMDL is not consistent with treatment of air deposition in the same TMDL (where the source is given a mass-based allocation and is included in the TMDL equation, even though evaporation is greater than deposition). Is this difference in approaches reasonable?*

Response: Our treatment of dredging and disposal is comparable to our treatment of bed erosion, which consists of erosion and accretion terms. Our treatment of atmospheric deposition and evaporation is an exception, but this difference in approaches seems reasonable. Dredging and disposal always occur together. Bed erosion and accretion always occur together. Atmospheric deposition and evaporation are entirely separate processes that are independent from one another. Deposition relates to air sources. Evaporation relates to the fate and transport of mercury in the bay. The two processes are not directly linked.

U.S. Geological Survey, Alexander Wood

The comment seeks to replace a cited reference with a more up-to-date version. We will replace the citation as follows.

Staff Report page 108:

> ~~Central Valley Regional Water Quality Control Board (CVRWQCB) 2003. *Economic Analysis for the Sacramento-San Joaquin Delta Estuary Mercury TMDL*, prepared by A. Wood, U.S. Geological Survey, May, pp. 1 to 34 and 41 to 71.~~

Staff Report page 118:

> U.S. Geological Survey (USGS) 2003c. *Remediation Control Strategies and Cost Data for an Economic Analysis of a Mercury Total Maximum Daily Load in California*, open file report 03-284, prepared by A. Wood, pp. 1 to 11.

As a result of updating this citation, we will change Staff Report page 101 as follows:

> …As shown in Table 9.2, the Central Valley Regional Water Quality Control Board has estimated unit costs for a number of mercury reduction options (~~CVRWQCB~~ USGS 2003c).

As a result of updating this citation, we will also change Staff Report Table 9.2 (page 103) as follows to reflect the content of the newer report:

Mercury Mine Site Cleanup	$0.93 ~~520~~	$16 ~~15,000,000~~	per cubic yard ~~acre~~
~~Mercury Site Cleanup~~	~~$270~~ ~~$92,000~~	~~$3,100,000~~ ~~$1,200,000~~	~~per cubic yard~~ ~~per acre~~
~~Non-Mercury Mine Site Cleanup*~~	~~$13,000~~ ~~$2.40~~ ~~$8.00~~	~~$640,000~~ ~~$79~~ ~~$1,200~~	~~per acre~~ ~~per ton~~ ~~per cubic meter~~
Mercury Control (i.e., keeping mercury out of water body)	$0.32 $2.70 $320	$2,200 $60 $8,600	per ton per pound per kilogram mercury
Erosion Control (i.e., keeping sediment out of water body)	~~$25~~ $760 $41	~~$230~~ $900,000 $200	~~per cubic yard~~ per acre per cubic meter
Ecosystem Modification	$2,500 $300,000 $2,800	$22,000 $3,900,000 $150,000	per gallon/minute per study per acre
Wastewater Treatment Plant Activities (i.e., pollution prevention or treatment)	$75,000	$3,600,000	per million gallons/day

PUBLIC HEARING COMMENTS

Responses to public comments from the June 16, 2004 hearing are below. The responses are keyed to the hearing transcript.

A) Santa Clara County Parks and Recreation Department, Lisa Killough
Transcript page 40

A-1 Ms. Killough spoke of concerns that the TMDL focuses on total sediment mercury despite the intent to reduce bioaccumulation of methylmercury. She asserted that no relationship exists between total mercury and methylmercury. Our response is on pages 75 and 94.

A-2 Ms. Killough questioned the feasibility of attaining the proposed allocations and suggested that more certainty is needed before embarking on a 20-year implementation plan. Our response is on page 77.

A-3 Ms. Killough took issue with the relatively large mercury load reduction required from the Guadalupe River watershed given that much of this mercury is believed to occur naturally. Our response is on page 86.

A-4 Ms. Killough questioned the approach of treating all of San Francisco Bay as one water body instead of addressing separate segments individually. Our response is on page 77.

A-5 Ms. Killough noted that Santa Clara County has spent over $6 million in remediation and the proposed Basin Plan Amendment does not provide any credit for activities that took place in the 1990s. Our response is on page 77.

B) Santa Clara Valley Water District, David Chesterman
Transcript page 44

B-1 Mr. Chesterman mentioned that time will be needed to resolve many remaining issues and that meeting water quality standards may require more resources than public agencies have. Therefore, TMDL implementation must focus on the most cost-effective measures. The adaptive management approach has worked well with other projects. Our response is on page 91.

B-2 Mr. Chesterman suggested that the TMDL overemphasizes sediment mercury and would be better if it focused more on methylmercury. He requested that the Basin Plan Amendment include ways to provide incentives for methylmercury control measures. He said studies will be needed to identify the most cost-effective measures. Our responses are on pages 91 and 94.

C) Central Contra Costa Sanitary District, James Kelly
Transcript page 48

C-1 Mr. Kelly asked that the Basin Plan Amendment provide credit for household hazardous waste collection programs and other source reduction programs. Our response is on page 54.

D) Bay Area Clean Water Agencies, Michelle Pla
Transcript page 50

D-1 Ms. Pla asked that the Water Board hold another public hearing so staff can respond to comments in an open forum. Our response is on page 1.

D-2 Ms. Pla recommended that the Basin Plan Amendment's proposed wastewater wasteload allocation be increased from 14 kg/yr to 17 kg/yr to accommodate growth. Our response is on page 45.

D-3 Ms. Pla requested that the Basin Plan Amendment specify a five-year averaging period for compliance with the categorical wastewater allocation. Our response is on page 48.

D-4 Ms. Pla asserted that the proposed individual allocations could penalize top-performing individual wastewater dischargers. Our response is on page 49.

D-5 Ms. Pla asked that staff consider technical reports prepared by the Clean Estuary Partnership, including its draft mercury source assessment, wastewater implementation, and inactive mines reports. Our response is on page 50.

E) San Jose, City of, Carl Mosher
Transcript page 55

E-1 Mr. Mosher noted that municipal wastewater is a relatively small source of San Francisco Bay mercury. He suggested that basing allocations on past performance, as proposed, provides a disincentive for dischargers to implement proactive pollution prevention programs. Moreover, he expressed concern that recent poor economic conditions have temporarily reduced mercury loads, and with foreseeable future economic improvement, the City of San Jose may not be able to meet its allocation. Our response is on page 59.

E-2 Mr. Mosher asserted that no linear relationship exists between total sediment mercury and methylmercury in fish tissue. He suggested that the TMDL could overstate the urban runoff contribution to the mercury problem. He also expressed concerns about implementation feasibility and costs. Our response is on pages 13, 59, and 94.

E-3 Mr. Mosher asked that we establish a process to reach agreement on mercury allocations and other TMDLs. Our response is on page 1.

E-4 Mr. Mosher requested that the Water Board take more time to complete the TMDL. He proposed forming a legacy pollution collaborative, supported by stakeholder partnerships, to reduce technical uncertainties and develop implementation strategies. Our response is on pages 1 and 59.

F) Bay Planning Coalition, Ellen Johnck

Transcript page 60

F-1 Ms. Johnck was pleased that the TMDL does not frame dredging and disposal as a net source of San Francisco Bay mercury. This comment does not require a response.

F-2 Ms. Johnck expressed concern regarding how a bay-wide ambient sediment concentration might be defined and requested that dredged material disposal decisions continue to be made through the Dredged Materials Management Office (DMMO). Our response is on pages 106 and 99.

F-3 Ms. Johnck asked that the Water Board continue to rely on the Long Term Management Strategy (LTMS) as the implementation tool. Our response is on page 106.

G) Environmental Law Foundation, Josh Berger

Transcript page 63

G-1 Mr. Berger noted that the TMDL implementation plan calls for certain actions related to inactive mines. He asked the following questions:

- Who at the Water Board has been assigned to these tasks?
- Is there a work plan?
- What funds are available?
- If no funds currently exist, what plans are there to obtain funds.

Response: The Water Board's North Bay and South Bay Watershed Divisions and Groundwater Protection and Waste Containment Division are responsible for implementing the Mines Program described in the Basin Plan. We do not have staff resources to specifically implement the Mines Program. Implementation is accomplished via the NPDES Industrial Stormwater Program and Waste Discharge Requirements issued (or waived) pursuant to Title 23, Chapter 15, Article 7. As such, implementation of the Mines Program will be accomplished using resources available to implement the Stormwater and Chapter 15 Programs. These limited funds are allocated based on threats to water quality. Upon adoption of the San Francisco Bay Mercury TMDL, staff assignments pertaining to regulating the cleanup of mines will be given a high priority. If it is later determined that

responsible parties are unable to cleanup mines that are determined to be a source of mercury to San Francisco Bay, staff will pursue obtaining cleanup and abatement funds and grant monies to obtain the necessary funds.

H) Delta Diablo Sanitation District, Gary Darling
Transcript page 66

H-1 Mr. Darling stated that the proposed Basin Plan Amendment would reduce the Delta Diablo Sanitation District's mercury limit by 45%. From the perspective of a good environmental steward, he questioned the basis for the allocation. Our response is on pages 45, 49, and 55.

H-2 Mr. Darling requested that the Water Board find some way of providing credit to reward proactive programs that invest in pollution prevention. Our response is on page 54.

I) Partnership for Sound Science and Environmental Policy, Debbie Webster
Transcript page 69

I-1 Ms. Webster expressed surprise at changes made since June 2003. In particular, she noted that the wastewater allocations had been reduced. She noted that the allocations do not account for foreseeable growth. Our response is on pages 45, 51, and 70.

I-2 Ms. Webster suggested that the proposed allocations could stifle economic activity. She also requested that the petroleum refinery and non-petroleum refinery industrial discharge categories be combined as they had been previously. Our response is on pages 70.

I-3 Ms. Webster asserted that changing the compliance averaging period from five years to one year was inconsistent with TMDL findings regarding inter-annual weather variability. She noted that the proposed Basin Plan Amendment applied longer averaging periods to other sources. Our response is on page 48.

I-4 Ms. Webster objected to adopting individual industrial wastewater wasteload allocations. Our response is on page 49.

J) Livermore, City of, Darren Greenwood
Transcript page 72

J-1 Mr. Greenwood suggested that the proposed municipal wastewater allocations penalize higher performing facilities. He noted that the City of Livermore's proposed allocation is 50% lower than stated in previous TMDL reports. Our response is on pages 45 and 49.

J-2 Mr. Greenwood noted that the proposed allocations do not account for growth, and the City of Livermore expects substantial growth. Therefore, it may not be able to achieve its allocation. Our response is on pages 51, 57, and 58.

J-3 Mr. Greenwood indicated that the City of Livermore plant performs well; therefore, future performance improvements are unlikely. He reiterated that the proposed allocation scheme appears to penalize good performance. Our response is on pages 45, 49, and 57.

K) Santa Clara Valley Urban Runoff Pollution Prevention Program, Robert Falk
Transcript page 76

K-1 Mr. Falk asserted that the TMDL is not based on the most current science. He stated that no relationship exists between mercury in sediment and mercury in fish tissue. He identified the problem as methylmercury, and objected to the TMDL's focus on sediment mercury. He noted that other regulators, including the Central Valley Regional Water Quality Control Board, are taking a different approach. Our response is on pages 2, 75, and 94.

K-2 Mr. Falk stated that the TMDL does not recognize South San Francisco Bay's special characteristics, noting economic challenges associated with improving South San Francisco Bay conditions. He objected to the TMDL addressing San Francisco Bay as one water body. He claimed that South San Francisco Bay meets California Toxics Rule water quality objectives and argued that the TMDL would unduly burden South San Francisco Bay municipalities. Our responses are on pages 23, 24, and 77.

K-3 Mr. Falk questioned the urban runoff mercury load estimate and the need for a roughly 50% reduction. He noted that some urban runoff mercury comes from indirect atmospheric deposition, and asserted that most urban mercury is already in urban stream beds and banks, not in the urban landscape. Our responses are on pages 10 and 12.

K-4 Mr. Falk referred to an urban runoff implementation cost estimate of $500 million per year. Our response is on page 13.

In addition to these comments, Mr. Falk submitted a handout listing the following additional comments, most of which we have responded to elsewhere as noted below.

- The TMDL is not based on the most current science. See page 2.
- The TMDL fails to take a targeted approach. See page 75.
- The TMDL does not account for policies already in the Basin Plan. See pages 24 and 28.
- The TMDL will disproportionately burden local governments. See pages 24 and 36.

- The TMDL will not yield the desired results. See pages 3 and 94.
- The TMDL fails to distinguish between "old" and "new" mercury. See page 97.
- The TMDL incorrectly assumes that mercury levels in sediment correspond to mercury levels in fish. See pages 3 and 94.
- The TMDL underestimates bed erosion, and targets will be achieved in half the projected time even with no action. See page 8.
- The TMDL overstates the potential to reduce the urban runoff mercury load (75% is already in creek banks and beds). See page 10.
- The TMDL assumes that mercury in urban runoff due to indirect atmospheric deposition is controllable. See page 12.
- The TMDL ignores that mercury control measures for urban runoff can reduce little of the urban runoff load. See page 13.
- The TMDL takes on more than required pursuant to the §303(d) listing. See page 24.
- The TMDL ignores Basin Plan policies related to South San Francisco Bay by using a one-box model. See pages 24 and 77.
- The TMDL ignores that South San Francisco Bay is in compliance with the California Toxics Rule mercury water quality objective. See pages 23 and 24.
- The TMDL implementation plan does not recognize the "maximum extent practicable" standard for urban runoff. See page 28.
- The TMDL insufficiently evaluates burdens to be placed on local governments. See page 36.

Mr. Falk's handout concluded with the following suggestions.

- Adopt a two-phase collaborative approach to implementation by further assessing the role of methylmercury. See page 8.
- Evaluate how the TMDL might be different using revised bed erosion and urban runoff load estimates. See pages 8 and 10.
- Address the unique circumstances of the South San Francisco Bay through the implementation plan and separate the implementation plan from the rest of the TMDL (so USEPA cannot review it). See page 24 regarding the unique circumstances of the South San Francisco Bay. Our response to the comment regarding separating the implementation plan from the TMDL is as follows. California's Porter-Cologne Water Quality Control Act requires that Basin Plans include implementation plans that specify the actions needed to meet water quality standards, time schedules to complete the actions, and surveillance measures to determine compliance with standards. In California, TMDLs are not effective until these implementation plans are adopted.
- More rigorously consider costs to local governments. See pages 13 and 36.

L) Fairfield-Suisun Sewer District, Larry Bahr
Transcript page 80

L-1 Mr. Bahr expressed concern that the Water Board may not be able to change wastewater allocations in the future without running afoul of anti-backsliding provisions. The Fairfield Suisun Sewer District plans to expand its treatment plant, but after doing so, it would likely exceed its wasteload allocation. Therefore, Mr. Bahr believes the TMDL could cap future growth. Our responses are on pages 51 and 65.

M) Seyfarth Shaw (for Guadalupe Rubbish Disposal Company), Todd Maiden
Transcript page 83

M-1 Mr. Maiden noted that landfills have not engaged in or profited from mining. He referred to project objectives relating to considering site-specific factors and avoiding unreasonable costs. He suggested that the Guadalupe River watershed allocation could be too expensive to implement and may be unattainable. Our response is on pages 77 and 86.

M-2 Mr. Maiden mentioned that cinnabar occurs naturally in Guadalupe River watershed soils and is widely distributed. Controlling this mercury will be expensive. Our response is on pages 86 and 97.

M-3 Mr. Maiden mentioned calcine deposits remaining from the mining legacy. Calcine mining wastes containing mercury were spread widely throughout the region; therefore, control actions will be costly. Our response is on page 86.

M-4 Mr. Maiden requested that the Water Board consider alternative allocation schemes. Our response is on page 88.

M-5 Mr. Maiden suggested that the TMDL should focus more on the largest mercury source (bed erosion). He recommended that implementation actions do more to prevent dredged material disposal in San Francisco Bay. Our response is on page 87.

N) California Department of Transportation, David Yam
Transcript page 88

N-1 Mr. Yam said Caltrans' wasteload allocation is based on a percentage share of other urban runoff dischargers and questioned whether this approach is equitable. Our response is on page 38.

N-2 Mr. Yam stated that information about mercury from roadway runoff is insufficient and committed to working with the Water Board to provide adequate information for use during the adaptive management process. Our response is on page 40.

O) San Francisco Baykeeper, Shana Lazerow
Transcript page 89

O-1 Ms. Lazerow interpreted the Clean Water Act to empower and require the Water Board to regulate all San Francisco Bay mercury sources, including individual air emissions sources. Our response is on page 117.

O-2 Ms. Lazerow stated that local air sources should receive allocations (i.e., reductions) and asked that the Water Board ask staff to consider the issue of regulating air sources through NPDES permits. Our response is on page 117.

O-3 Ms. Lazerow said local air sources are controllable and reductions are needed despite any apparent economic infeasibility. Our response is on page 117.

O-4 Ms. Lazerow acknowledged that the proposed Basin Plan Amendment includes individual wasteload allocations, but questioned whether individual dischargers would actually be assigned individual responsibilities. Our response is on page 116.

P) San Francisco Baykeeper, Sejal Choksi
Transcript page 93

P-1 Ms. Choksi characterized the TMDL as proposing to let nature take its course over the next 120 years. She spoke of the need for vision. She requested that the Water Board study available innovations in mine remediation and sediment cleanup techniques. Our response is on pages 110 and 114.

P-2 Ms. Choksi made a case for reducing wastewater allocations. She stressed that wastewater dischargers operate pursuant to permits, that San Francisco Bay has no assimilative capacity for mercury, and that mercury from newer sources, like wastewater, may be more bioavailable than mercury from other sources. Our response is on pages 113 and 115.

P-3 Ms. Choksi asked the Water Board to warn subsistence fishers about seafood consumption risks. She requested that the Water Board educate communities and physicians about the symptoms of mercury poisoning and alternative protein sources. She noted that a disproportionate number of subsistence fishers are people of color and non-English speakers. Our response is on page 109.

P-4 Ms. Choksi asked for clarification on the costs borne by Bay Area residents who eat San Francisco Bay fish and the commercial and sport fishing industries. Our response is on page 109.

Q) Sunnyvale, City of, Marvin Rose
Transcript page 96

Q-1 Mr. Rose stated that, with the proposed allocations, the City of Sunnyvale could not increase its discharges to meet future growth demands. He said no additional source control reductions are feasible. Increasing water recycling would cost $4 million per gram of mercury in capital costs alone. Our response is on pages 51 and 54.

Q-2 Mr. Rose stated that the 2003 TMDL report acknowledged a need to accommodate growth and growth is foreseeable. He asserted that increased flows and mercury loads will be proportional to population growth. The City of Sunnyvale's existing unused plant capacity could be worthless if the proposed allocation must be attained. The City of Sunnyvale would need to implement connection bans and other growth and development controls. Moreover, Mr. Rose expressed concern that, after the allocations are placed in permits, any changes to the allocations will run afoul of anti-backsliding provisions. He concluded that allowing wastewater mercury load increases would shorten San Francisco Bay's recovery time very little. Our response is on pages 51 and 65.

Q-3 Mr. Rose asked the Water Board to keep the administrative record open as work on the TMDL continues. Our response is on page 1.

R) Alameda Countywide Clean Water Program, James Scanlin
Transcript page 100

R-1 Mr. Scanlin noted that mercury does not fit into the TMDL framework well because the biggest sources are not regulated through the NPDES permit program. His primary concern was the challenge of attaining a roughly 50% reduction in urban runoff mercury loads. Our response is on page 13.

R-2 Mr. Scanlin mentioned that atmospheric deposition is probably a significant contributor to urban runoff mercury loads. Readily available controls are limited to street sweeping and treatment. Our response is on pages 12 and 13.

R-3 Mr. Scanlin said the costs of storm water treatment would be very high. Our response is on page 13.

R-4 Mr. Scanlin asked that we reconsider the proposed allocations and adjust them to require only what is currently feasible. Our response is on page 13.

STAFF-INITIATED CLARIFICATIONS AND CORRECTIONS

Introduction to Basin Plan Amendment

We will modify the introductory paragraph to the Basin Plan Amendment to include language helping the reader identify changes that have been made since the April 2004 version. The changes to the first paragraph of Staff Report page A-1 will be as follows:

> *This proposed Basin Plan Amendment consists of two changes to the existing Basin Plan. The first change would insert the following text in its entirety into Chapter 4, immediately after the introduction of the section entitled "TOXIC POLLUTANT MANAGEMENT IN THE LARGER SAN FRANCISCO BAY ESTUARY SYSTEM." Because this text would be added in its entirety, it is not shown below in ~~redline~~underline/strikeout. ~~A redline/strikeout version of the proposed amendment is available at the Water Board's web site, www.swrcb.ca.gov/rwqcb2/sfbaymercurytmdl.htm.~~ The second change (found on the last page of this appendix) modifies the existing Basin Plan text relating to continuing planning. It is shown in ~~redline~~underline/strikeout ~~here and in the version available from the Water Board's web site~~.*

Numeric Target Clarifications

We will make a number of changes to the numeric targets section of the Staff Report and Basin Plan Amendment to clarify the language used to describe the targets.

Staff Report page 35:

> …This report proposes targets for mercury concentrations in San Francisco Bay fish tissue, bird eggs, and suspended sediment.

Staff Report page A-2:

> …To protect sport fishing and human health, the average fish tissue mercury concentration for typically consumed fish shall not exceed 0.2 mg mercury per kg fish tissue (wet weight).
>
> …To achieve the fish tissue and bird egg targets and to attain water quality standards, the Baywide ~~concentration of~~ ~~mercury in~~ suspended sediment mercury concentration target is ~~shall not exceed~~ 0.2 mg mercury per kg dry sediment.
>
> The suspended sediment target (0.2 mg mercury per kg dry sediment) shall be compared to the annual median Bay suspended sediment mercury concentration found through RMP monitoring.

Staff Report page A-2:

> The human health target is a fish tissue mercury concentration (0.2 mg mercury per kg fish tissue – wet weight).

Seasonal Variability

Staff has considered seasonal variability in setting allocations, but this discussion is provided on Staff Report page 63 and does not need to be included or summarized in the Basin Plan Amendment. Therefore, we will change Staff Report Page A-5 (Basin Plan Amendment) as follows to improve clarity and remove unnecessary text.

> ~~Federal regulations also require TMDLs to account for seasonal variations and critical conditions.~~ There is no evidence that m~~M~~ercury contamination in San Francisco Bay ~~does not appear to be~~is worse at any particular time of year. Therefore, ~~concern about seasonal variability is not critical to this TMDL, and~~ the TMDL and allocation scheme do~~es~~ not have a seasonal component.

Corrected Individual Refinery Allocations

Staff received corrected effluent discharge and mercury load information for the ConocoPhillips and Valero Refining Company refineries. The correction involved adjusting the average load and effluent discharge over the period 2000 to 2003 by a factor of 1.575 for ConocoPhillips and 1.22 for Valero Refining Company. Additionally, the final individual allocations are now the average of fractional average effluent discharge and fractional average mercury load (RWQCB 2004b; ConocoPhillips 2004; Valero 2004). Consideration of this new information and the modified calculation method results in a slight adjustment to the individual wasteload allocations for the petroleum refineries.

We will make the following changes to Staff Report page 58.

> …The allocations were computed as the average of ~~selected after considering~~ each facility's fractional mercury load and fractional effluent volume for the period 2000 through 2003 (SFBRWQCB 2004b).

We will make the following changes to Staff Report Table 7.5 (page 59) and Basin Plan Amendment Table 4-y (page A-9).

Chevron Products Company	CA0005134	~~0.40~~38
ConocoPhillips	CA0005053	0.15
Martinez Refining Co. (formerly Shell)	CA0005789	0.25
Ultramar, Golden Eagle	CA0004961	0.1~~2~~3
Valero Refining Company	CA0005550	0.0~~80~~9

Clarification of Load Reductions

One of the ways in which watershed-based source categories (urban runoff, Guadalupe River) can show progress toward meeting allocations is to quantify the reductions in mercury loads to the Bay. The term "load avoided" is not appropriate for these source categories. For the wastewater source category, there is no obligation for load reductions so the phrase "loads avoided" is appropriate and is used to distinguish those activities that result in reductions in loading beyond what is strictly required by the TMDL. We will remove the ambiguous term "load avoided" from several passages in the Staff Report.

Staff Report page 67:

> …The proposed plan will recognize loads reduced ~~avoided~~ by implementing pollution prevention and control programs….

Staff Report page 68:

> Loads reduced~~avoided~~ by diverting urban storm water runoff otherwise destined for San Francisco Bay to treatment facilities will also be recognized as credit toward attaining the allocation. If this is accomplished with the assistance of wastewater treatment facilities, credit for mercury loads reduced~~avoided~~ may be shared by cooperating agencies. In addition, if storm water dischargers help to reduce loads from another source category (e.g., mining legacies), credit for loads reduced~~avoided~~ can be shared by the cooperating entities….
>
> iii) Develop and implement a monitoring system to quantify either mercury loads or the loads reduced~~avoided~~ through treatment, source control, and other management efforts….
>
> vi) Prepare an annual report that documents compliance with the above requirements and documents either mercury loads discharged or loads ~~avoided~~reduced through ongoing pollution prevention and control activities.

Staff Report page 83:

> …For example, credit for mercury loads ~~avoided~~reduced by diverting urban storm water to treatment facilities may be shared by cooperating agencies.

Staff Report page A-9:

> iii) Develop and implement a monitoring system to quantify either mercury loads or the loads reduced~~avoided~~ through treatment, source control, and other management efforts….

vi) Prepare an annual report that documents compliance with the above requirements and documents either mercury loads discharged or loads ~~avoided~~reduced through ongoing pollution prevention and control activities.

Means of Submitting Wastewater Source Control Data

It is unnecessary to specify the manner of compliance for submittal of data by municipal wastewater dischargers; therefore, we will change the following sections of the Staff Report.

Staff Report page 75:

- Prepare an annual report that documents mercury load data from ~~all facilities~~ each facility, including mercury loads avoided through ~~program activities~~ control actions. ~~unrelated to normal treatment. All wastewater dischargers should be parties to a memorandum of understanding affirming their obligation to provide the necessary information for this report.~~

Staff Report page 77:

- Prepare an annual report that documents mercury loads from each facility,~~data~~, mercury effluent concentrations, and ongoing source control ~~and pollution prevention~~ activities, including mercury loads avoided through control actions.

Staff Report page A-11 (Basin Plan Amendment):

- Prepare an annual report that documents mercury loads from ~~all facilities~~each facility, mercury effluent concentrations, and ongoing source control activities, including mercury loads avoided through ~~program activities~~control actions. ~~unrelated to normal treatment. All wastewater dischargers shall be parties to a memorandum of understanding affirming their obligation to provide the necessary information for this annual report.~~

Staff Report page A-12:

- Prepare an annual report that documents mercury loads from ~~all facilities~~each facility, mercury effluent concentrations, and ongoing source control activities, including mercury loads avoided through ~~all program activities~~control actions. ~~unrelated to normal treatment~~

Means of Reporting Wastewater Effluent Data

We will clarify the manner in which certain effluent data are to be reported by wastewater facilities.

Staff Report page 75:

> The watershed NPDES ~~watershed~~ permit for municipal facilities will put in place a set of triggered actions that would apply individually to each facility….
>
> …If a facility exceeds both the applicable mass and concentration triggers, it will be required to report the exceedance in its individual Self-Monitoring Report, and to submit a report that:

Staff Report page 77:

> …If a facility exceeds both the applicable mass and concentration triggers, it will be required to report the exceedance in its individual Self-Monitoring Report, and to submit a report that:

Staff Report page A-11 (the Basin Plan Amendment):

> The watershed NPDES ~~watershed~~ permit ~~for municipal facilities~~ shall also specify conditions that apply to each individual facility. These conditions are intended to minimize the potential for adverse effects in the immediate vicinity of discharges and to ensure that municipal wastewater facilities maintain proper operation, maintenance, and performance. If a facility exceeds its individual mercury load allocation and an effluent mercury trigger concentration, it shall be required to report the exceedance in its individual Self-Monitoring Report, and to submit a report that:

Staff Report page A-12:

> If a facility exceeds its individual mercury load allocation and an effluent mercury trigger concentration, it shall be required to report the exceedance in its individual Self-Monitoring Report, and to submit a report that:

Mercury Mine Implementation

We will make the following edits for clarity.

Staff Report page 79:

> To address mercury mines requires continued implementation of the Mines and Mineral Producers Discharge Control Program (Mines Program) described in the Basin Plan. The key regulatory component of this established program is that property owners of inactive and active mine sites are required to comply with NPDES industrial storm water regulations. Under the ~~Discharge Control~~Mines Program, the Water Board has the authority to issue individual industrial permits or allow the discharger to obtain coverage under the industrial storm water general permit issued by the State Water Resources Control Board.
>
> Approximately seven small mercury mines located in the North Bay are not meeting the conditions set forth in the Mines Program~~Basin Plan~~. Responsible parties must attain ~~will be notified of their requirements to come into~~ compliance within five years of the adoption of the TMDL implementation plan.

Staff Report page A-14:

> Local inactive mercury mines shall be addressed through continued implementation of the Mines and Mineral Producers Discharge Control Program (Mines Program) described later in this chapter.
>
> Under the ~~Discharge Control~~Mines Program, the Water Board has the authority to issue individual industrial permits or allow the discharger to obtain coverage under the industrial stormwater general permit issued by the State Water Resources Control Board. For those mines that are not currently meeting the conditions set forth in the ~~mines section of this chapter~~Mines Program, responsible parties ~~will be notified immediately that they~~ shall attain compliance within five years of the effective date of this Mercury TMDL implementation plan.

C&H Sugar Allocation

There was a mistake in the previous industrial load estimate because the C&H sugar facility load was incorrectly tabulated and greatly undercounted. The load from this discharge now makes up a substantial portion of the industrial wastewater source. The consequences of correcting this omission are the following:

- The 99% upper confidence limit of the mean load results in a group allocation for industrial wastewater of 2 kg/yr.

- The industrial plus petroleum refinery allocation is 3 kg/yr.
- This new group mass was re-allocated to individual discharges in this category according to their proportions of annual loading from 2000 to 2003. The changes associated with these new allocations are discussed on page 70 and below.

We will change the Staff Report to reflect this correction as follows:

Staff Report page 30:

> …The combined load of the industrial dischargers and petroleum refineries is about ~~2~~ 3 kg/yr (LWA 2004, SFBRWQCB 2004 b,c).

Staff Report page 76 (box):

Existing Load:	~~2.0~~ 3.0 kg Hg/yr (major dischargers)
Allocation:	~~2.0~~ 3.0 kg Hg/yr (major dischargers)

These corrections are minor in view of the total mercury load to San Francisco Bay being over 1,200 kg/yr.

East Brother Light Station

Water Board staff recognized that a small publicly owned treatment works (East Brother Light Station) is about to get a NPDES permit and thus requires an allocation. This facility is very small (250 gallons per day). We will assign this discharge an allocation in the same way as we did for the other discharges in this category using an effluent concentration of 25 ng/l and 250 gallons per day effluent flow.

We will add the following entry to Staff Report Table 4.3 (page 29) as shown:

East Brother Light Station	CA0038806

We will add the following entry to Staff Report Table 7.3 (page 57) and Basin Plan Amendment Table 4-x (Staff Report page A-6), immediately following the entry for East Bay Municipal Utilities District:

East Brother Light Station	CA0038806	0.001

East Bay Dischargers Authority

The East Bay Dischargers Authority (EBDA) discharge is a combined outfall in San Francisco Bay that discharges the effluent from all contributing agencies. Therefore, it is appropriate to group them such that they share an allocation (3.67 kg/yr) that is the sum of their individual allocations. In Staff Report Table 4.3 (page 29), we will revise the EBDA entry to include the contributing member agencies (EBDA, Dublin-San Ramon Services District, City of Livermore, Union Sanitary District wet weather, and Hayward Marsh [not previously included due to an oversight]). We will also delete the previous

individual entries for Livermore, Dublin-San Ramon, and Union Sanitary District wet weather. The new entry will be as follows:

East Bay Dischargers Authority	CA0037869
Dublin-San Ramon Services District (CA0037613)	
Hayward Shoreline Marsh (CA0038636)	
Livermore, City of (CA0038008)	
Union Sanitary District, wet weather (CA0038733)	

In the tables showing individual allocations for municipal wastewater discharges (Staff Report Table 7.3 [page 57] and Basin Plan Amendment Table 4-x [Staff Report page A-6]), we will revise the EBDA entry similarly. We will also delete the previous individual entries for Livermore, Dublin-San Ramon, and Union Sanitary District wet weather from these tables to avoid double counting. The new entry will be as follows:

East Bay Dischargers Authority	CA0037869	3.67[a]
Dublin-San Ramon Services District (CA0037613)		
Hayward Shoreline Marsh (CA0038636)		
Livermore, City of (CA0038008)		
Union Sanitary District, wet weather (CA0038733)		

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This list contains only new references to be included in the administrative record. References cited in the Staff Report are not duplicated here.

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