APPENDIX D

Response to Comments

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Total Maximum Daily Load for PCBs in San Francisco Bay

Responses to Comments

California Regional Water Quality Control Board
San Francisco Bay Region

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I. INTRODUCTION

This document provides Water Board staff's responses to oral and written comments on a proposed Basin Plan amendment and supporting Staff Report for a Total Maximum Daily Load (TMDL) and Implementation Plan for PCBs in San Francisco Bay.

We include responses to written comments on two versions of the proposed Basin Plan amendment and supporting Staff Report, comments made during the September 12, 2007 Board hearing, and Peer Review comments.

We received twenty-one comment letters on the June 22, 2007 version of the proposed Basin Plan amendment and supporting Staff Report. We have responded to these comments in several ways. Some comments we acknowledge here in this Response to Comments document as expressing interpretations of data or expressions of opinion that are different from staff's findings and conclusions. Given the nature of science and policy, we believe that such differences are inevitable and contribute to the development of carefully considered regulation such as the PCBs TMDL. Some comments prompted us to reevaluate our presentation of elements of the TMDL, and led us to clarify parts of the Basin Plan amendment or Staff Report. In some cases, we made more substantive revisions to the documents. Staff decided to recirculate the proposed Basin Plan amendment and supporting staff report on December 3, 2007 to allow for public comment on the changes proposed since the June 22, 2007 version. We received twelve additional comment letters on the December 3, 2007 version of the proposed Basin Plan amendment and supporting Staff Report.

A number of important issues were raised in the comment letters, some of them by multiple stakeholders. We review these major overarching issues in this overview. The issues are as follows:

- Estimate of current PCBs loads to San Francisco Bay
- Feasibility/Achievability of the TMDL
- Modeling and TMDL targets
- Individual Wasteload Allocations and Wastewater NPDES Permits Effluent Limits
- Adaptive Implementation
- Regulatory Analyses: CEQA and Economic Considerations

Estimate of current PCBs loads to San Francisco Bay

We received comments on the adequacy of our estimate of current loads of PCBs to the Bay, including an assessment of the current scientific knowledge of these loads. In response we have updated the current load estimates in the TMDL, based on analyses conducted by the San Francisco Estuary Institute, including loads from the Central Valley. We also have added an analysis of the Central Valley PCBs load reductions as well as load reductions in the Bay as a whole resulting from natural attenuation.

Feasibility/Achievability of the TMDL

We received a number of comments questioning the feasibility of achieving the allocations for specific source categories, including the Central Valley and urban stormwater runoff. The commenters maintained that due to uncertainty about achieving the allocations, the Water Board should not adopt the Basin Plan amendment and Staff Report, as these documents do not assure attainment of the TMDL target or protection of the Bay's beneficial uses. From the opposite perspective, we received comments asserting that load reductions, and therefore implementation actions to achieve those reductions, are not necessary to protect the Bay from PCBs. These other comments maintain that natural attenuation of PCBs, currently occurring due to loss of PCBs through the Golden Gate, via atmospheric loss, and through degradation and transformation, is sufficient to redress the impairment of the Bay from PCBs.

Overall, we agree that uncertainties exist about the effectiveness of early implementation actions in attaining allocations (and thus the TMDL target). However, we assert that the implementation plan—specifically, our adaptive approach to implementation—provides sufficient flexibility to allow achievement of the TMDL. We plan to begin with implementation of load reduction activities that have a significant chance of success, while we study or pilot-test feasible implementation measures that carry less certainty of effectiveness. We intend to monitor effectiveness of the implemented actions, attainment of load and wasteload allocations, and resulting improvement of the health of Bay fish, adjusting implementation actions as necessary to ensure attainment of the TMDL.

Such an adaptive implementation approach will require further data collection and pilot and special studies to help refine our understanding of the state of the Bay; effectiveness of measures and the Bay's response to implementation actions; and long-term trends in loads and recovery of the Bay. As we generate new scientific information, we anticipate revising the TMDL and load and wasteload allocations, along with associated implementation actions. As proposed in the revised Basin Plan amendment and Staff Report, we intend to do the first review within ten years of adoption of the TMDL.

We have included natural attenuation of PCBs in the Bay as a component of the model used to derive the proposed TMDL and associated load and wasteload allocations. Our mass budget model predicts attainment of the target in about one hundred years from natural attenuation alone. However, according to the same model, the proposed TMDL will accelerate recovery of the Bay by about 40 years. A shorter recovery time clearly benefits sport fish consumers.

Modeling and TMDL Target

Several comments questioned the scientific soundness of the TMDL's linkage analysis. Concerns focused mainly on the mass budget model's ability to predict the long term decline of PCBs in the Bay by adequately characterizing the Bay's natural physical and chemical processes. In fact, we used the most up-to-date and well-accepted models and data to derive the numeric target and the associated TMDL that will lead to restoration and protection of beneficial. Furthermore, the Basin Plan amendment and Staff Report underwent scientific peer review by

two independent reviewers: Dr David Carpenter, Director of the Institute for Health and the Environment, State University of New York at Albany, and Dr. Kevin Farley of the Department of Civil and Environmental Engineering, Manhattan College Riverdale. Both reviewers found the linkage analysis to be scientifically sound.

We also received specific comments on the effect of natural attenuation on the mass budget model. As discussed above, the declining levels of PCBs in the Bay estimated by the mass budget model take into account natural attenuation in the Bay and surrounding watersheds. As previously noted, although the mass budget model predicts attainment of the target from monitored natural attenuation alone, the proposed TMDL accelerates recovery of the Bay by about 40 years (this assumes it takes 20 years to achieve the TMDL load allocations).

Individual Wasteload Allocations and Wastewater NPDES Permit Effluent Limits

We received comments during both comment periods from several parties on implementing individual wastewater wasteload allocations via effluent limits in wastewater NPDES permits. Dischargers argue that numeric limits are not required or feasible to calculate. Whereas USEPA and others argue they are required and feasible. The NPDES regulations are clear in that NPDES permits must have water quality based effluent limitations that are consistent with the assumption s and requirements of wasteload allocations. The NPDES regulations also authorize use on non-numeric requirements when numeric limits are not feasible. So the issue is whether it is feasible to establish numeric limits that are consistent with the individual wasteload allocations, with the consideration that individual wasteload allocations are assumed to represent current performance of individual facilities.

We intend to develop municipal and industrial wastewater NPDES permit numeric water quality based effluent limits that are consistent with the wasteload allocations in the TMDL. However, we acknowledge that the individual wasteload allocations are based on a limited dataset. We have insufficient or no data to calculate wasteload allocations for individual facilities based on individual facility performance at this time. Therefore, individual load allocations are based on each facility's fraction of the total yearly wastewater discharged from this source category using average annual flow data from 1999 through 2002. The resulting individual wasteload allocations do not represent individual facility actual discharge performance and do not account for variability in discharge performance. Additional data collection is necessary in order to calculate performance based numeric effluent limits and ensure their consistency with the wasteload allocations. NPDES permits will include data collection requirements to support the calculation of numeric effluent limits and to demonstrate attainment of individual allocations that account for inter-annual and intra-annual variability. We will work with USEPA to determine appropriate permit limits consistent with the allocations while additional data are collected.

Adaptive Implementation

The Water Board received some comments suggesting that the TMDL does not fully put in practice an adaptive implementation process. The comments maintain that adaptive

implementation at this time should consist initially of only monitoring and natural attenuation and that a better description of adaptive implementation is required. On the other hand, the Water Board also received a number of comments supporting our adaptive implementation approach.

We believe our proposed adaptive implementation approach is both comprehensive and appropriate, and provides stakeholders with maximum opportunity to refine and revise the actions they must take in order to meet their allocations. Our adaptive implementation approach is based on taking immediate actions commensurate with available information, reviewing new information as it becomes available, and modifying actions as necessary based on the new information. Taking immediate action makes progress at the same time while more and better information is collected, and the effectiveness of current actions is evaluated. In this manner, this TMDL will be implemented in phases starting with actions described in each source category, risk management, monitoring, and critical data needs section of the implementation plan with subsequent modifications and phases based on improved knowledge of PCBs sources, control measures, and fate in the environment. In particular, there are four principal ongoing activities that may necessitate TMDL adaptation.

First, ongoing monitoring being conducted through the Regional Monitoring Program will allow us to improve our understanding of the rate of natural attenuation and recovery, as well as our understanding of patterns of PCBs concentrations in fish tissue and sediment. Interpretation of these data may illuminate improved ways of expressing TMDL targets or evaluating them.

Second, there are ongoing efforts by the San Francisco Estuary Institute to improve understanding of the fate and transport of PCBs in the Bay and to model the relevant biological, physical and chemical processes. Improved modeling capabilities combined with bathymetric and sediment core data will allow us to better predict how the Bay will respond to management actions and changing conditions. This may, in turn, inform the need to adapt implementation schedules.

Third, we will continue to pursue clean-up of in-Bay contaminated sites. By evaluating the degree to which in-Bay contaminated sites can be remediated, and the resultant impacts on PCBs levels in the Bay and its biota, we will gain valuable insights relevant to determining the pace at which the beneficial uses of the Bay will be restored.

Last, the success of the TMDL will depend in large part on concerted efforts to locate and evaluate opportunities to control on-land PCB sources and the PCB load conveyed to the Bay via urban stormwater runoff. Our progressive approach to addressing this challenge is described in the revised stormwater runoff implementation section of the staff report in more detail.

We will be assessing progress in each of these four areas on a continuing basis to determine whether the quantity and quality of emerging information are sufficient to warrant adaptation of the TMDL. We have revised the Adaptive Implementation section of the Basin Plan amendment and the Staff Report to (1) better describe our adaptive implementation approach and (2) call for annual progress reports to the Board on implementation of the TMDL. The

annual reporting process will also provide opportunities for interested parties to provide input on adapting the TMDL.

Regulatory Analyses: CEQA and Economic Considerations

We received a number of comments concerning the Regulatory Analyses section of the Staff Report, where we evaluate potential environmental impacts of adoption of the Basin Plan amendment, as required by the California Environmental Quality Act (CEQA). The comments focused mainly on our evaluation of project alternatives, our discussion of economic factors and our evaluation of the cumulative impacts of the PCBs TMDL. In response to these comments, we made changes to this section of the Staff Report and circulated the Basin Plan amendment and Staff Report for a second 45 day public review period, as required under CEQA. We addressed all of concerns raised.

Reviewers concerned with our alternatives analysis requested more complete descriptions of alternative projects we considered, as well as an analysis of some specific alternatives which we did not consider. We have responded, in part, by revising the Staff Report to include a more detailed analysis of each considered alternative. We note, however, that CEQA does not require us to analyze any particular alternative, other than the 'No Project' alternative.

We received many comments on our discussion of economic factors in our CEQA analysis. We disagree with comments made that assert we are required to provide a cost-benefit analysis in order to adopt a TMDL; this is not a requirement. Some of the commenters made assumptions about the methods that would be required to be implemented to attain the allocations, targets or sediment goal in the TMDL. These assumptions led them to believe that there would be significant economic consequences, as well as significant environmental impacts, to adoption of the PCBs TMDL. For example, one commenter stated that application of the one ug/kg sediment goal as a cleanup goal would lead to remedial dredging of the Bay on the order of 110 million cubic yards, and thus would be very costly. However, this was not envisioned as a requirement of the PCBs TMDL. Additional language was added to the Basin Plan amendment and staff report to make it clear that this is not being required and thus neither the costs nor the significant environmental impacts would occur.

Commenters expressed concern over the cost of treating stormwater to meet the load allocations in the TMDL. One estimate of 8 billion dollars, to treat 58 billion gallons of stormwater for a 4.8" 24-hour rainfall event, was put forward as the cost of implementing the PCBs TMDL for stormwater management agencies. This estimate is based on creating 28 square miles of detention basins, (or fifty-five, 330 acre, 10 foot deep detention basins). This is not an expected method of compliance for a number of reasons. First, to achieve the load allocations, stormwater treatment would have to occur strategically, where there are sources in the watershed from former industrial/urban uses; therefore, not all stormwater would need to be treated. Second, the implementation plan requires implementation of compliance measures on a pilot basis, as proposed by the implementing parties, to assess their technical practicability, as well as their cost effectiveness.

We added more detail in the Regulatory Analysis section of the Staff Report about costs to support the economic analysis and clarified the basis of our implementation cost estimates in the December 3, 2007 version of the PCBs TMDL. In addition, we added additional details about the costs of implementing measures to control PCBs in stormwater to the February 2008 version of the Staff Report.

Finally, we responded to comments about the limited analysis of cumulative impacts in the Regulatory Analysis section of the Staff Report by significantly augmenting this discussion.

II. RESPONSES TO ISSUES RAISED AT THE SEPTEMBER 12, 2007 PUBLIC HEARING

This section addresses questions raised at the September 12, 2007 Water Board testimony hearing on the PCBs TMDL. Dr. Tom Mumley, Assistant Executive Officer, answered some questions during the meeting; those questions and Dr. Mumley's responses are recorded in the hearing transcript and are included in Appendix F of the Board Package. Staff responses to concerns that required research or further consideration of the TMDL are provided in this section.

Board member Margaret Bruce asked a question regarding the range of uncertainty that characterizes the data from which the TMDL was derived, and conclusions—specifically the fish tissue target and allocations—based on that data. She asked us to explain the limitations of the data and the methodologies we used to establish the TMDL, so that Board members could better understand its strengths and weaknesses.

Ms. Bruce's question is well taken. It is difficult to precisely identify a range of uncertainty for the model result and allocations. In determining the numeric fish tissue target we followed US EPA guidance and protocol, using our best understanding of local sport fish consumption rates. The target is consistent with the water quality criterion set by US EPA in the California Toxics Rule. We derived the allocations from the fish tissue target and TMDL using available data and the best available food web and mass budget models. The models have been scientifically peer reviewed and used for regulatory actions in many jurisdictions.

We are relying on our adaptive implementation approach to address the uncertainties that do exist. We plan to revisit the validity of the results within ten years of adoption of the TMDL. If necessary, we will revise the fish tissue target based on new understanding of sport fish consumption rates; and we will revise the allocations based on new mass budget modeling efforts that are now underway.

Board member William Peacock asked for clarification of the requirements to conduct economic analyses. He asked specifically whether the Water Board is required by the Porter-Cologne Water Quality Act to perform an "economic balance" or cost-benefit analysis of TMDLs.

According to an internal State Water Board memo prepared by Sheila Vassey (State Board 1999), the Boards must comply with the California Environmental Quality Control Act (CEQA) when they amend their basin plans to adopt regulatory provisions that establish performance. The analysis required under CEQA must include economic factors in relation to the reasonably foreseeable methods of compliance with the wasteload and load allocations. The Boards are not required to do a formal cost-benefit analysis. Subsequent to the hearing our legal counsel clarified the kinds of actions for which "a discussion of economic considerations is required." A more detailed explanation of the applicable legal standards and their basis in statute (CEQA or Porter-Cologne) has been provided by Water Board legal counsel. This in-depth review of the

relevant statutes confirms that the Water Board is required to consider economics among other factors, but is not obligated to conduct a cost-benefit analysis or cost-effectiveness study. Furthermore, the Board must comply with provisions of the Clean Water Act that require attainment of water quality standards – even in the face of significant cost.

Board Member Terry Young had several concerns, which we summarize below along with our responses.

- **She asked whether at some future date numeric aspects of the TMDL (fish tissue target, allocations, etc.) could be revised, if new or additional information warrants reassessing these numbers.**

  Response: Our phased implementation plan and adaptive approach proved for review and revision of the target and allocations, as warranted. We acknowledge that during early phases of TMDL implementation, additional studies, data collection, and evaluation of potential means of compliance may refine our understanding of the fate and transport of PCBs in the Bay and how to best reduce PCB loads. Adjustments will be made as warranted.

- **Noting that the TMDL has been designed to capitalize on ongoing activities that would minimize additional implementation costs, she asked if new actions required to implement the TMDL can be separated out for clarity.**

  Response: In response to this request we have revised Chapter 11 of the Staff Report to distinguish between ongoing and new actions to reduce PCBs.

- **Board member Young also suggested establishing a clear schedule for future reassessments of the TMDL and progress toward meeting the target and allocations.**

  Response: In response to Board member Young (and other reviewers, as well), we have provided more information on the scheduling of activities associated with the TMDL. See sections of the Basin Plan on Adaptive Implementation, and Section 11, Implementation, of the revised Staff Report.

- **Finally, she requested clearer explanations of two aspects of the TMDL:**
  - **How the goals of the TMDL might be interpreted relative to cleanup of contaminated sites**

    Response: In revised sections of both the Basin Plan amendment and Staff Report describing implementation, we have clarified how the numeric goals of the TMDL do and do not relate to clean up of contaminated.

  - **Which agencies will be responsible for cleanup at inland contaminated sites.**

    Response: In the same sections of both documents we clarified the responsibilities of agencies/implementing parties.

III. RESPONSES TO WRITTEN COMMENTS ON THE JUNE 22, 2007 STAFF REPORT AND DRAFT BASIN PLAN AMENDMENT

We received twenty comment letters during the public review period that closed on August 20, 2008. An additional comment letter is included in this response from the Bay Planning Coalition, as it was read into the record during the September 12, 2007 Testimony Hearing.

Comment Letters Received:

U.S. Environmental Protection Agency, Region IX

California Department of Transportation

Bay Area Stormwater Management Agencies Association

Bay Area Clean Water Agencies

San Francisco Public Utilities Commission

City of San José, Environmental Services Department

Baykeeper, Clean Water Action, and Communities for a Better Environment

Associated General Contractors of California, et. al.

Bay Planning Coalition

Roger James

Mirant Delta, LLC.

Pacific Gas and Electric

California Chamber of Commerce and General Electric Company, submitted by Latham & Watkins LLP

Additional comment letters submitted on behalf of the California Chamber of Commerce and General Electric Company:

Quantitative Environmental Analysis

Natalie Wilson, BBL, Inc.

Russell E. Keenan Ph.D., AMEC Earth & Environmental, Inc.

Jay B. Silkworth, GE Global Research Center

Kenneth D. Jenkins

Anchor Environmental CA, L.P.

Dr. David Sunding, Berkeley Economic Consulting, Inc.

Evan K. Nyer, Donald F. Sauda, ARCADIS U.S., Inc.

U.S. Environmental Protection Agency

USEPA Comment Cover Letter 1: "Before approving a TMDL in which some of the load reductions are allocated to nonpoint sources in lieu of additional load reductions allocated to point sources, there must be specific reasonable assurances that the non-point source reductions will in fact occur. Therefore, it is necessary for the Regional Board to explain in greater detail in this TMDL, with specific reasonable assurances, how the Central Valley load reduction from 42 kg/yr to 5 kg/yr will be achieved, and how the Urban Stormwater Runoff load reduction from 40 kg/yr to 2 kg/yr will be achieved, in order to allocate mass-based loads to point sources based on current concentrations and flows."

We revised the Basin Plan amendment and staff report to incorporate new load estimates for both Central Valley and stormwater sources, to 11 kg/yr (from 42 kg/yr in the previous draft documents) and 20 kg/yr (from 40 kg/yr), respectively (See Staff Report section 7.4 and Table A-1 of the Basin Plan amendment).

Central Valley load reduction: There is sufficient reasonable assurance that the Central Valley allocation will be achieved. Sediments currently entering the Bay from the Central Valley have lower PCBs concentrations than in-Bay sediments, a condition we expect will continue. We are not aware of any specific sources of PCBs in the Central Valley that would affect the Central Valley loading if they were regulated or remediated. Also, calculating the decline in PCBs over time due to natural attenuation (using a half-life of 56 years), we estimate that the Central Valley load allocation will be attained in about 40 years (see Staff Report section 7.2). Verification of ongoing Central Valley loads and load reductions will be a regular component of the Regional Monitoring Program. Accordingly, natural attenuation and loads monitoring provide reasonable assurance Central Valley allocation will be achieved and there is no need for further regulatory assurance.

Urban Stormwater Runoff load reduction: Urban runoff will be regulated as a point source through NPDES permits issued by the Water Board. The permit process provides reasonable assurance that load reductions and allocations will be achieved.

USEPA Comment Cover Letter 2: "The draft Basin Plan language provides only a brief discussion concerning implementation of the PCB TMDL through NPDES permitting for wastewater and industrial sources. It is unclear how Water Board staff intends to calculate water quality-based effluent limits that are consistent with the wasteload allocations for NPDES dischargers, and whether the NPDES permits will require any reductions from these sources. Please explain further how these waste load allocations will be implemented."

To clarify how wasteload allocations will be implemented vis-à-vis NPDES permits for wastewater in response to this comment, we added language to the Implementation Plan of the Basin Plan amendment and to the revised Staff Report (Section 11.1).

The wasteload allocations were derived from a limited data set used to estimate the total PCBs annual load to San Francisco Bay from all wastewater discharges. The data set was limited due to the technical difficulty and associated costs of measuring very low concentrations of PCBs in wastewater. Furthermore, the individual allocations, which were based on each facility's

fraction of the total yearly wastewater discharged to the Bay, do not represent actual performance of individual dischargers. Consequently, implementation of the individual wasteload allocations directly as effluent limits is not feasible at this time **since** they do directly account for individual plant performance and inter-annual and intra-annual variability of discharges. Effluent limits in NPDES permits will be based on current performance. We will work with USEPA to determine appropriate permit limits consistent with the allocations while additional data are collected. NPDES permits will require individual facility's to collect data in order to calculate daily or monthly average effluent limits that are consistent with the annual load allocations, and possibly recalculation of individual wasteload allocations based on these data. However, calculation of these limits is not feasible at this time.

USEPA Comment 1: "Page 1 of Staff Report: Introduction: Second Paragraph: This paragraph says that the Basin Plan delineates the water quality standards for PCBs in San Francisco Bay. While the Basin Plan contains the beneficial uses, the California Toxics Rule contains the numeric water quality criteria for PCBs in San Francisco Bay. Similarly, on page 3 of the Staff Report, under Project Definition, the third paragraph states that the PCB objective of 0.00017 ug/l total PCBs in water is not attained. The 0.00017 ug/l total PCBs value in water is the CTR criterion."

We revised Staff Report sections 1 and 2.2 to correctly reflect the CTR criterion.

USEPA Comment 2a: "Page 23 of Staff Report: Fish Tissue Studies: This section calculates a screening value using a risk level of 10(-5), defined as the maximum acceptable risk level, which is later used as the numeric target for the TMDL. However, the CTR promulgated PCB human health criteria at a 10(-6) risk level (10 times more stringent). This section uses a fish consumption rate of 32 g/day, while the CTR uses a fish consumption n rate of 6.5 g/day. The resulting CTR water column value is 170 pg/l (in 2002, EPA updated its recommended fish consumption rate to 17.5 g/day, resulting in a revised Clean Water Act section 304(a) criterion of 65 pg/l). The calculation in this section results in a screening value of 10 ng/g, while using the CTR values, the calculation results in a screening value of 5.3 ng/g. (This 5.3 ng/g value is used as the numeric target in the Calleguas Creek TMDL, dated June 20, 2005.) On page 20, it states that the CTR criterion was developed to protect the general population from an increased risk of no more than one in one million, but that sub-populations that consume greater quantities of fish may be less protected. However, it is not clear that the general population is sufficiently protected at a 10(-6) risk level consistent with the CTR which reflects a screening value of 5.3 ng/g, since the screening value used as the numeric target for this TMDL is 10 ng/g."

The proposed TMDL fish tissue target is protective of the general population at a 10(-6) risk level and is consistent with the CTR. The fish tissue target is based on protection of people who consume bay fish at the risk level of 10(-5), and it is also conservative since it was derived using an upper bound consumption rate for this subpopulation. It is reasonable to assume that this numeric target is protective of the general population as only a small fraction of the overall population catch and consume fish in the Bay. The fish tissue target is also consistent with the

CTR water column criterion, which is based on protection of the general population at a 10(-6) risk level. To demonstrate this, we calculated the expected concentration of PCBs in the Bay water column upon attainment of the fish tissue numeric target, using bioaccumulation factors based on current Bay fish tissue and water column data. The calculations indicate that when the fish tissue numeric target is attained, levels in the Bay water column will be less than the CTR criterion, thus, the PCBs water quality standard will be attained.

USEPA Comment 2b: "On page 51 of the Staff Report, in Section 8.1, Fish Tissue Target, the report states that the fish tissue numeric target is consistent with the CTR criterion of 170 pg/l, and that the CTR criteria will be attained when the fish tissue target for white croaker is attained. This is based on a calculation of actual bioaccumulation factors (BAFs) for the Bay, which are listed in Table 21 on page 52. Please include the fish tissue and water column data, from which the BAFs were calculated, and whether the data are spatially and temporally consistent."

We have included the data requested in the revised Staff Report in Section 8.1, Table 18.

USEPA Comment 2c: "We note that the report used an appropriate cancer slope factor of 2 in Section 6.2 to calculate the screening value/numeric target, but Section 8.1 states that a slope factor of 1 was used. It appears Section 8.1 needs to be corrected."

The TMDL fish tissue target was based on a cancer slope factor of 2. The noted statement in Section 8.1 was revised to state that a slope factor of 2 (not 1) was used.

USEPA Comment 3: "Page 23 of Staff Report: Fish Tissue Studies: At the bottom of the page, the report states that the calculated screening level of 10 ng/g wet-weight is equivalent to a sediment PCBs concentration of 1 ng/g, as discussed in Section 7.2. However, this discussion appears to be in Section 9.1, not Section 7.2. Section 9.1 discusses the SFEI food web model and references the Gobas and Arnot 2005 Final Technical Report as the source of the Figure 26, Conceptual Model of PCBs Movement and Fate in San Francisco Bay. Please clearly include the reference to the report that shows the relationship (how it was calculated) between the fish tissue value of 10 ng/g and sediment concentration of 1 ng/g."

We have corrected Section 6.2 (Fish Tissue Studies) of the Staff Report to point out the noted discussion is in Section 9.1, not Section 7.2. We calculated the sediment goal using the food web model as referenced in the TMDL. However, the authors of the 2005 report made certain assumptions, such as loss of PCBs during cooking, which we did not choose to include in our calculations. We therefore recalculated the sediment PCBs concentration using the model spreadsheet provided by the authors with the two following changes: a fish tissue screening value of 10 ng/g and 100 percent PCB retention while cooking. The spreadsheet is public domain and we can provide a copy to all interested parties.

USEPA Comment 4: "Page 24 of Staff Report: Fish Tissue Studies: At the top of the page, the report states that the screening level of 10 ng/g wet-weight is protective of wildlife beneficial uses because it equates to a sediment concentration of 1 ng/g, and an EPA document calculated a screening level for the protection of wildlife of 160 ng/g of PCBs in sediment. (This is also noted at page 55, Section 9.1.) However, it is not clear that the 10 ng/g fish tissue value is appropriate for and protective of wildlife in San Francisco Bay. More discussion is needed. If you have not already done so, we request you discuss whether the projected target for the protection of human health will also protect wildlife in the San Francisco Bay with the Sacramento U.S. Fish and Wildlife Service."

We have discussed the appropriateness of the fish tissue numeric target with the Sacramento U.S. Fish and Wildlife Service. They did not indicate that the target would not be protective of wildlife.

USEPA Comment 5a: "Page 56-57 of Staff Report: Section 9.2 Mass Budget Model: The report discusses the SFEI simple mass budget model for PCBs and that the model predicts that reduction of external loads to 10 kg/yr is needed to attain a PCBs mass in the Bay of 160 kg, which is equivalent to the sediment goal of 1 ug/kg. Therefore, the report concludes that the assimilative capacity of the Bay is 10 kg/yr from external sources. Figure 28 reflects this model and the time line to achieve different reduction scenarios. It appears that the chosen scenario will take about 100 years to achieve, although this is not mentioned. More discussion of the model and the length of time necessary to achieve water quality standards in the Bay based on this model should be included."

We updated the estimates of current loads and ambient concentrations of PCBs in water and sediments in the Bay. We have therefore rerun the mass budget model with the new baseline conditions. The mass budget model predicts that with a TMDL of 10 kg/yr, we will attain the target within 40 years. Assuming it takes 20 years to achieve the load allocations, water quality standards will be achieved about 40 years faster than if current loads remain constant into the future (See Staff Report section 9.2).

USEPA Comment 5b: "Similarly, in section 11.2 Internal Sources, it states that the cleanup of PCB hot spots will "help accelerate the recovery of the Bay from its current impairment" but there is no attempt to quantify their affect or how their clean-up would affect the length of time necessary to achieve water quality standards. This important discussion should be more detailed."

It is not feasible to quantify the change in recovery rate that will result from remediation of in-Bay PCBs-contaminated sites with existing models. The food web model and mass balance model that we used to derive the TMDL cannot account for hot spots. Moreover, there are insufficient or no site-specific data to estimate the affect of clean ups. Regardless, remedial actions are likely to occur whether or not the TMDL is adopted due to adverse impacts in local biota associated with high concentrations of PCBs in sediments in hot spots. We assume PCBs in hot spot sediments are a source of PCBs in benthic and other aquatic organisms in these areas.

Consideration of remedial actions and associated benefits will occur on a case-by-case basis; we assume that any site-specific benefits will also benefit the recovery of the Bay.

USEPA Comment 6: "Page 59 of Staff Report: Section 10.1 Total Maximum Daily Load: This section expresses the TMDL as an average annual load. As discussed in EPA's guidance memorandum dated November 15, 2006, EPA recommends that TMDLs and associated load allocations and wasteload allocations be expressed in terms of daily time increments. TMDLs and allocations may also be expressed in terms of both daily and non-daily time increments to help facilitate implementation of the applicable water quality standards."

Due to the inherent uncertainties in the TMDL and the estimate of current and allocated loads, we prefer to express the TMDL as a yearly load. The primary reason is that changes in bioaccumulation in fish, our TMDL numeric target, occur on a timescale greater than daily. We are also not able to calculate a TMDL in daily or monthly increments due to limitations in model capabilities and PCBs loading and fate and transport data.

USEPA Comment 7: "Page 61 of Staff Report: Section 10.3 Wasteload Allocations/Urban Stormwater Runoff: Although this section in the Staff Report does not say how long stormwater agencies will have to achieve their individual wasteload allocations, the Draft Basin Plan Amendment at page A-9 states that "Urban stormwater runoff shall be achieved within 20 years and shall be implemented through the NPDES stormwater permits issued to urban stormwater runoff management agencies and the California Department of Transportation (Caltrans)." If the schedule is to be implemented through compliance schedules in NPDES permits, and if its terms would not be covered by a compliance schedule-authorizing provision already in existence, the State will need to submit to EPA, and EPA will need to approve, a compliance schedule-authorizing provision under Clean Water Act section 303(c)."

In this comment the USEPA is advising the Board what it would need to do if it intends to rely on compliance schedules in the NPDES stormwater permits. We do not anticipate the need for compliance schedules in the NPDES stormwater permits. It is our understanding that in general, NPDES permits must comply with all requirements in CWA §301. An exception to this rule is for some storm water permits; for example, storm water permits for municipal separate storm sewer systems (MS4s) are not required to comply with CWA §301. MS4s are required to comply with water quality standards, but through an iterative approach, therefore a compliance schedule demonstrating compliance with water quality standards is not required.

USEPA Comment 8: "Page 64 of Staff Report: Section 10.4 Load Allocations: The report indicates that the Central Valley Watershed allocation is 5 kg/yr, down from a present loading of 42 kg/yr. In Section 11.1, Implementation/External Sources, the report states that sediments entering from the Central Valley have lower PCBs concentrations than in-bay sediments, and that major PCBs mass loading events that occur during episodic high flow

events mostly flow directly out of the Bay through the Golden Gate. The report further states "[t]he allocation will be attained through anticipated natural attenuation of PCBs in the Central Valley watershed." Please reference the information or basis used to make this assumption, and the time necessary to achieve this. As noted previously, please explain in more detail how the Central Valley allocation will be achieved."

We used data generated by the Regional Monitoring Program to determine that sediments entering the Bay from the Central Valley, and sediment in Suisun Bay, which is directly downstream of Central Valley inputs to the Bay, have lower PCBs concentrations than sediments in other Bay segments. Although we do not have quantitative data for the mass of sediment flowing through and out of the Bay during episodic high flow events, we see a large plume of sediment flowing from the Central Valley through Raccoon Strait (north side of Angel Island) and the Golden Gate at these times, and the data show increased concentrations of sediments (and mass of PCBs) entering the Bay from the Central Valley during high flow events. We therefore assume that some potentially significant mass of PCBs in sediment, entering the Bay from the Central Valley, is not deposited in the Bay but rather travels directly to the ocean through the Golden Gate. Nevertheless, we have calculated the decline in PCBs over time due to natural attenuation using a half life of 56 years, which indicates that the Central Valley load allocation will be attained in about 40 years.

USEPA Comment 9: "Page 64 of Staff Report: Section 10.5 Margin of Safety: The report indicates that the Margin of Safety is implicit because of several conservative assumptions, one of which is the conservative approach used to derive the fish tissue target. However, the TMDL uses a 10(-5) risk level, thus the target is 10 times less conservative than the risk level used in the CTR to protect the general population. Using a higher fish consumption rate of 32 g/day for the target in the TMDL, as opposed to the 6.5 g/day used in the CTR, does not offset the 10 fold difference in the risk level, as discussed in comment 3 above."

We do not agree with this analysis of the method we used to determine the fish tissue numeric target. In the CTR, U.S. EPA used generic fish consumption rates to derive the water quality criterion for PCBs. In the TMDL, we use local fish consumption rates to calculate the fish tissue numeric target. The fish tissue target is based on protection of people who consume bay fish at the risk level of 10(-5), and is conservative since it was derived using an upper bound consumption rate for this subpopulation. It is reasonable to assume that this numeric target is protective of the general population as only a small fraction of the overall population catch and consume fish in the Bay.

USEPA Comment 10: "Page 73 of Staff Report: Section 11.5 Adaptive Implementation/ Periodic Review: This section states that the Water Board will review new information periodically, but does not say how often it will review this information and consider amendments to the TMDL. We suggest the Board consider a more definite timeframe for review of technical information and consideration of amendments to update the TMDL."

We have revised the Adaptive Implementation section of the Basin Plan amendment to state our commitment to review technical information and consideration of amendments to update the TMDL within ten years of adoption of the TMDL. We have also included a call for an annual report to the Board on TMDL implementation that will provide opportunity for an annual review of technical studies and monitoring results that may provide cause to consider amendments to update the TMDL.

California Department of Transportation, Division of Environmental Analysis

Caltrans Comment 1: "With respect to the Department, the proposed Basin Plan Amendment (Appendix A) includes the following statement:

> 'Urban stormwater runoff wasteload allocations shall be achieved within 20 years and shall be implemented through the NPDES stormwater permits issued to urban stormwater runoff management agencies and the Department. The urban stormwater runoff wasteload 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 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. [Page A-9]'

"It would be premature to develop strategy for corrective actions or effectively control when the sources are largely unknown. While some hot spots have been identified, there is little information demonstrating that those and other hot spots are responsible for the majority of PCBs contributed by urban runoff. We believe that additional research is needed to identify the sources. We are concerned that the strategy of focusing on hotspots will not achieve the high reductions (95%) required of urban watersheds. As a result, structural controls for runoff may be the only option for meeting the allocation. However, structural BMPs are not considered viable for controlling PCBs in urban runoff. Therefore, the report should clearly demonstrate how the hotspot strategy will achieve those reductions or thoroughly discuss the use of structural BMPs, including their costs, impacts, siting and other feasibility issues."

In order to improve our understanding of both sources and effective treatment options, we have awarded state funds to the San Francisco Estuary Institute (SFEI) to investigate locations with elevated PCBs and determine the right combination of source and treatment control BMPs that will lead to sufficient PCBs load reductions from urban runoff. We expect phased implementation of these controls will consist of pilot studies focusing on hotspots to further evaluate their effectiveness and cost, impacts, siting, and feasibility issues. Results of these pilot efforts should lead to expanded implementation in urban areas that that have high levels of PCBs. Consideration and implementation of controls in other areas will also be part of phased implementation.

Most PCBs in urban runoff are associated with suspended sediment. While structural treatment control measures have not been evaluated for control of PCBs in urban runoff, they have been evaluated for control of suspended solids. Notably, one such evaluation was performed by Caltrans. These evaluations showed varied effectiveness in the removal of suspended sediments in urban runoff. As none of the control measures evaluated showed 95 percent removal efficiency, treatment control will not in itself lower PCBs loads enough to attain the urban runoff wasteload allocations. Therefore, it will be necessary to implement source control measures in urban watersheds, and the obvious location for these controls will be identified hotspots.

Caltrans Comment 2: "The Staff Report proposes routing urban stormwater runoff through municipal wastewater treatment facilities as an efficient means of reducing PCBs and other particle-associated contaminant loads to the Bay. The TMDL includes an additional allocation for PCBs (0.9 kg/yr) for the stormwater flows directed to POTWs. Routing of stormwater flows to POTWs could be beneficial. However, the following potential constraints and regulatory issues should [be] addressed in the TMDL:

"Stormwater pollutants could cause POTWs to exceed their water quality-based, effluent limits (WQBEL) or worsen current exceedances. Recent permits issued (or proposed to be issued) to POTWs include enforcement orders due to exceedance of WQBELs for dioxin, mercury, and other constituents. Dioxin, in particular, is present generally due to infiltration or inflow of stormwater into sewer systems. Monitoring by the Board has found high levels of dioxin in stormwater runoff.' Dioxins in runoff can be as much as two orders of magnitude higher than water quality criteria (objectives). POTWs will be unlikely to accept urban runoff-with its heavy load of dioxins-that is certain to exacerbate permit compliance.

During larger storms, POTW capacity is typically exceeded to the extent that all flows do not receive full secondary treatment. Increasingly, regulatory pressure is being applied to POTWs to improve their treatment levels during wet weather. As a result, POTWs are going to be reluctant to accept stormwater flows that may put them at risk of not providing full treatment to all flows."

We recognize there are issues with the feasibility of routing urban stormwater runoff through municipal wastewater treatment facilities, and there may be associated permit limit compliance issues. That is why it is proposed as an urban stormwater runoff control option and is not mandatory. We propose to evaluate the potential for strategic diversions of stormwater to POTWs to help control PCBs and other pollutants in urban areas through the phased implementation plan for urban stormwater runoff. Future pilot studies will identify sites where treatment capacity exists and addition of stormwater will not cause permit compliance issues.

Caltrans Comment 3: "It is not clear how the TMDL can make an appropriate and substantiated allocation to external sources (stormwater runoff, etc.) until the contribution of internal sources has been better quantified. The Staff Report notes that bed erosion and in-bay contaminated sediment have not been quantified. Nevertheless, the modeling done for the TMDL concludes that attaining the desired Bay sediment concentration of one ug/kg will require a reduction in external loadings to 10 kg/yr."

The model used for the TMDL accounted for bed erosion based on estimates of sediments in the mass of PCBs in the active sediment layer. Further evaluation of PCBs in Bay sediments including erosion potential will be conducted as part of the proposed adaptive implementation plan.

Caltrans Comment 4: "The Basin Plan Amendment specifies that:

> Requirements in each NPDES permit issued or reissued [including the Caltrans permit], shall be based on an updated assessment of best management practices and control measures intended to reduce PCBs in urban runoff. Control measures implemented by urban runoff

> management agencies and other entities (except construction and industrial sites) shall reduce PCBs in urban runoff to the maximum extent practicable. [Page A-7]

"It then identifies the measures that 'demonstrate progress toward attainment,' which include:

Selection of one of three options for quantifying PCB loading in the permittee's drainage

Development and implementation of a "monitoring system to quantify PCBs urban runoff loads and the load reductions achieved through treatment, source control and other actions ...

Support for "actions to reduce the health risks of people who consume PCBs-contaminated San Francisco Bay fish ...

Conducting or causing "to be conducted' monitoring; and studies to fill critical data needs identified in the adaptive implementation section

"Who completes the updated assessment for permitting purposes? Specifically what BMPs or other control measures will the Department need to implement? This vague requirement places no bounds on information collection efforts. In addition, we are not convinced that permitees will have a responsibility to take direct actions, other than reducing pollutant discharges that reduce health risks for those consuming contaminated Bay fish. It is not clear what the Board is proposing. Does it include educational messages or providing alternative food sources? These proposed actions should be further developed to include information on purpose, scope, and costs, before it is possible to evaluate whether they are appropriate."

The updated assessment of best management practices and control measures intended to reduce PCBs in urban runoff will be conducted through the permit reissuance public process. It will be the responsibility of permittees to present updated assessment information in their applications for permit reissuance. The Basin Plan amendment discussion under Stormwater Runoff, and the Staff Report, section 11.1, have been revised to better describe the proposed phased implementation plan and the phased five-year permit term requirements. The scope of information collection for each phase will reflected in permit requirements. Permits will also specify the scope of requirements to support, cause, or conduct health list reduction efforts and monitoring and studies.

Bay Area Stormwater Management Agencies Association

BASMAA Comment 1: BASMAA requested an extension of the public comment period on the Basin Plan amendment.

The public comment period was extended by two weeks.

BASMAA Comment 2: "It should…be noted that while the adoption of a TMDL containing wasteload allocations and load allocations may be a federally mandated requirement, the Water Board's discretionary determination to assign load reductions and implementation plan responsibilities to municipal stormwater agencies is not required by the Clean Water Act (CWA) and hence, represents a new State-imposed program and/or level of service increase which is subject to the subvention requirements of Article XIII B, section 6 of the California Constitution. (See County of Los Angeles v. Comm'n on State Mandates, Cal. App. 4th (Cal. Ct. App., May 10, 2007).)."

The commenter's concern relates to a provision of the California Constitution that requires that in some instances the state must provide funds when the Legislature or a state agency requires that a local agency implement "a new program or a higher level of service". (Cal. Const. art. XIIIB, Section 6.) There are important exceptions, a number of which apply here.

The proposed TMDL would not constitute an unfunded local government mandate subject to subvention under Article XIIIB, Section (6) of the California Constitution for several reasons, including, but not limited to, the following. First, the proposed TMDL is adopted pursuant to a federal mandate. The federal Clean Water Act requires TMDLs to be developed for water bodies that do not meet federal water quality standards. (33 U.S.C. § 1313(d).) Once the U.S. Environmental Protection Agency or a state develops a TMDL, federal law requires that NPDES permits must contain effluent limitations consistent with the assumptions of any applicable wasteload allocation. (40 C.F.R. § 122.44(d)(1)(vii)(B).)

Second, NPDES permits for stormwater dischargers implement federally mandated requirements under federal Clean Water Act section 402, subdivision (p)(3)(B). (33 U.S.C. § 1342(p)(3)(B).) This includes federal requirements to effectively prohibit non-storm water discharges, to reduce the discharge of pollutants to the maximum extent practicable, and to include such other provisions as the Administrator or the State determines appropriate for the control of such pollutants. Federal cases have held these provisions require the development of permits and permit provisions on a case-by-case basis to satisfy federal requirements. (Natural Resources Defense Council, Inc. v. U.S. E.P.A. (9th Cir. 1992) 966 F.2d 1292, 1308, fn. 17.) The authority exercised in the adoption of those permits is not reserved state authority under the Clean Water Act's savings clause (cf. Burbank v. State Water Resources Control Bd. (2005) 35 Cal.4th 613, 627-628 [relying on 33 U.S.C. § 1370, which allows a state to develop requirements which are not "less stringent" than federal requirements]), but instead, is part of a federal mandate to develop pollutant reduction requirements for municipal separate storm sewer systems. To this extent, it is entirely federal authority that forms the legal basis to establish the permit provisions. (See, City of Rancho Cucamonga v. Regional Water Quality Control Bd.-

Santa Ana Region (2006) 135 Cal.App.4th 1377, 1389; Building Industry Ass'n of San Diego County v. State Water Resources Control Bd. (2004) 124 Cal.App.4th 866, 882-883.)

Third, the stormwater agency permittees have the authority to levy service charges, fees, or assessments sufficient to pay for compliance with NPDES permits. Numerous activities contribute to the pollutant loading in the municipal separate storm sewer system. Local agencies can levy service charges, fees, or assessments on these activities, independent of real property ownership. (See, e.g., Apartment Ass'n of Los Angeles County, Inc. v. City of Los Angeles (2001) 24 Cal.4th 830, 842 [upholding inspection fees associated with renting property].) The ability of a local agency to defray the cost of a program without raising taxes indicates that a program does not entail a cost subject to subvention. (County of Fresno v. State of California (1991) 53 Cal.3d 482, 487-488.)

Fourth, the stormwater agencies have consistently requested permit coverage in lieu of compliance with the complete prohibition against the discharge of pollutants contained in federal Clean Water Act section 301, subdivision (a) (33 U.S.C. § 1311(a)) and in lieu of numeric restrictions on their discharges. To the extent that the local agencies voluntarily avail themselves of NPDES permits, the program is not a state mandate. (Accord County of San Diego v. State of California (1997) 15 Cal.4th 68, 107-108.) Likewise, the stormwater agencies have voluntarily sought a program-based municipal storm water permit in lieu of a numeric limits approach. (See City of Abilene v. U.S. E.P.A. (5th Cir. 2003) 325 F.3d 657, 662-663 [noting that municipalities can choose between a management permit or a permit with numeric limits].) If the stormwater agencies choose to voluntarily file a report of waste discharge proposing a program-based permit, they would be making a voluntary decision not subject to subvention. (See Environmental Defense Center v. USEPA (9th Cir. 2003) 344 F.3d 832, 845-848.)

Finally, the stormwater agencies' responsibility for preventing discharges of waste that can create conditions of pollution or nuisance from conveyances that are within their ownership or control under state law predates the enactment of Article XIIIB, Section (6) of the California Constitution.

BASMAA Comment 3: "There is substantial anecdotal evidence that PCB-containing oils were historically used for dust control, resulting in direct releases of PCBs to the environment. In addition, the use of hydraulic fluids containing PCBs had significant potential to result in releases to the environment, since hydraulic systems were designed to leak slowly to provide lubrication. The PCB Report/BPA should be revised to discuss these uses and their relatively high potential to result in releases to the environment."

We acknowledge these uses had and may still have potential for releases to the environment, particularly via urban stormwater runoff. We expect such anecdotal evidence will be considered by urban stormwater permittees in identification of sources and evaluation and implementation of controls as part of their phased adaptive implementation efforts. The Staff Report already contains an extensive discussion of PCBs uses (Section 4.3), and we see no benefit of further discussion of dust control and hydraulic fluid uses.

BASMAA Comment 4: "Bay Area equipment that may continue to contain PCBs includes PG&E electrical equipment with dielectric fluids, such as substation transformers. The PCB Report/BPA should be revised to include a discussion of PG&E's historic and current use of PCBs. Furthermore, the PCB Report/BPA should acknowledge the need for additional documentation of the status of PG&E's efforts to remove PCBs from their equipment, the fate and management of such removed equipment, and the past, current, and future potential for PG&E equipment (removed and in-service) to release PCBs to the environment. This is an important potential source of PCBs that require further documentation and investigation."

PG&E's PCBs management program is closely monitored by both federal and state regulatory agencies. The utility has received USEPA recognition for their Voluntary Accelerated Reduction program. In its comment letter, dated August 20, 2007, PG&E provides a summary of its PCBs Elimination and Assessment Program. Consequently we have confidence in their ongoing efforts to remove PCBs from their equipment and dispose of PCBs-containing wastes.

BASMAA Comment 5: "The PCB Report/BPA incorporates an estimate of PCB loading from urban runoff into the Bay of 40 kg/year. This very preliminary and highly uncertain estimate was developed by the Joint Stormwater Agency Project and was calculated using concentrations of PCBs in bedded sediments from stormwater conveyances. As such it should not be incorporated into regulatory criteria or actions such as the PCB TMDL. The PCB Report/BPA should instead be revised to designate the 40 kg/year estimate as preliminary and describe the associated assumptions, uncertainties and limitations of the estimate, per the Joint Stormwater Agency Project report. Furthermore, the PCB Report/BPA should state that the 40 kg/year estimate will be revised in the adaptive management process once sufficient data are available to extrapolate a loading estimate from ongoing RMP and future urban runoff program studies."

Based on the San Francisco Estuary Institute's monitoring of PCBs in local tributaries to the Bay, we have revised the source analysis to incorporate an updated combined urban and non-urban stormwater load estimate of 20 kg/yr. Please see section 7.2, External Sources, Stormwater Runoff. The TMDL monitoring requirements include monitoring of runoff loads, and the adaptive implementation process will provide opportunities to revise the TMDL, as necessary, as better data become available.

BASMAA Comment 6: "The linkage analysis and calculation of the total TMDL of 10 kg/year rely on a simple one-box pollutant fate model. The PCB Report/BPA should be revised to clearly describe the limitations of this model. For example, it does not account for how processes such as pollutant loading and sediment erosion/deposition vary among different Bay segments. A multi-box fate model that is currently under development will supersede the one-box model and will help address the limitations. The PCB Report/BPA should be revised to clarify that the linkage analysis and TMDL of 10 kg/year are preliminary pending incorporation of the multi-box model. The linkage analysis and calculation should then be revised accordingly. Although the PCB Report/BPA does acknowledge the need for improved fate and transport modeling, the requested revisions are

necessary to inform stakeholders and the public about the current uncertainty in our understanding of how the recovery of the Bay would respond to load reductions caused by management actions.

The TMDL of 10 kg/yr and linkage analysis reflect the current state of knowledge. The need for improved PCBs fate and transport modeling is called out in the Critical Data needs section of the Basin Plan amendment and the Staff Report. As the commenter notes, efforts are underway to develop an improved multi-box model; the adaptive implementation process already provides opportunity to consider revisions to the TMDL when new and relevant information and/or models become available. We have revised the Adaptive Implementation section of the Basin Plan amendment to state our commitment to review technical information and consideration of amendments to update the TMDL within ten years of adoption of the TMDL. We have also included a call for an annual report to the Board on TMDL implementation that will provide opportunity for an annual review of technical studies and monitoring results that may provide cause to consider amendments to update the TMDL.

BASMAA Comment 7: "The explanation of how the proposed total wasteload allocation for urban runoff of 2 kg/year was calculated is inadequate. The PCB Report/BPA should be revised to include a detailed explanation of the calculation, including all assumptions, justified values for all parameters, and the exact mathematical calculation used. This explanation and wasteload allocation is especially important to BASMAA member agencies."

We appreciate the comment, and have revised the report accordingly. Specifically, we have added the following text to section 10.3, Wasteload Allocations:

Sediment load estimates vary from 870,000 tons (SFEI, 2007), 930,000 tons (Krone, 1979), to 1,500,000 tons (SFEI, 2005b). Due to the uncertainty in these estimates and until they are refined, we will use 2,000,000 tons as an upper bound estimate of maximum sediment yields from local tributaries to calculate the stormwater wasteload allocations, resulting in 2 kg/yr.

BASMAA Comment 8: "The proposed urban runoff allocation of 2 kg/year represents a 95% reduction in PCBs loads, based upon the estimated existing urban runoff load of 40 kg/year. Two kg/year is also estimated to be the resulting load when all sediment in urban runoff has a concentration of 1 ug/kg, the sediment PCB concentration goal. Meeting this allocation and sediment target in the proposed 20-year time frame is almost certainly unrealistic, impracticable and infeasible. A thorough technical and economic analysis of the feasibility of using available technologies to achieve the urban runoff wasteload allocation must be developed and included in a revised PCB Report/BPA."

The proposed phased, adaptive implementation plan provides a mechanism to identify and evaluate control measures, including technical and economic analysis of the feasibility of control measures to achieve the urban stormwater runoff wasteload allocations. Also, natural attenuation of PCBs in urban areas will likely result in substantial reductions in PCBs loads. The 20-year, phased schedule reflects the shortest timeframe envisioned to attain allocations by allowing opportunity during the first ten-years of implementation, spanning two permit terms,

to identify and evaluate control measures leading to full implementation necessary to attain allocations in the second ten-years of implementation. Moreover, the Adaptive Implementation section of the Basin Plan amendment provides opportunities and establishes an approach for the Water Board to consider modifying the schedule and, if necessary, the allocations.

BASMAA Comment 9: "BASMAA acknowledges that implementing the TMDL may include remediating selected on-land areas with elevated PCBs. However, it would be unfair and legally inappropriate to burden municipalities with cleaning up these sites. Thus, PCB site cleanups should not be pursued through municipal stormwater NPDES permits. Other regulatory programs and funding sources exist (e.g., Proposition 13 and the State Cleanup and Abatement Account), present reliable enforcement mechanisms, have a proven track record of success, and should instead be used by the Water Board. Existing models used to cleanup polluted sites (e.g., CERCLA actions and site cleanup requirements, waste discharge requirements and Section 13267 requests issued by the Water Board under the California Water Code) should be applied, which include identifying the real responsible parties whenever possible. These are the appropriate legal and regulatory mechanisms for implementation of PCB site cleanups, with assistance from municipalities in this effort. Some sites are currently being cleaned up under such programs; the PCB Report/BPA should be revised to discuss the need to establish coordination between these programs and the TMDL."

We recognize that the Water Board, DTSC, and US EPA—in addition to municipalities—share responsibility for overseeing cleanup of on-land sites contaminated by PCBs. We will continue to work with stakeholders, including municipalities, to identify both appropriate roles for the various parties, and effective means of reducing PCBs contributions from such sites to urban runoff. The Stormwater Runoff discussion in the Implementation Plan, External Sources section of the Staff Report (Section 11.1) has been revised to better describe the role of municipalities.

BASMAA Comment 10: "The PCB Report/BPA proposes relatively large load reductions for two external sources: the Central Valley watershed and urban runoff. The PCB Report/BPA should include an estimate of the timeframe for the Central Valley watershed to achieve its proposed wasteload allocation and discuss the relationship between that timeframe and the proposed 20-year timeframe for urban runoff in the context of achievement of the overall TMDL."

We have incorporated new load estimates for the Central Valley of 11 kg/yr (see Staff report section 7.2). Calculating the decline in PCBs over time due to natural attenuation using a half life of 56 years indicates that the Central Valley load allocation will be attained in about 40 years (see Staff Report section 10.4). Sediments currently entering the Bay from the Central Valley have lower PCBs concentrations than in-Bay sediment, and we expect this to continue. We are not aware of any specific sources in the Central Valley would affect the Central Valley loading if they were regulated or remediated. Verification of ongoing loads and load reductions will be a regular component of the Regional Monitoring Program. Accordingly, natural attenuation and

loads monitoring provide reasonable assurance Central Valley allocation will be achieved and there is no need for further regulatory assurance.

The rationale for the proposed 20 year timeframe for attaining the stormwater runoff allocations is that our model predicts that attainment of fish tissue targets based solely on natural attenuation would take about one hundred years, whereas it will be attained in about 40 years if stormwater runoff loads were reduced to the proposed allocations. The proposed 20-year timeframe reflects the shortest timeframe that can be justified to implement controls in addition to natural attenuation to attain stormwater runoff allocations.

BASMAA Comment 11: "Stormwater agencies have generally been supportive of linking implementation planning with TMDL development. However, BASMAA also strongly desires that implementation policies, actions and schedules be developed in a separate but parallel process from development of the TMDL (i.e., calculation of acceptable loading and allocations) and its approval by USEPA. Separating the TMDL per se from related implementation considerations will allow the Water Board to more expeditiously submit the former for approval by USEPA (which is not required to review or approve implementation aspects of TMDLs under the CWA) and, by so doing, will preserve the State's maximum authority and flexibility to work with local governments on addressing the challenges that will be presented. Thus, the PCB Report/BPA should be revised to remove the implementation sections; these sections should be presented in a separate report."

The Water Board's customary practice of including implementation plans in Basin Plan amendments incorporating TMDLs is consistent with the recommendations of the National Research Council (NRC 2001). Furthermore, the Porter-Cologne Water Quality Control Act requires that Basin Plans include implementation plans that specify actions needed to meet water quality standards; time schedules; and monitoring procedures designed to determine compliance with standards. This means that Basin Plan amendments that establish TMDLs to attain water quality standards must include implementation plans.

BASMAA Comment 12: "The economic analysis presented in the PCB Report/BPA is inadequate, poorly supported, and presents numerous assumptions without basis or justification. The PCB Report/BPA states that the basis of cost information includes "similar work performed elsewhere." However, no information or examples are provided to support this statement. The PCB Report/BPA should be revised to include a thorough and detailed economic analysis of the costs associated with the implementation and monitoring activities that might result from the proposed Basin Plan Amendment. The analysis should clearly document and justify all assumptions used to develop the costs."

We have revised the Staff Report to include additional explanation of how we arrived at our estimates of implementation costs associated with the TMDL (see Section 12.10 of the Staff Report)

BASMAA Comment 13: "Based upon the information in the PCB Report/BPA, a gross upper-bound estimate of the anticipated cost to restore the Bay's beneficial uses that are impaired by PCBs (i.e., attain the sediment target of 1 ug/kg and the fish tissue target of 0.01 mg/kg) is 70 years at $500 million per year, or about $35 billion. This equates to an estimated cost of approximately $14.3 million per kg PCBs removed. Such a comparison of the costs and assumed benefits of the proposed implementation actions should be included in the PCB Report/BPA and used to inform a debate among the Water Board, stakeholders and public regarding whether a reasonable relationship exists between the anticipated costs and benefits."

Control measures that could be implemented within the projected upper-bound $500 million per year would control multiple pollutants in urban runoff in addition to PCBs. Consideration of the cost-benefit of control measures is beyond the scope of analyses required to support the proposed Basin Plan. However, the phased, adaptive implementation plan provides opportunity to consider the technical and economic feasibility of control measures.

BASMAA Comment 14: "The PCB Report/BPA asserts that the proposed implementation plan schedule provides opportunity to analyze alternative means of compliance and allows time for urban runoff agencies to secure funding. However, potential sources of such funding are not identified. Unfortunately, the BASMAA member agencies that will be required to implement the urban runoff PCB reduction strategies are under severe budget restrictions and furthermore, as we have repeatedly stated, Proposition 218 severely limits the ability of local government to generate additional revenues for urban runoff programs. Thus, the PCB Report/BPA should be revised to discuss the financial constraints on local agencies and the need for the Water Board to provide flexibility to ensure that the targets, allocations and implementation measures are economically attainable and technically feasible."

We acknowledge the significant financial constraints on BASMAA member agencies. In light of this, we have endeavored to develop a TMDL that is technically feasible, provides flexibility through use of adaptive management, and anticipates an initial implementation phase long enough to allow for pilot studies to evaluate potential methods for reducing PCBs content in urban runoff. We have provided clarification of our adaptive implementation approach and the implementation timeframe in our revised Staff Report (see Section 11.1, subsection Stormwater Runoff).

Bay Area Clean Water Agencies

BACWA Comment 1: "BACWA strongly recommends that Table A-3 be eliminated from the TMDL…We do not believe that it is necessary for the TMDL to allocate to each clean water agency a portion of the Municipal Wastewater WLA. The source category WLAs, can lead to enforceable requirements that are applied to particular sources in individual permits - as long as those requirements are "consistent with the assumptions and requirements" in a TMDL, 40 C.F.R. 122.44(d)(1)(vii).As the WLA is so small, we suggest that individual allocations be eliminated. Attainment of the TMDL and the WSL would be determined through compliance with the permit numeric effluent limit and the periodic quantification of loads as is already required by the TMDL. Please see Attachment A for more examples of USEPA approved TMDLs that do not include individual WLA for point sources."

We agree that the individual wasteload allocations in the PCBs TMDL are based on a limited dataset. Additional data collection is necessary and required under the TMDL implementation plan, in order to calculate performance based numeric effluent limits and ensure their consistency with the wasteload allocations. The NPDES permit requirements will include data collection that can serve to confirm the accuracy of the TMDL wasteload allocations as well as support the calculation of numeric effluent limits. If the wasteload allocations in the TMDL require revision in view of the additional data collection, this can be accomplished as part of adaptive implementation.

BACWA Comment 2: "BACWA supports the fish tissue target for this PCB TMDL. BACWA believes that the CTR criterion for water column concentration is not an appropriate basis for a target (and in fact is not the basis for the 303(d) listing). There is no established relationship between the water column and the fish tissue concentrations."

A TMDL target must reflect attainment of all applicable water quality standards, and for this PCBs TMDL that includes the CTR PCBs water quality criterion. The TMDL fish tissue target is not based on the CTR criterion, but as we discuss in Section 9.1 of the Staff Report, levels of PCBs in the Bay water column will attain the CTR criterion when the TMDL fish tissue target is attained.

BACWA Comment 3: "…We believe that a numeric effluent limit of 1.0 ug/L would be more realistic [than the 0.5 ug/L proposed in the draft documents] based on the limit of current technology and available methods for measurement of PCBs…."

We have eliminated the proposed numeric effluent limit of 0.5 ug/L in the revised the Municipal and Industrial Wastewater Dischargers implementation requirements of the Basin Plan amendment.

BACWA Comment 4: "BACWA fully supports adaptive implementation…. The investment in adaptive management studies and analyses must be targeted and focused to ensure that they will indeed further our understanding of the fish tissue target and the sediment target…"

We acknowledge the need to better understand the fate and transport of contaminated sediments, and appreciate BACWA's support of our adaptive implementation approach and a multi-box model. However, we need to be clear that the TMDL does not propose a sediment target per se. Nevertheless, attainment of the TMDL and water quality standards is based on reducing PCBs concentrations in sediment to a level that will result in attainment of the fish tissue target. Load allocations are partially based on attaining this sediment concentration.

BACWA Comment 5a: "BACWA supports risk management,…[although] we do not anticipate that such a program would ever entail the development and delivery of health care."

Comment acknowledged. We do not expect risk management activities will include the development and delivery of health care.

BACWA Comment 5b: We also request that the last bullet on page A-11 of the proposed TMDL be changed to state: Conduct or cause to be conducted special studies needed to support health assessment and risk communication.

The language "conduct or cause to be conducted" doesn't apply in this context as it is generally applied to refer to single discharger requirements. In this section of the amendment we are referring to the collaborative approach we intend to follow to in conducting risk management activities with other agencies and dischargers.

BACWA Comment 6: Urban stormwater treatment at POTWs….We are not aware of any clean water agency that is ready to take advantage of this particular part of the TMDL. As you can imagine, there are many financial and regulatory issues associated with intentional diversion of stormwater to POTWs.

We will continue to work with the municipalities to resolve issues associated with treatment of urban runoff by wastewater treatment plants. Specifically, we are already working with several municipal wastewater treatment agencies and SFEI to identify locations where urban stormwater runoff can be intercepted, determine the appropriate season for interception, and implement pilot interception and treatment project(s).

BACWA Comment 7: "Limited ability to reduce loading….BACWA must insist that the State develop a mass offset program which provides credits to any BACWA member (or other discharger) who volunteers to implement more advanced tools such as land based remediation of PCBs, for reducing PCB concentrations in the Bay that originate from sources other than POTWs."

We do not envision a situation in which POTWs will need an offset program to attain and maintain their wasteload allocations, since their allocations are based on current performance. However, we recognize that an offset program has merits and will entertain proposals to develop an offset program in the future.

San Francisco Public Utilities Commission

SFPUC Comment 1: "The SFPUC appreciates that the efforts San Francisco has put in place to treat stormwater have been considered in the PCB wasteload allocation designated for San Francisco stormwater. However, to be fully accurate, a clarification must be made to reflect the fact that treatment of stormwater flows occurs not just at the Southeast Plant, but also at the North Point Wet Weather Facility and the storage/transport facilities. Therefore, we recommend the following modification of Table A-5 County-Based Watershed Wasteload allocations for Urban Stormwater Runoff, Footnote C (Page A-8):

"Does not account for treatment provided by San Francisco's combined sewer system. The Treatment provided by the City and County of San Francisco's Southeast Plant, North Point Wet Weather Facility, and storage/transport facilities (NPDES permit CA0037664) will be credited toward meeting the allocation and load reduction."

We have made the requested modification of Table A-5, Footnote C.

SFPUC Comment 2: "Like other agencies that are responsible for both stormwater and wastewater management, San Francisco has been given a separate stormwater wasteload allocation from its wastewater wasteload allocation. Unlike all of the other agencies in the San Francisco Bay Region, San Francisco operates a combined sewer system that is designed to direct stormwater to treatment facilities. Therefore, by definition, San Francisco is already implementing the "Urban Stormwater Runoff Treatment by POTWs" option. The benefit from implementing stormwater treatment by POTWs that other agencies may receive when they elect to accept stormwater flows to their POTWs, must also be inherently recognized for San Francisco and included as a footnote to Table A-3 Individual Wasteload Allocations for Municipal Wastewater Dischargers (Page A-6).

"Does not include a percentage of the 'Urban Stormwater Runoff Treatment by POTWs' for the stormwater treatment that is provided by San Francisco's combined sewer system. The San Francisco Southeast Plant allocation will be modified to include a reasonable portion of this allocation."

There is no need to modify the San Francisco Southeast Plant allocation to account for urban stormwater treatment since San Francisco is already provided an additional allocation for urban stormwater (See SFPUC Comment 1).

SFPUC Comment 3: "As a combined system, the majority of San Francisco's wet weather and sewer flows are collected, treated, and discharged through the same sewer system. Considering this intrinsic design, it would be sensible to allow the stormwater and wastewater wasteload allocations to be met collectively. For example, the stormwater and wastewater mass loadings would be able to collectively meet 0.5 kilograms per year. This value is the combination of the individual municipal wastewater wasteload allocation of 0.3 kilograms per year and the urban stormwater runoff allocation of 0.2 kilograms per year. The TMDL should explicitly state that the stormwater and wastewater wasteload allocations

given to San Francisco may be combined. This may require that a footnote be added to Table A-3 and Table A-5 that states something to the following:

"For San Francisco's combined stormwater and wastewater system, stormwater and wastewater wasteload allocations can be combined and met collectively."

At this time, these allocations are separate (municipal wastewater discharge in Basin Plan amendment Table A-3; urban stormwater discharge in Table A-5) because San Francisco does not treat all of its stormwater. However, we have provided clarification via Footnote C to Table A-5 that attainment of the stormwater wasteload allocations will include accounting for stormwater treatment provided by San Francisco's combined sewer system. Also, we prefer to resolve uncertainties associated with the separate allocations before combining them. In the future, the Water Board may consider combining the allocations through its adaptive implementation review of the TMDL, if San Francisco presents quantitative evidence justifying a combined allocation scheme.

City of San José, Environmental Services Department

San José Comment 1: "The City's chief concerns with the Report and BPA are that the data limitations and scientific uncertainties make waste load allocations development extremely difficult. Therefore, this TMDL effort necessitates the development of a long-term regional plan to address PCBs and related uncertainties in a cost-effective manner. In particular, implementation actions should be consistent with the standard of "maximum extent practicable."

We acknowledge there are data limitations and scientific uncertainties. That is why the adaptive implementation plan is a phased long-term plan to address PCBs and related uncertainties in a cost-effective manner. In particular, the phased adaptive implementation plan component for urban stormwater runoff calls for iterative advances in maximum extent practicable controls on a permit term basis leading to attainment of the water quality based allocations.

San José Comment 2: "The Report should include a preliminary timeframe that estimates when attainment of the sediment target will occur. This preliminary timeframe should state explicitly that the timeframe could be adjusted as new information becomes available."

We are not proposing a sediment target in the TMDL, although attainment of the TMDL and water quality standards is based on reducing sediment PCB concentrations. The TMDL is determined based on attaining a sediment concentration (level) that will result in attainment of the fish tissue target, and load allocations are partially based on attaining this sediment concentration. Based on mass budget model results, we expect to attain the sediment level in about 40 years, once the TMDL is achieved. However, we expect to review and revise this timeframe based on the results of the multibox model development and subsequent TMDL review.

San José Comment 3: "A development of a multi-box fate model is currently under development, which will provide a multi-box sediment budget that would benefit all TMDLs for contaminants associated with sediment. The Report and BPA should clarify that the TMDL of 10 kg/year and all associated load allocations are preliminary until the results of the multi-box model are available."

Because the TMDL of 10 kg/yr is included in the Staff Report and proposed Basin Plan amendment, it cannot be considered preliminary. We intend to perform the first comprehensive review of the TMDL within ten years of adoption, and have incorporated this commitment in the TMDL. At such time, we expect to have available next generation models, such as the multi-box model to better refine the TMDL. We will also provide annual reports to the Board on TMDL implementation, which will provide opportunity to acknowledge and support potential TMDL revisions based on new information (see section 11.6 of the Staff Report and page 13 of the revised proposed Basin Plan amendment).

San José Comment 4: "The Report and BPA should include a solid rationale for the reduction from the Central Valley and a preliminary timeline estimating when these

reductions are expected. A timeline appropriate for this source category should be specified as it is for other sources (Urban Runoff attainment is expected in 20 years with a review and possible modification of timeline at 10 years)."

We are confident in our rationale for anticipated load reductions from the Central Valley; please see section 7.2 of the Staff Report. We have calculated the decline in PCBs over time due to natural attenuation using a half life of 56 years. This indicates that the Central Valley load allocation will be attained in about 40 years. Verification of ongoing loads and load reductions will be a regular component of the Regional Monitoring Program. Accordingly, natural attenuation and loads monitoring provide reasonable assurance Central Valley allocation will be achieved and there is no need for further regulatory assurance and a specific timeline.

San José Comment 5: "The Water Board should qualify the data used to estimate urban runoff loads as highly conservative. Furthermore, the BPA should clearly identify that adaptive management will be used to refine estimates from urban runoff as new information becomes available. The Water Board should not base load reduction activities upon these estimates since the ability to measure success will not be possible given the high level of uncertainty. Until uncertainty levels have been reduced, any urban runoff loading estimates should be classified as preliminary and highly uncertain."

We recognize the uncertainty in estimates for stormwater runoff. Therefore, our implementation plan for stormwater load reductions is based on principles of adaptive implementation. Specifically, our approach is to initially implement load reduction activities with a large chance of success, while we study or pilot test feasible implementation measures that carry more uncertainty in the effectiveness for reducing PCBs loads, as well as review assumptions used in the TMDL. We are not basing load reduction activities on load estimates, rather on expected benefits of load reduction activities. Implementation will regulated via NPDES permits and as such will have sequential five year timeframes for review of load reduction activities and loading estimates.

San José Comment 6: "The City recognizes that the available data is the best technical information for estimating Municipal Wastewater Discharger loads. However, these load estimates should be specified as preliminary pending additional monitoring and analysis. Refinement of this estimate should occur through the adaptive management process and the proposed monitoring in the Implementation section of the Report and BPA."

Load estimates in the Basin Plan cannot be "preliminary." We have estimated loads from municipal and industrial wastewater dischargers based on available data. However, we are committed to revising these load estimates as new data become available, in the course of our adaptive implementation process as the commenter suggests.

San José Comment 7: "Include [Golden Gate outflow and degradation] losses as separate categories in the TMDL indicating negative loading terms or explicitly state how they contribute over time to attainment of waste load allocations assigned to various Source

Categories. For example, what percentage (if any) is the Central Valley Watershed load reduction from 42 kg/year to 5 kg/year expected to come from Golden Gate Outflow over time?"

PCBs losses from the Bay through the Golden Gate are implicit in the one-box model. During high flow events, when the high masses of PCBs enter the Bay from the Central Valley, a virtual river of fresh water, floating on top of the salt water, and flows directly out the Golden Gate. It is therefore fully justified to assume that a significant mass of PCBs passes from the Central Valley, through the Bay, and out to the ocean during high flow events.

San José Comment 8: "The City recommends that uncertainties be addresses prior to requiring additional load reduction activities and implementation actions be developed consistent with "maximum extent practicable." The Report should indicate load reductions and implementation actions for urban runoff dischargers are preliminary. The City recognizes the net environmental benefit of sediment control measures for PCBs and other particle bound pollutants. However, measuring and demonstrating PCBs load reduction resulting from sediment control actions is not currently practicable or feasible."

We acknowledge the inherent uncertainty in PCBs load estimates for stormwater runoff. Consequently, our implementation plan for stormwater load reductions is based on principles of adaptive implementation. Specifically, our approach is to begin with implementation of load reduction activities that have a significant chance of success, while we study or pilot-test feasible implementation measures that carry less certainty of effectiveness in reducing PCBs loads. These studies will include measuring and demonstrating PCBs load reduction resulting from sediment control actions.

San José Comment 9: "The augmentation of 0.9 kg/year Bay-wide for Municipal Wastewater Dischargers that accept Urban Stormwater may not be sufficient. There does not appear to be a mathematical or scientific justification for this allocation reserve.

"A more rigorous and transparent justification for this reserved allocation of 0.9 kg/year is required. An analysis of how this reserved allocation will provide adequate protection for POTWs should be included in the Report and BPA. The City recognizes that targeted diversion of Urban Stormwater for Municipal Wastewater treatment could provide a net environmental benefit. However, since POTWs are expected to maintain current performance with respect to PCBs removal, the City is concerned that the 0.9 kg/year augmentation may not provide sufficient protection for POTWs that accept Urban Stormwater into their system. Given the uncertainty regarding PCBs loads and allocations for Urban Stormwater, it could be possible for POTWs to exceed even the augmented Waste Load Allocation if they accept PCBs loads from Urban Stormwater."

The allocation reserved for Municipal Wastewater Dischargers that accept Urban Stormwater is based on the balance of the TMDL that remains once all of the other allocations are subtracted from it. It does not reflect an analysis of the actual benefit or consequence of such treatment, but initial implementation is expected via small-scale pilot projects to determine the feasibility of

larger scale implementation. Also, to the extent that PCBs in urban runoff are attached to sediments and municipal wastewater treatment systems remove about 90% of sediments in untreated wastewater, the proposed allocation could account for treatment of nearly half of the current predicted urban stormwater PCBs load of 20 kg/yr.

San José Comment 10: "The South Bay Salt Pond Restoration Project should be described as a current and future uncertainty that will be considered in the adaptive management process. While it is impossible to predict the impacts of the restoration project on the recovery of the Bay from PCB impairment, it is known that the restoration is occurring, on-going, and likely to affect sediment bound pollutants in some fashion."

We agree that the South Bay Salt Pond Restoration Project illustrates the need for a sediment and PCBs model with better spatial resolution. While we believe that the project is an unlikely source of significant PCBs loads to the Bay, it could have a measurable impact on the sediment budget in the South Bay. The South Bay Salt Pond Restoration Project is developing a sediment fate and transport model. We will track this effort that we expect to help us understand the effect of the salt pond restoration project on sediment supply and movement, and therefore on the fate of PCBs in the South Bay.

Baykeeper, Clean Water Action, and Communities for a Better Environment

BayKeeper et al. Comment 1: "The fish tissue target in the proposed TMDL is not adequate to protect beneficial uses….The proposed fish tissue target is unreasonably high in light of information about fish contamination and consumption in the Bay Area. One in ten Bay anglers consumes more fish than considered safe by the Office of Environmental Health Hazard Assessment….In addition to PCBs, those fish may also contain high levels of other pollutants such as…PBDEs, DDT, and dioxins. Therefore, according to peer reviewer, Dr. David Carpenter, setting a fish tissue target based solely on PCBs is likely to significantly underestimate the risk of Bay fish consumption....[We] strongly urge the Water Board to recalculate the fish tissue target using more conservative assumptions, including a risk factor of at least 1 in 1,000,000."

The TMDL is designed to protect the beneficial uses of the Bay, specifically the use designated to protect humans consuming Bay fish from harm. We used standard calculations and assumptions to derive this target, which will protect humans consuming fish from additional harm. The proposed TMDL fish tissue target is protective of the general population at a risk level10^{-6}. The fish tissue target is based on protection of people who consume bay fish at the risk level of 10^{-5}, and it is also conservative since it was derived using an upper bound consumption rate for this subpopulation. It is reasonable to assume that this numeric target is protective of the general population as only a small fraction of the overall population catch and consume fish in the Bay. To set a target that is ten times lower is not realistic at this time. As indicated by other commenters, attainment of the proposed fish tissue target and resulting TMDL and allocations will already be very challenging. We expect our proposed adaptive implementation plan designed to track attainment of allocations and ultimately the target in phases will result in knowledge and insight as to the most protective levels that are attainable.

The effects of multiple pollutants on biota are poorly understood; while some pollutants may have synergistic effects on organisms, others may result in antagonistic effects. While addressing the synergistic effects of chemical stressors is not a requirement for any individual TMDL, We have accounted for interactive effects by incorporating conservative assumptions into the impairment assessments and numeric target, which is specifically intended to protect humans consuming fish from harm. Nevertheless, we share the concerns regarding other pollutants in Bay fish and will pursue preventive and corrective actions to address them in future projects.

Baykeeper et al. Comment 2: "We further note that a less protective target has significant environmental justice implications. Of the fishermen who eat more than two meals each month of Bay fish— the maximum amount recommended by OEHAA—seventy-five percent (75%) are persons of color with incomes under $45,000 a year. Low income communities and communities of color, therefore, are disproportionately affected by PCBs contamination and will not be adequately protected unless the fish tissue target is recalculated."

The TMDL protects all consumers of Bay fish, and we acknowledge the majority of people who consume Bay fish are from low income communities and communities of color. The target is

designed to ensure protection for people eating fish from the Bay at a level of 10^{-5} and is based on a consumption rate greater than two meals a month.

Baykeeper et al. Comment 3: "The TMDL should contain a sediment target. Unlike the PCBs TMDL Staff Report prepared in 2004, the proposed TMDL lacks a numeric target for bedded sediments. According to the 2004 report, sediments are the largest environmental reservoir of PCBs in the Bay and PCBs uptake by biota from sediment is "likely to be *the* most important pathway for PCBs bioaccumulation in fish." As explained in the 2004 report, a sediment target is necessary because reducing concentrations in Bay sediments is the most effective means of reducing fish tissue PCBs concentration and the TMDL is largely focused on reducing PCBs through reductions in sediment loads and PCBs concentrations in those loads. Considering the previous report's emphasis on a sediment target and the relationship between sediment and fish tissue concentrations, the rationale for removing the sediment target is unclear.…Should the Water Board decline to reinsert a sediment target, the TMDL must explain the scientific and policy reasons for removing it."

We disagree that a sediment target is a necessary part of this TMDL. The fish tissue target is a direct expression of desired conditions in the Bay that will protect sport fish consumers. A target for sediment is unnecessary because attainment of the TMDL and water quality standards will require, and in fact is based on, reducing concentrations of PCBs in Bay sediments. The TMDL is based on attainment of a sediment concentration that will result in attainment of the fish tissue target (see section 9 (Linkage Analysis) of the Staff Report). Establishing a sediment target provides no added value.

Baykeeper et al. Comment 4: "More detail is needed about implementation of urban stormwater load reductions….The proposed TMDL's implementation description lacks sufficient detail to ensure implementation of urban stormwater load reductions within the specified time. While it states that reductions in urban stormwater loading should occur within twenty years, it fails to state how those reductions will occur or on what timeframe. At a minimum, the TMDL should identify the specific TMDL-related actions in the proposed municipal regional stormwater permit and state a schedule for completion of each. For example, the TMDL should require completion of each of the pilot projects identified by 2010 and require identification, investigation and abatement of land with elevated PCBs concentrations by 2018."

The commenter should be aware that the Water Board cannot prescribe specific implementation actions—it can only require responsible parties to meet targets and allocation in the specified timeframe. The section 11 (Implementation Plan) of the Staff Report lists actions that parties may reasonably use to reduce PCBs loads to the Bay and remove PCBs from sediments. If parties are aware of, or devise other actions that will have the same effect, they are free to adopt those options. We have revised the Stormwater Runoff parts of the Basin Plan amendment and Staff Report Implementation Plan sections to clarify the phased implementation schedule associated with NPDES permit five-year terms.

Baykeeper et al. Comment 5: "Attainment of Wasteload Allocations for stormwater should be demonstrated using multiple methods…. For the TMDL to be successful…loading from urban stormwater must be dramatically reduced and that reduction must be quantifiable and demonstrable. The draft TMDL, however, allows stormwater permittees to show progress towards wasteload allocations using widely different methods, each of which is based on different assumptions and is likely to produce very different assessments of whether compliance is achieved.

"Moreover, the proposed TMDL fails to articulate the basis for selecting these methods and we question whether they will produce meaningful information about actual reductions in loading. For example, PCBs strongly associate with sediments, yet the proposed TMDL would allow permittees to rely only on flow and water column data to estimate reductions. Similarly, the proposed TMDL allows permittees to estimate load reductions resulting from pollution prevention activities and source and treatment controls yet we fail to see how a specific load reduction could be assigned to a pollution prevention activity or other control given all the variables that affect PCBs loading.

"Before specifying any methods to quantify reductions in loading, the Water Board must explain the rationale for selecting those methods and the limitations of each. If multiple methods are available, the TMDL should require The use of multiple methods will provide a better understanding of the limitations of each method and would be a more valid way of evaluating progress toward attaining the TMDL's wasteload allocations. We ask that the Water Board explain the basis for selecting the three methods identified on page A-9 of the draft TMDL and consider requiring permittees to demonstrate progress using all three methods and a weight of evidence approach."

We have removed specification of these means of demonstrating compliance from the allocations. Instead, we have revised the Stormwater Runoff parts of the Basin Plan amendment and Staff Report Implementation Plan sections to clarify the phased implementation schedule and associated requirements associated with NPDES permit five-year terms. Dischargers are expected to use a "weight of evidence approach" that involves the use of all available methods to demonstrate compliance with permit requirements.

Baykeeper et al. Comment 6: "The TMDL and any municipal stormwater permit should require municipalities' stormwater inspection programs to include abandoned sites. The primary way that the PCBs TMDL will reduce loading is through implementation of the municipal stormwater permit once it is adopted. One significant limitation of the draft permit and current stormwater programs is that they do not require stormwater inspections of industrial facilities that are abandoned or no longer in operation. The TMDL should specify the regulatory actions the Water Board will take to ensure all sites which are potentially significant sources of PCBs (i.e., industrial sites active at any time from the 1940s through the early 1980s) will be identified, investigated, prioritized for sampling and inspection, and followed up with appropriate cleanup action."

Inspection of abandoned sites is implicitly required by the proposed phase implementation plan. The proposed phased implementation plan calls for municipalities to investigate of on-land PCBs contaminated soils and/or sediments whether from active or abandoned sites. The regulatory mechanism to require remediation will be determined on a case by case and may involve federal, state, or local authority.

Baykeeper et al. Comment 7: "Codification of the MEP and BAT standards is inappropriate. The implementation plan for controlling PCBs inappropriately specifies that all municipal stormwater permits requirements will be based on the maximum extent practicable standard ("MEP") and that pollution from construction and industrial sites shall reduce discharges based on the best available technology economically achievable ("BAT") standard.

"[A TMDL requires that]…the State…determine the maximum amount of pollutant that a waterway can accept from each discharger and still achieve water quality standards taking into account neither economic feasibility nor economic consequences. The NPDES permit for each discharger, then, must contain effluent limits based on and consistent with the TMDL's wasteload allocated for that discharger.

"The language in the draft PCBs TMDL is inconsistent with the TMDL regime because it restricts permit limits to those based on MEP or BAT for municipal and non-municipal stormwater permittees respectively. Instead, the draft TMDL should state that stormwater permits shall contain requirements based on the applicable standard (MEP for municipalities and BAT for other dischargers) and any more stringent requirements necessary to implement the wasteload allocations in the TMDL. This change will ensure that the Water Board retains its ability to include in permits more stringent requirements should they be necessary to implement the TMDL and achieve water quality standards."

The TMDL does not codify MEP and BAT standards. The TMDL states that the allocations, which by definition are necessary to implement the TMDL and achieve water quality standards, will be implemented via stormwater permits. The reference to MEP and BAT only applies in the context of the phased implementation plan that anticipates iterative advances in MEP and BAT controls on a permit term basis leading to attainment of the water quality based allocations. The TMDL also states that all permits must be consistent with Section 4.8 - Stormwater Discharges of the existing Basin Plan, which already calls for requirements for stormwater discharges to attain water quality objectives.

Baykeeper et al. Comment 8: "The TMDL should commit the Water Board to ensuring that on-land site cleanup standards are protective of water quality. One of the comments repeatedly raised during the October 2006 TMDL Roundtable Meeting was that the standards for a cleanup under CERCLA or RCRA are designed to be protective of human health and not water quality. Efforts to reduce PCBs loading in stormwater, therefore, are likely to be frustrated if site cleanups fail to remediate PCBs levels to the extent or in such a way that these sites no longer remain a significant source of PCBs in stormwater. This possibility was explicitly recognized in the Clean Estuary Project's 2006 PCBs TMDL

Implementation Plan Development Report, which noted that washoff from remediated sites could be substantial as 'annual washoff quantity is usually not a PCB-contaminated site remediation endpoint,' and sites that may have undergone remediation may still have significant amounts of PCBs present in soils. The TMDL, therefore, should commit the Water Board to developing clean up standards for on-land sites that may contribute to PCBs loading and to ensuring that those standards become part of all cleanups."

It is not possible to develop generic clean-up standards that apply to every foreseeable contaminated site. The usual approach taken by regulatory agencies has been to develop generic screening levels based on an average set of assumption, but develop site-specific clean-up levels based on nature and extent of contamination, risk posed and potential for risk reduction, and consideration of costs. Many clean-ups are undertaken under either USEPA or California DTSC oversight, and we acknowledge that clean up standards designed to be protective of human health may not be adequate to protect water quality.

Regulations and guidance for cleaning on-land contaminated sites are well established, and usually target the protection of human health and/or ecological risk to wildlife. In the TMDL, we do not propose to change this well established approach. However, we have included an implementation action in the TMDL to investigate and identify locations within the municipalities' watersheds with elevated concentrations of PCBs. These investigations should lead to the identification of areas where PCBs were either applied in the landscape, on buildings, or spilled from contained or semi contained uses. The regulatory mechanism to require remediation of these areas will be determined on a case by case and may involve federal, state, or local authority. Regardless, the Water Board has the authority to approve, disapprove or condition remediation actions, and the TMDL requirements provide sufficient cause and transparency to ensure that remediation requirements will be adequate to protect water quality.

Baykeeper et al. Comment 9: "The TMDL must specify a timeframe for clean up of in-Bay contaminated sites. Currently, the proposed PCBs TMDL provides a deadline for including specific actions into site cleanup plans but lacks a date by which all clean-ups must be completed. As mentioned above, a TMDL is intended to initiate action to cleanup a waterway. Without sufficient detail regarding implementation, the TMDL's effectiveness is limited. In order to drive cleanups and ensure expeditious completion of those already underway, the TMDL should state a deadline by which the cleanup plans for all in-Bay contaminated sites will be completed."

Contaminated site investigations and evaluation of remedial activities will occur due to existing regulations whether or not called for in this TMDL. The TMDL does not drive the investigation and remediation of in-Bay PCBs contaminated sites. However, the TMDL recognizes the benefits that remediation of these "hot-spots" will provide in terms of accelerating recovery of the Bay from impairment due to elevated PCBs in sports fish. The timeframe for remediation of in-bay contaminated sites will be determined following the process described in the TMDL. The Water Board will set priorities for investigation and remediation of sites, and the time frame for cleanup will be set on a case-by-case basis.

Baykeeper et al. Comment 10: "The TMDL should address the likelihood that erosion may uncover contaminated sediments. As recognized by Water Board staff, certain sections of the Bay are believed to be eroding and this erosion could uncover contaminated sediments. While the draft TMDL acknowledges that the uncovering of contaminated sources may contribute to loading, it makes no attempt to quantify this source or to address this possibility in terms of the margin of safety or other mechanism. We are deeply concerned that erosion may ultimately increase fish tissue concentrations and request that the TMDL more explicitly address this possibility."

We recognize that the fate of PCBs in Bay sediments will affect the rate of recovery of the Bay. While it is not possible at this time to fully quantify loadings of PCBs associated with erosion of contaminated sediments, the mass budget model includes a constant degree of erosion through a profile of PCBs with initially increasing PCB concentrations. The model still resulted in attainment of the target within 40 years.

However, because we share the commenters' concern with future erosion of PCBs-laded sediments, as an early implementation action that is part of the adaptive implementation of the TMDL, we are participating in a current program evaluating the vertical distribution of PCBs, and the degree of burial of PCBs, in the Bay, as well as erosion and/or depositional status of sediments. This is a Regional Monitoring Program project.

For this study, cores were collected in open waters of the Bay. The sediment will be radio-dated and analyzed for PCBs. Results will indicate whether there is a buried pool of PCBs at depth in the Bay and if so, its potential for release to overlying waters and aquatic organisms. This information will inform the adaptive management process.

Baykeeper et al. Comment 11: "A recent study of PCBs in wastewater undertaken in support of a PCBs TMDL for the Delaware River concluded that wastewater was a more significant source than previously estimated. The study was based on data submitted by all the NPDES permit holders in the watershed as required by their permits and the Delaware River PCBs TMDL. As part of the study, all dischargers analyzed effluent using an analytical method—Method 1668A—to quantify PCB concentrations at picogram per liter concentrations. The study results demonstrated discharges from wastewater were of sufficient magnitude to cause the water quality standards to be exceeded. It also concluded that most of the loading during wet weather was associated with combined sewer overflows.

"Many NPDES permits issued by the Water Board currently contain effluent limits for PCBs of 0.5 μg/L, which is the reporting limit for the method used by the dischargers. To our knowledge, no Bay Area dischargers have exceeded this limit in recent memory. Because the limit is equal to the reporting limit, the dischargers report that PCBs were not detected or detected but not quantified. Calculating the annual mass of PCBs discharged by permittees is difficult because the reporting limit and their effluent limits are typically higher than the concentration being emitted. Considering that many of these permittees discharge millions

of gallons each day, PCB concentrations less than 0.5 μg/L may equal a substantial mass of PCBs discharged annually.

"The TMDL appears to circumvent the reporting limit challenge by calculating loadings from all municipal dischargers based on two sampling events conducted on the effluent of five dischargers using secondary treatment and four sampling events for the four using advanced treatment. Similarly, the loads for refineries were calculated based only on two sampling events, although at all Bay Area refineries. Considering the limited sampling size, the recognized variability in PCB concentrations across municipal wastewater treatment plants, the possibility of temporal variability, and the results of the Delaware River study, we believe that additional monitoring is appropriate. We strongly recommend that the Water Board revise the TMDL to require all NPDES permit holders to use Method 1668A to better determine actual loading from point sources. This data can then provide a basis for revising the TMDL wasteload allocations should loading from wastewater be greater or less than originally estimated."

As noted, we estimated the loads of PCBs using Method 1668A for a few sampling events at a selected number of wastewater facilities. The PCBs concentrations in the discharges were of the same order of magnitude as those in the Bay, except in the South Bay where the advanced treatment facilities' discharged PCBs concentrations were lower than that in the Bay. These results show that PCBs in wastewater discharges are a small external load to the Bay, and very small compared to the internal reservoir in the Bay. We are aware of the Delaware River area data, but we do not consider them an indicator that our Bay area wastewater load estimates too low. Many of the Delaware River area plants serve combined sewer systems, and there are many PCB contaminated Superfund sites in the Delaware River area.

We acknowledge there is uncertainty in these load estimates due to the limited sampling size, the variability in PCBs concentrations across municipal wastewater treatment plants, and the possibility of temporal variability. That is why the TMDL calls for monitoring to demonstrate attainment of wasteload allocations using a low detection method such as Method 1668A. Even though Method 1668A has not been authorized by USEPA for use for compliance determinations in the 40 CFR Part 136 regulations, we consider an appropriate tool to characterize discharge levels of PCBs. We will also consider revising the TMDL wasteload allocations if justified by additional discharge data.

Baykeeper et al. Comment 12: "Finally, we note that studies have clearly shown a relationship between decreased effluent PCBs concentration and increased wastewater treatment. Most, if not all, Bay area publicly-owned treatment works regularly discharge untreated or partially treated wastewater in the form of sewer overflows, combined sewer overflows, and bypassing and blending events. Please clarify whether the load allocations for municipal wastewater takes into account loading from wet weather events."

The load allocations for municipal wastewater facilities represent the total annual load that a facility may discharge including bypassing and blending events. They do not account for prohibited sanitary sewer overflows. San Francisco's combined sewer overflow discharges are accounted for in its stormwater runoff allocation.

Baykeeper et al. Comment 13: "According to the draft TMDL, the Central Valley is the largest source of PCBs loading to the San Francisco Bay, contributing an estimated 42 kg/year. The TMDL assigns the Central Valley a final load allocation of 5 kg/yr but neither the TMDL nor the Staff Report explain how that load allocation will be achieved other than through natural attenuation. Reliance solely on natural attenuation to achieve a 37 kg/year reduction is concerning. In fact, estimates of the degree and time in which other contaminants attenuate, including some pesticides, have proven to be overly optimistic. We remind the Board that the Clean Water Act contemplates that water quality be brought into compliance within a reasonably quick period of time, with the expectation that specific strategies be carried out to meet those goals. We ask, therefore, that the Water Board identify any and all actions necessary to ensure that the Central Valley load allocation will be achieved within the expected timeframe."

There is sufficient reasonable assurance that the Central Valley allocation will be achieved. Sediments currently entering the Bay from the Central Valley have lower PCBs concentrations than in-Bay sediments, a condition we expect will continue. We are not aware of any specific sources of PCBs in the Central Valley that would affect the Central Valley loading if they were regulated or remediated. Also, calculating the decline in PCBs over time due to natural attenuation (using a half-life of 56 years), we estimate that the Central Valley load allocation will be attained in about 40 years (see Staff Report section 7.2). Verification of ongoing Central Valley loads and load reductions will be a regular component of the Regional Monitoring Program. Accordingly, natural attenuation and loads monitoring provide reasonable assurance Central Valley allocation will be achieved and there is no need for further regulatory assurance.

Associated General Contractors of California, et al.

AGC et al. Comment 1: "We understand that the Board staff previously calculated a fish target of 111 parts per billion ('ppb'), 11 times greater than the current proposal, and, as recently as January 2004, proposed a target that was more than twice as high as the current proposal. The TMDL is 3.4 to 8.9 times as stringent as the California Toxics Rule water-quality criteria set by the U.S. EPA to protect human health. The Board bears a heavy burden to demonstrate why it needs to subject the regulated community to such an extraordinarily stringent target."

The comment refers to a series of calculations we did internally to evaluate different assumptions/approaches to calculating the fish tissue target. A 111 ng/g target, which is based on a fish consumption rate of 6.3 g/day for the general population and a risk level of 10^{-5}, is clearly not as protective as the CTR-derived water quality criterion, which is based on a fish consumption rate of 6.3 g/day for the general population and a risk level of 10^{-6}, and therefore not acceptable as a fish tissue target since the target must reflect attainment of all applicable water quality standards. The change from 20 ng/g in the 2004 report to 10 ng/g in the proposed Basin Plan amendment represents the correction of an error. The earlier fish tissue target was calculated with a slope factor representing a central tendency, while the recalculated target uses the upper bound slope factor as required by U.S. EPA. These differ by a factor of two. This correction results in a fish tissue target equally as protective of human health as the CTR water quality criterion.

AGC et al. Comment 2: "The ostensible benefits of the TMDL are minimal and speculative, as the TMDL is addressing theoretical risks, and is intended to protect a segment of the sport fishing population that probably does not even exist….Even if the TMDL would result in attainment of the 10 ppb fish-tissue target and even if such hypothetical anglers existed,…anglers would be able to buy and consume fish."

The TMDL is designed to protect the beneficial uses of the Bay, specifically protection of humans who consume Bay fish. This beneficial use does not need to reflect current use, rather is a reflection of future desired use. The fish tissue target in the TMDL, which was calculated following standard U.S. EPA guidance, is in the same range as PCBs targets calculated elsewhere, and will protect humans consuming Bay fish. Protection of people who consume fish from markets and at restaurants and the adequacy of the federal Food and Drug Administration's national tolerance level is beyond the scope of this TMDL project.

AGC et al. Comment 3: "The TMDL would result in no material benefits to the ecosystem as current levels of PCBs are not hurting fish or wildlife. Bay waters are in compliance with the California Toxics Rule for the protection of aquatic life. Likewise the vast majority of PCB concentrations in Bay sediment are well below screening levels set by the U.S. EPA for the protection of wildlife."

The Bay is not in compliance with human-health based water quality standards for PCs. Also, in a recent report, USFWS suggested that piscivorous birds feeding in the Bay's shallow waters, such as the Caspian terns, Forster's terns, and the federally endangered California least tern, are the primary wildlife foraging guild at risk in the Bay. As such, impairment of wildlife, aquatic habitat, and rare and endangered species beneficial uses cannot be dismissed. In order to adopt a TMDL, a demonstration that all applicable will be attained is required. In this TMDL, we have included a demonstration that attainment of the human-health based fish tissue target will also protect and/or attain all applicable beneficial uses.

AGC et al. Comment 4: "The TMDL calls for a 95 percent reduction of PCBs in stormwater to help meet the TMDL's proposed water column concentration of 19 to 49 parts per quadrillion. BMPs could not be expected to achieve these extremely low concentrations—in fact, there is no technology demonstrated to achieve these levels in stormwater on a wide-scale basis. The TMDL calls for hundreds of millions of dollars to be spent annually on removal of PCBs from stormwater, without analysis to demonstrate that such removal is necessary or feasible at any particular Bay locations."

The TMDL does not propose any water column concentrations. Nevertheless, we realize attainment of the stormwater allocations poses a significant challenge. Our implementation plan for stormwater load reductions is based on principles of adaptive implementation. Specifically, we plan to begin with implementation of load reduction activities that have a significant chance of success, while we study or pilot-test additional implementation measures, including consideration of costs. We also expect measures that control PCBs will also reduce many other pollutants. One potentially effective measure is strategic routing of stormwater runoff to wastewater treatment systems. We also expect reductions in PCBs loads will occur due to natural attenuation. Within ten-years we expect pilot studies to be completed and identification of controls needed in addition to natural attenuation to attain the allocations. If more than 20 years is needed to attain the stormwater allocations or a higher allocation is justified, the Water Board will consider revising the allocations and or schedule as indicated in the adaptive implementation section of the Basin Plan amendment and associated Staff Report.

AGC et al. Comment 5: "Additional huge sums would be necessary to physically remove PCBs from sediments in the Bay margin, where the Board calls for mass removal of PCBs through dredging and capping, without regard to any risk reduction benefits that might accrue."

We have not specifically asked for the removal of sediments by dredging followed by capping. We consider this as a potential alternative action in the Regulatory Analyses section of the Staff Report (original and revised versions). In the discussion on "Special Studies" in section 11 of the Staff Report, we call for site-specific investigations into the distribution of PCBs at in-Bay sites, along with an analysis of the risks posed by PCBs at such sites, and the feasibility of various remedial actions if warranted.

AGC et al. Comment 6: "Given the potentially huge costs of the TMDL, and the very minimal benefits associated with it, the TMDL does not reflect a reasonable balance between costs and benefits. Adoption of the TMDL would violate the economic and business priorities of the Administration, and the reasonable balance called for by the Board's governing statute, the Porter-Cologne Act."

The extremely large cost estimated by the commenters is based on an assumption that the TMDL will result in new infrastructure providing storage and treatment of most if not all urban runoff in the Bay area, in order to attain the wasteload allocations for urban runoff. We strongly contest this thesis. The TMDL will not result in a requirement that municipalities store and treat large volumes of urban runoff, although it does encourage strategic interception and treatment of stormwater when and where a treatment plant's treatment capacity will not be exceeded. Furthermore, the State Water Resources Control Board's "NPDES Stormwater Cost Survey" (2005, Appendix H-Alternative Approaches to Stormwater Quality Control) documents that there are far less expensive approaches available that, if implemented, would achieve high levels of compliance with current water quality objectives, and to a high degree satisfy the implementation section of this TMDL for urban runoff.

AGC et al. Comment 7: "The TMDL has serious errors in its data, modeling, and analysis that leaves the Board without an accurate understanding of PCBs in the Bay…By applying a model that violates basic principles of physics (i.e., conservation of mass, the TMDL significantly understates the ability of the Bay to assimilate PCBs. The TMDL also ignores extensive, reliable data showing that the Bay is recovering from PCBs with half the PCBs dissipating every six to twelve years. External loads from the Central Valley, non-urban runoff, the atmosphere and rainfall are indefinite, and based on inappropriate, incomplete, or the faulty interpretation of data. The TMDL uses an uncalibrated mode1 to calculate stormwater loads and then arbitrarily assigns load reductions to counties based on their populations."

We have corrected errors in the TMDL Staff Report, and added natural attenuation to the mass budget model (see Staff Report section 9.2). The model which was subjected to scientific peer review does not violate basic principles of physics, and we provide definitive estimates of all external loads. We recognize there are uncertainties associated with estimates of stormwater loads and allocations. Based on our assumption that PCBs are associated with urban areas, we allocated loads based on population since this is a good indicator of urban areas.

AGC et al. Comment 8: "Our organizations believe that an analysis of economic and environmental impacts of the Board's proposal must be conducted and that the Board has not yet developed that information. The information that is available shows that implementing the TMDL will have a potentially huge price tag, however, and will cause significant environmental impacts-including destroying healthy benthic communities, emissions of criteria pollutants, consumptions of landfill capacity, and emissions of green-house gases."

In Section 12 (Regulatory Analysis) of the June 2007 Staff Report, we presented a discussion of economic considerations as well as our evaluation of the potential environmental impacts that could result from implementation of the PCBs TMDL. In the revised Staff Report (December 2007), the Regulatory Analysis section provides an expanded discussion of both economic considerations and, in some cases, a more detailed explanation of our evaluation of environmental impacts.

While we acknowledge that remedial dredging could cause some environmental impacts to air quality and benthic communities, we strongly disagree that these would be significant, for several reasons:

It should be noted that the PCBs TMDL does not trigger or require remediation of in-Bay contaminated sediments. Such cleanups are ongoing in some locations and planned for others under already existing regulatory programs.

Dredging is only one option for remediation at contaminated sites and is likely to be desirable or required only in limited areas.

Benthic communities are adapted to the dynamic fluctuating estuarine environment, are not threatened or endangered, and should be able to re-colonize easily from surrounding undisturbed Bay floor.

While some impacts to air quality might also occur, for the reasons outlined above, we identify a number of best management practices which would be required as conditions of required permits, and which would mitigate such impacts.

AGC et al. Comment 9: "Our organizations request the Board to pursue less costly, more environmentally sensitive alternatives to the proposed TMDL such as monitored natural attenuation with an education and outreach program for subsistence fisherman."

Without further PCBs load reductions except for natural attenuation, the mass budget model predicts that the Bay will not recover for 100 years. However, with the proposed TMDL, the model predicts recovery within 40 years upon achievement of the TMDL. We therefore selected the proposed TMDL as a preferable alternative to natural attenuation. Nevertheless, our proposed TMDL adaptive implementation plan is designed to identify and implement feasible, cost efficient, and environmentally sensitive control actions.

Bay Planning Coalition

BPC Comment 1: "*General accounting of sources and losses from dredging and dredged material disposal.* With the mercury TMDL as your foundation for assessing loading from dredging and sediment disposal, BPC supports your analysis that in-bay dredging and disposal has a net zero loading allocation. Moreover, we support your use of the LTMS implementation plan as a basis on which to identify a -3.3 average annual estimated PCB Mass (kg/yr) loss associated with dredge material disposal. Also we note your agreement with the scientific understanding that the mass of PCBs resuspended by dredging and transported by in-bay disposal are "small" relative to the suspension and deposition assumed for the active layer."

Comment acknowledged. We appreciate the support of the Bay Planning Coalition.

BPC Comment 2: "*Sediment Dredging.* "The Report proposes that the 'PCB concentration in dredged material disposed of in the Bay not exceed the 99th percentile total PCBs concentration of the previous 10 years of Bay surface sediment samples collected through the RMP'. This same requirement was adopted in the mercury TMDL, and it poses a problem for us. This percentile changes frequently--it is a moving - target. It increases the threshold being used by the DMMO on which to make permitting decisions. As the 10-year period slides forward in time, the ambient concentration should become lower. This could hurt smaller dredgers in the future who maintain their harbors infrequently, once very 5-10 years. Sediments would be buried after dredging in one year and be consistent with background concentrations, but exceed a future background concentration. We propose a lowering to the 90th percentile which is what we proposed for the mercury TMDL."

We recognize the concern, but for now—in order to remain consistent with the mercury TMDL—we are maintaining the 99th percentile level of the prior 10 years. As we track implementation, we will consider future modifications to the requirement if problems materialize as the commenter suggests.

BPC Comment 3: "*Linkage Analysis and Food Web Bioaccumulation Modeling.* "We believe the assumptions on which the above 'modeling' is based are flawed. On page 54-55 the Report indicates that you have chosen sediment rather than biota, as the primary vector causing PCB concentrations and bioaccumulation in fish. Based on this approach, this means that a sediment management strategy will have to be employed to reduce sediment concentrations to the fish tissue level of 10 ppb. As a general approach, this natural recovery will be impossible to achieve. We note that one of your assumptions is that PCBs are really deposited into the Bay from the watershed, and so we believe that a management strategy should be redirected at that assumption."

The role of sediments in providing a source of PCBs to biota is well known. This interaction is explicitly included in the mass budget model through the use of partitioning coefficients which calculate the relative concentrations of PCBs in sediments and water. This is a well established

scientific approach to calculate the relative amounts of PCBs in sediment and water at equilibrium. Furthermore, the food web model makes use of biota-sediment accumulation factors, which represent the concentration of PCBs in tissues of an organism relative to that in sediment. The use of accumulation factors is also accepted in the scientific and regulatory literature. Also, the food web model incorporates a representation of the diet of fish, and specifically models the transfer of PCBs from sediment and water to benthic and pelagic biota and finally from biota to fish. Finally, our adaptive implementation approach relies on natural attenuation accelerated by reductions of loads from stormwater and the Central Valley, as well as a reduction of the reservoir of PCBs already in Bay sediment. This strategy should not affect maintenance dredging of newly deposited sediment unless there is an on-going near-by source of PCBs contributing to sediment contamination.

BPC Comment 4: "*Other Technical Problems.* The theoretical bioaccumulation model does not take into account how PCB's can vary dramatically between different ecosystems, due to site specific hydraulic, biological, chemical, and ecological factors that affect bioavailability and bioaccumulation. For instance, there are substantial differences in the toxicity of various PCB congeners, differences in the degree to which such congeners can be sequestered in the sediment such that their bioavailability is reduced, and substantial differences in the process of breakdown of congeners. More analysis is needed to assess the relative distribution of congener patterns relative to fish tissue."

We recognize the limitations of the steady-state food web model. However, this model provides estimates of site-specific concentrations of PCBs in the food web based on water and sediment data. The model input uses congener-specific data in water and sediment to estimate the concentration in fish and other aquatic species. It is a state of the art model that has been peer reviewed by the scientific research community and the regulatory community. Furthermore, the State selected this model by for the development of sediment quality objectives. However, we still expect to improve on this model in the future if it becomes necessary and appropriate.

BPC Comment 5: "*Sediments as a sink.* The literature on dredging and sediments shows that sediments sequester contaminants and release only a small fraction of constituents. This fact should be reflected in the PCB TMDL."

The interaction of PCBs with sediments is well known. This interaction is explicitly included in the mass budget model through the use of partitioning coefficients which calculate the relative concentrations of PCBs in sediments and water. This is a well established scientific approach to calculate the relative amounts of PCBs in sediment and water at equilibrium. Furthermore, the food web model makes use of biota-sediment accumulation factors (BSAFs), the relative concentration of PCBs in tissues of an organism to that in sediment. The use of BSAFs is accepted in the scientific and regulatory literature.

BPC Comment 6: "*Other relevant studies.* Two studies, a US Army Corps of Engineers evaluation of the HARS site in New York and a Willamette River study, were recently

completed that indicate that PCBs primary transport mechanism is through the water column, not sediments. This is reflected by the congener pattern."

We do not have access to these reports. We have requested further references from the commenter, but were not provided links to them. Nonetheless, the PCBs TMDL is based on our understanding of the Bay and of PCBs in the Bay.

BPC Comment 7: "*Implementation actions for sediment and dredge material disposal.* The dredging implementation component of the PCB (and Mercury) TMDL is based on the subscription to the LTMS 40% ocean, 40% upland and beneficial reuse and 20% in-bay disposal plan. The dredging community diligently works towards achieving the LTMS disposal plan and is making good progress. However, the plan is a disposal target, not a regulation. Reaching this target is, in part, dependent on variables beyond the control of dredgers, such as a timely permit process and available funding. Thus, we would like the Regional Board to understand that TMDL implementation cannot strictly rely on the dredging community adherence to the 40-40-20 plan because we can only achieve it if it is financially and practically feasible to do so, and that permits are approved."

We concur and recognize that the LTMS disposal is a plan rather than a regulation. As such, the TMDL does not rely on out of Bay disposal to attain its target.

BPC Comment 8: "Finally, we have one general comment to be considered when developing future TMDLs. As the Bay and watershed is a dynamic ecosystem, individual TMDL criteria and implementation plans must be developed to ensure that the plans are complementary and provide for adaptive environmental management. We look forward to participating in the TMDL program in the future to ensure the integration of sound science and the balancing of economic and environmental policy goals."

We are coordinating the adaptive implementation sections for Bay TMDLs. For example, we propose the same approach to determine the suitability of in-Bay disposal of dredge material as was incorporated in the mercury TMDL.

Roger James

Roger James Comment 1: "Application of MEP to TMDLs: The reduction of pollutants to the "maximum extent practicable" is a technology based standard in the Clean Water Act, does not apply to compliance with water quality based standards and should be deleted in the 2nd paragraph on page 68."

We recognize that "maximum extent practicable" (MEP) is a technology-based standard, and that water quality-based requirements must ultimately apply. The TMDL states that the allocations, which by definition are necessary to implement the TMDL and achieve water quality standards, will be implemented via stormwater permits. The reference to MEP only applies in the context of the phased implementation plan that anticipates iterative advances in MEP controls on a permit term basis leading to attainment of the water quality based allocations. The TMDL also states that all permits must be consistent with Section 4.8 - Stormwater Discharges of the existing Basin Plan, which already calls for requirements for stormwater discharges to attain water quality objectives.

Roger James Comment 2: "Urban Storm Water Treatment by POTWs: While I agree that this should be explored, the feasibility is questioned and reliance on this as a possible solution should be quickly addressed and feasibility determined. The feasibility is questioned because runoff from areas with elevated PCBs in soils/ sediments will be from pervious areas.

"Studies by Pitt and Bozeman, 1982 Sources of Urban Runoff Pollution and Its Effects on an Urban Creek, USEPA-600/S2-82-090 have reported on the relative solids and other pollutant loadings from pervious and impervious areas in the San José area. They found that total solids loadings from pervious areas were over six times those from impervious areas.

"Dry weather nuisance flows from pervious areas will be minimal. Storm event runoff from pervious areas occurs later in a storm event, during larger events and during short-duration periods of high storm intensities when the ground is saturated. POTWs during these periods of rainfall will have minimal additional capacity to treat storm water runoff.

"McKee et al 2005 found a seasonal SSC "first flush", but also found that 90% of the annual loads occur during floods and that the maximum PCB concentration coincided with a high stream flows and maximum SSCs.

"The ability or willingness of POTWs to accept storm water runoff discharges during periods of high runoff or storm events should be quickly addressed so that the effort to identify effective BMPs can focus on other feasible control measures in the TMDL implementation plan and Regional Storm Water Permit."

We agree there are numerous uncertainties and challenges associated urban stormwater treatment by POTWs. We intend to work with POTWs and stormwater management agencies to determine feasibility in the early stages of TMDL implementation, particularly in drainage areas that have a high percentage of impervious area and high PCBs concentrations in storm drain sediments.

Roger James Comment 3: "Storm Design Criteria: The investigation of strategic runoff treatment retrofits must also include a requirement to develop the storm event volume, duration and short-term (5-15 minute) rainfall intensities that mobilize the sediments and associated PCB concentrations by particle size from the pervious areas with elevated PCBs in soils/sediments. The current storm event design criteria in the State's BMP manuals and NPDES Permits were not developed considering these criteria. It is highly likely that larger capacity flow thorough treatment BMPs will be required to address PCBs."

We agree that strategic runoff treatment retrofit studies must consider the storm event volume, duration and short-term rainfall intensities that mobilize the sediments and associated PCB concentrations by particle size from the pervious areas with elevated PCBs in soils/sediments.

Roger James Comment 4: "Improved System Design Operation and Maintenance: Street sweeping or street washing will not be effective BMPs in controlling runoff from pervious areas with elevated PCBs in soils/sediments unless those sediments were deposited on streets by wind from adjacent pervious areas with elevated PCBs in soils/sediments or were deposited on the streets during previous runoff events. Storm drain inlets are not effective in trapping sediments unless they have large sumped catch basins. Street sweeping, street washing and storm drain inlets should be deleted from further consideration because they will not be effective."

We recognize that these BMPs may have limited benefit, but we expect that they carry some merit, particularly when undertaken in conjunction with other measures. In any case we will evaluate their effectiveness in the pilot studies included in the adaptive implementation process.

Roger James Comment 5: "Control measures should focus on source control to prevent or abate PCBs in runoff, preventing erosion of soils from pervious areas with elevated PCBs in soils/sediments and treatment of discharges from the storm drain systems. The fewer options given to municipalities for further study and evaluation will lead to quicker implementation of feasible control measures."

We agree. These are the control measures we expect will to be evaluated and implemented in the early phases of the TMDL adaptive implementation plan.

Mirant Delta, LLC

Mirant Delta, LLC Comment 1: "The TMDL does not account for ambient PCBs in once-through cooling water. PCBs are ubiquitous in Bay sediment and will, from time to time, appear in the water column due to air deposition or stirring up of the bay as a result of wind, storms, tidal action or the actions of others. These suspended PCBs may be drawn into the intake structures of facilities using Bay water as once-through cooling water and may then appear in effluent monitoring for those facilities. A facility is not responsible for ambient PCBs, yet the wasteload allocations for industrial facilities (Table A-4) make no provision for ambient PCBs in once-through cooling water.

"The same issue was resolved in the Regional Board's Basin Plan amendment for the San Francisco Bay Mercury TMDL….The Regional Board added footnote (c) to the individual wasteload allocations for industrial discharges table. The footnote [to Table 4-z] reads:

"Wasteload allocations for industrial wastewater discharges do not include mass from once-through cooling water. The Water Board will apply intake credits to once-through cooling water as allowed by law.

"…Mirant suggests the same language be added as a footnote to Table A-4 of the San Francisco Bay PCBs TMDL."

We have revised the TMDL Basin Plan amendment to include the requested language in a footnote to Table A-4.

Mirant Delta, LLC Comment 2 : "Financial burdens for monitoring and evaluation should not be placed exclusively on point source dischargers. As the TMDL recognizes, the single most significant source of source of PCBs to fish, equal to all other quantified sources combined, is inflow to the San Francisco Bay from the Central Valley….Nonetheless, the TMDL proposes to place the entire financial burden of monitoring and evaluation of the TMDL's success on the discharger-funded Regional Monitoring Program….Point-source dischargers (wastewater and stormwater) should not continue to be the sole source of funding for the monitoring of PCB conditions in the Bay. We would suggest that the Regional Board actively seek additional funding at the local, state, and federal levels. One recommendation to the Regional Board is to make the TMDL expressly contingent on obtaining funding at the state and federal levels, proportionate to the "non-point source" contribution. Since the TMDL must be approved at both the state and federal levels, making the TMDL contingent on appropriate state and federal funding would assure that the costs of implementing to the TMDL are shared among all the appropriate parties."

The discharger-funded Regional Monitoring Program will be only one means to acquire additional critical data called for in the TMDL. Although PCBs loads from the Central Valley are large, concentrations of PCBs in sediments entering the Bay from the Central Valley are lower than PCBs in Bay sediments and we are not aware of any specific sources in the Central Valley that affect the loading. We certainly intend to work with the Bay area dischargers to find

other sources of funding to conduct studies, but it is not possible to make the TMDL expressly contingent on obtaining funding at the state and federal levels.

Pacific Gas and Electric Company

PG&E Comment 1: "PG&E supports the SFRWQCB's efforts to use good science to reduce PCB loading to San Francisco Bay."

Comment acknowledged.

PG&E Comment 2: "PG&E operates throughout northern and central California and is concerned with consistent implementation of the TMDL. PG&E urges the Board to take the necessary steps to ensure a consistent approach and further, encourage and foster cooperation amongst the various jurisdictions implementing the TMDL program."

We agree that cooperation among both municipal jurisdictions and the many parties affected by this TMDL are essential for is successful implementation. We will continue to work with all parties to ensure both consistency and success.

PG&E Comment 3: "The direct allocations for industrial dischargers includes an allocation for Hunters Point Power Plant. Hunters Point Power Plant closed in May 2006 and its NPDES permit was rescinded in June 2006. The plant is being demolished and the area will be remediated to residential standards. All activities at the site are covered by an industrial storm water discharge permit. Sara Everitt of PG&E spoke with Fred Hetzel of the SFRWQCB on August 17, 2007, and it is our understanding that Hunters Point will be removed from the allocation list for industrial dischargers."

We have removed the wasteload allocation for the Hunters Point Power Plant in the revised TMDL Staff Report and proposed Basin Plan amendment.

California Chamber of Commerce and General Electric Company, submitted by Latham & Watkins LLP

Cal. Chamber/GE Comment 1: "The TMDL documentation does not provide an adequate technical foundation for RWQCB to make an informed decision…."

This statement is followed by a list of comments (excerpted below) which comprises what the commenter describes as the "principle concerns" with the proposed TMDL. We have responded to each of these comments both here, and in later portions of the document where they recur with additional detail.

Cal. Chamber/GE Comment 2 : "*Assimilative Capacity Understated* – The model used to calculate the Bay's ability to assimilate PCBs artificially traps PCBs in the Bay that in reality flow out under the Golden Gate Bridge and to the open ocean. This artifact of the TMDL's analytical approach results in an estimate of the Bay's ability to assimilate PCBs that is too low by at least a factor of 2.5, which is very significant especially in light of the small quantities of PCBs allowed under the proposed TMDL."

We disagree that the Bay's assimilative capacity has been underestimated due to the model used. In fact, the model used to calculate this quantity accounts for PCB outflow through the Golden Gate. To do this, the model uses a technique called "scaling of PCB outflow". Scaling of PCB outflow was first implemented by Davis (2004) (Davis, J.A., 2004. The long-term fate of polychlorinated biphenyls in San Francisco Bay (USA). Environmental Toxicology and Chemistry, 23(10), 2396-2409) to account for a persistent pattern of declining PCB concentrations in water near the seaward end of the Bay. PCB concentrations in water in Central Bay, the Bay segment with a direct connection to the Pacific Ocean, are consistently lower than the Bay-wide average concentration. This drop in concentration is partially explained by the dilution of Bay water by ocean water and the recognition that this dilution processes does not occur equally in every region of the Bay; Central Bay experiences higher dilution by ocean water than other Bay segments. Regional differences in external PCB loads and internal processes also account for spatial patterns in PCB concentrations not explained by tidal dilution. In the end, the application of the outflow scaling factor is a means of accounting for the spatial heterogeneity of PCB concentrations. It recognizes that, in reality, a majority of the non-oceanic water, and thus non-oceanic PCBs, that exit the Bay through the Golden Gate under normal conditions is from Central Bay. The outflow scaling factor thus helps constrain modeled PCB outflows to a rate in agreement with what is conceptually possible, and brings an element of spatial realism into the simplified representation of the Bay captured in the one-box model.

Cal. Chamber/GE Comment 3: "*Natural Recovery Discounted* – The TMDL does not quantify natural recovery or compare its ameliorative effects on PCBs with the TMDL's proposed plan. Mussel, sediment, and water column data show that tidal flushing and other natural processes are reducing PCB levels in the Bay materially, with a half-life of six to twelve years, a process which shows no evidence of slowing. Even if RWQCB takes no action to

reduce external loads, the Bay will reach ambient sediment concentrations much lower than the current concentration of ten parts per billion ("ppb") (as estimated in the TMDL) – and may reach a concentration of five ppb in the next ten years. Natural recovery is a well accepted alternative for sites with residual levels of legacy compounds like PCBs, and should not be marginalized, as does the TMDL, by equating it with a 'no project' alternative."

Natural recovery was explicitly accounted for in the long term fate model, which took into account the role of natural attenuation on the decrease of PCBs in the Bay over time. In addition, natural attenuation of loads was added to the long term fate model. See Figure 28.

Natural recovery has now been explicitly accounted for in the long term fate model, which takes into account the role of natural attenuation on the decrease of PCBs in the Bay over time. Accordingly, changes were made to the Staff Report in Section 9.2, and Figures 28 and 30.

Cal. Chamber/GE Comment 4 : "*Arbitrary Stormwater Loadings From An Uncalibrated Model* – The TMDL's estimate of current PCBs in stormwater is based on an uncalibrated model that does not account for the spatial and temporal variability of stormwater loads to the Bay. The TMDL proposes to reduce these loads through an arbitrary allocation to each county in proportion to population, such that it is estimated San Francisco County would be allowed to discharge stormwater with a PCB concentration of 8,050 parts per quadrillion ("ppq"), but more rural Napa County must reduce PCBs in stormwater to a concentration of 640 ppq."

First, we have updated our estimates of current loads based on comments received (Section 7 and Table A-1). Second, we concur that there are uncertainties in the load estimate, but the nature and timing of stormwater loads make them very difficult to estimate. Thus, stormwater load estimates will always have a degree of uncertainty. We will continue to evaluate new data and information on loads as it is generated and will revise the TMDL as appropriate. Furthermore, in the TMDL, we have proposed requirements to monitor discharges to improve our load estimates and to evaluate the effectiveness of load reduction actions.

Cal. Chamber/GE Comment 5 : "*Reduction Of Indefinite Central Valley Loads Not Reasonably Assured* – The current load of PCBs from the Central Valley is effectively unknown as the TMDL assumed a rate of freshwater flow from the Central Valley that was seven to ten times too high and used PCB concentration data that were temporally biased and taken from sampling stations that are not representative of freshwater flows. Although attainment of the TMDL is predicated upon dramatic reductions in PCBs from the Central Valley, the TMDL contains no measures to reduce this source of PCBs and does not provide reasonable assurances that this load reduction will occur. This predicted reduction conflicts with the Central Valley RWQCB's analysis showing that the rate of any decline of PCBs in the Central Valley is unclear and cannot be predicted."

We updated the current load estimates using newer data (SFEI, 2007). The updated load estimate for the Central Valley is 11 kg/yr. This estimate is based on water column monitoring at Mallard Island performed by SFEI extrapolated to 25 years of flows. We have modeled the

decay rate for PCBs from the Central Valley to show attainment of the target over time. See Section 7.2. of the revised Staff Report for a more detailed discussion.

Cal. Chamber/GE Comment 6 : *"The TMDL Cannot Be Met Without Added Treatment At POTWs* – The load of PCBs from publicly owned treatment works ("POTWs") is understated as the TMDL did not use available site-specific data to calculate the load, and did not properly account for future growth. The TMDL's assumption that the POTWs will be able to meet their allocation of two kg/year without additional treatment is not correct, frustrating the potential attainment of the TMDL as such treatment is not part of the TMDL."

We realize that there is some uncertainty associated with municipal wastewater treatment plant PCB loads, however, we are confident that our estimates are adequate. This also the case for industrial wastewater PCB loads as loads from both these sources were calculated following the same methodology. These loads will be refined as more data become available. We believe that future growth is accommodated as these loads have decreased over time and will continued to decrease over time as on-land site clean-ups are accomplished and natural attenuation takes place in the watershed. This future decrease accommodates future growth.

Cal. Chamber/GE Comment 7: *"The PCB Load From Atmospheric Deposition Is Essentially Unknown* – The rate of atmospheric deposition of PCBs is effectively unknown, but is likely larger than the 0.35 kg/year assumed by the TMDL, which value the TMDL's own peer reviewer does not believe, and which includes no load for PCBs in rainfall. PCB loads to other water bodies can be very significant, and, in a number of cases, have been shown to be greater than 10 kg/yr – the proposed value for the entire TMDL from all sources."

We recognize that our estimate for direct atmospheric deposition has uncertainty associated with it, and further recognize the large loads estimated in studies done in the Great Lakes region. The Great Lakes studies showed that large quantities of PCBs were removed from the water via the atmosphere. However, the wind and the rain in the Bay area usually come from the ocean landward, rather than over land as for the Great Lakes. Therefore, wind and rain likely convey much less PCBs to the Bay than is the case in the Great Lakes area. Furthermore, the wind would carry PCB volatilized locally towards in land locations, and it has been shown that PCBs in the atmosphere are eventually deposited in arctic regions. Patterns of PCBs exchange between the Bay and the atmosphere are not comparable to that in the Great Lakes region. We have based our PCBs atmospheric exchange budget on the only study performed in the Bay area on this topic. This study was conducted by the San Francisco Estuary Institute and the results have been published in the peer reviewed scientific literature.

Cal. Chamber/GE Comment 8 : *"RWQCB must balance competing environmental and economic objectives when adopting a TMDL.* The TMDL does not provide RWQCB adequate information about the costs and benefits to make and informed decision…."

We have replied to this general comment below where the commenter provides more specific information about the issues with which they are concerned. The comments listed below were

given as bullet-points and provide more specific questions, concerns, or assertions about the TMDL and can thus be answered directly because they are clearer.

Cal. Chamber/GE Comment 9 : "*Stormwater Treatment Infeasibility* – Attempting to meet the stormwater load would require capture and treatment of stormwater on a region-wide scale, as Best Management Practices will not meet the TMDL's concentration requirements. The costs for acquiring the land for stormwater capture and treating stormwater with best available technology would be astronomical, even for a typical design storm volume. Even such sophisticated treatment has not been demonstrated to meet the stringent PCB levels called for by the TMDL."

The extremely large cost estimated by the commenters is based on the assumption that the TMDL will result in the construction and maintenance of facilities to store and treat most if not all urban runoff in the Bay area, based on a 24 hour rainfall event of 4.8 inches to attain the wasteload allocations for urban runoff. This is an overstatement of what would be required. See response to ARCADIS comment nos. 10 and 11. The TMDL does not require this. It requires pilot compliance measures to evaluate retrofitting of facilities to treat stormwater where PCBs are elevated in the watershed. It also encourages strategic interception and treatment of stormwater to POTWs when and where a treatment plant's treatment capacity will not be exceeded. We have added some additional language to Section 12.10 of the Staff Report regarding costs for stormwater implementation measures.

Cal. Chamber/GE Comment 10: "Dredging And Capping Infeasibility – Dredging and capping are the only implementation measures in the TMDL for contaminated sediments, identified as sediments containing more than 10 ppb PCBs. Given the many millions of cubic yards of sediment that presently exceed 10 ppb, dredging and capping this volume would entail an unprecedented effort, many times greater than any remedial project ever attempted in the United States. Even dredging and capping just the 22 sites identified in the TMDL as being of particular interest would potentially be the largest remedial project undertaken in the United States. The costs would be astronomical, the time to complete years if not decades, and the benefits minimal as technical analysis shows that these particular locations are not driving fish-tissue levels on a regional basis, and as natural recovery is reducing PCB levels at these sites at a rate certainly comparable to the timescale for any such undertaking, if not faster."

This comment is speculative and appears to be based on the most extensive estimate of dredging possible, which is not required by the TMDL. The need for and choice of remediation alternatives for a specific PCB-contaminated site will be evaluated on a site-specific basis. These evaluations will likely consider a variety of remediation alternatives, including the no action alternative, since dredging is only one potential option for remediation.

Cal. Chamber/GE Comment 11 : "*Infeasible PCB Numerical Targets And Goals* – The proposed PCB targets and goals are much more aggressive (in some cases by orders of

magnitude) than levels generally found to be acceptable at sites assessed under U.S. EPA oversight. While the TMDL states that the one ppb sediment 'goal' is not a cleanup standard, it sets the bar so low that even trying to approach it through remedial projects would be extremely onerous and potentially impossible and, as described above, unnecessary. If the TMDL, as it seems to imply, is not meant to affect PCB cleanups, the TMDL needs to be revised to create a clear separation between the TMDL and cleanup programs, lest the PCB targets and goals be used as de facto standards, or Applicable or Appropriate and Relevant Requirements ('ARARs')."

The TMDL includes a fish tissue target and an associated sediment goal in order to protect human health for sports fish consumers. The fact that this target and its associated sediment goal are lower than clean-up levels generally set for remediation of contaminated sediments in the Bay is irrelevant. Higher sediment clean-up goals at contaminated sites are typically established in order to protect sensitive ecological receptors rather than to protect of human health. The Basin Plan amendment and revised Staff Report describe the approach to contaminated site remediation programs (Section 11.2 and BPA page A-11).

Cal. Chamber/GE Comment 12 : "Adverse Environmental Impacts Of The TMDL – Implementing the TMDL would cause significant environmental impacts, including destruction of and/or damage to healthy benthic communities, emissions of criteria pollutants and greenhouse gases, consumption of landfill capacity, and land use impacts. Mass removal of PCBs from contaminated sediment sites will result in adverse impacts, as equipment to remove and transport the material likely will generate diesel exhaust, and greenhouse gases, and the act of sediment removal likely will reintroduce into the water column PCBs otherwise sequestered in the sediment."

We disagree that implementing the TMDL will result in adverse environmental impacts from large-scale sediment removal actions. The TMDL does not require the large-scale sediment removal action suggested by the commenter.

This comment is a summary of a number of comments provided later in this reviewer's letter. The more specific issues are replied to in detail in the order in which they occur. In any case, this general comment appears to be based on the reviewer's assertion that the PCBs TMDL would require over 100 million cubic yards of remedial dredging on an annual basis. The TMDL does not require any remedial dredging either to meet allocations or to meet our proposed fish tissue target. Activities to remediate PCBs contaminated-sediment sites in the Bay are not restricted to dredging; there are other potential methods of remediation. Furthermore, the sites are of very limited areal extent and would not lead to wide-scale dredging of Bay sediments such as the reviewer claims – they suggest a figure of 110 million cubic yards – and thus the potential environmental impacts are much lower than the reviewer suggests.

Cal. Chamber/GE Comment 13 : "*Adverse Consequences To Bay Management* – The TMDL will make it more difficult and expensive to manage sediment in the Bay, whether that entails removing it from places where it impedes navigation and commerce at ports,

handling it as part of waterfront redevelopment, or utilizing it as a resource for habitat restoration or the construction of wetlands. The TMDL may adversely affect maintenance dredging and the ability to keep the region's ports open for business, and the costs of, and options for, disposal of dredged material. The TMDL may adversely affect waterfront development and redevelopment since such economic activity will encounter sediment with levels greater than one ppb. The TMDL may affect adversely, and increase the cost of, projects to restore or reclaim habitat, or construct wetlands, given that such projects typically rely on the availability of sediment that can be used as a resource."

The TMDL does not create new regulatory requirements for dredging or the placement of dredge material, rather it relies on decisions and actions agreed upon and described in the LTMS. Thus, the TMDL will not have impacts on maintenance of navigational channels, operation of port facilities, or on re/development in waterfront areas. Nor will the PCBs TMDL affect use of dredge material in habitat restoration or reclamation projects.

Cal. Chamber/GE Comment 14 : "*No Apparent Ecological Benefit* – Adopting the TMDL would not appear to have material ecological benefits as the current PCB levels in fish, sediment, and the water column are below levels that are considered protective by U.S. EPA and NOAA. During multiple impairment proceedings over the last decade, data showing that PCBs are impairing the Bay's ecological standards have not been identified; nor does the TMDL show such impairment."

We have revised Section 2.1 (Problem Statement) of the Staff Report to clarify that the TMDL does not make the claim that wildlife beneficial uses are impaired due to ambient PCBs concentrations. However, in a recent report, USFWS suggested that piscivorous birds feeding in the Bay's shallow waters, such as the Caspian terns, Forster's terns, and the federally endangered California least tern, are the primary wildlife foraging guild at risk in the Bay. As such, impairment of wildlife, aquatic habitat, and rare and endangered species beneficial uses cannot be dismissed in the TMDL. In order to adopt a TMDL, a demonstration that all applicable beneficial uses will be attained is required. In this TMDL, we have included that demonstration.

Cal. Chamber/GE Comment 15: "*Health Benefits Theoretical and Speculative* – The fish-tissue target is based on such an extreme scenario that adopting the TMDL would not prevent a single case of cancer. Very few, if any, persons eat an average of eight ounces of uncooked white croaker or surf perch from the Bay every week for 70 years – which is the hypothetical population the TMDL is designed to protect. The TMDL's water-column goal of 19 to 49 parts per quadrillion is 3.4 to 8.9 times more stringent than the state-wide standard for PCBs set by U.S. EPA to protect sport fisheries, further underscoring the unrealistic risks on which the TMDL is based.'

The TMDL is designed to protect the beneficial uses of the Bay, specifically recreational sport fishing. We derived the fish tissue using standard calculations and assumptions applied to local fish consumption data, which will protect humans consuming fish from harm. We have

demonstrated that this fish tissue target is protective of water quality standards, and it is consistent with the CTR criterion established by the US EPA.

Cal. Chamber/GE Comment 16 : " No Risk To General Population – The TMDL proposes a safe level for PCBs in fish that is 200 times lower than the national tolerance level for commercial seafood set by the federal Food and Drug Administration. While the TMDL proposes to protect anglers from consuming fish with over 10 ppb of PCBs, those very same anglers can legally be served fish in a Bay-area restaurant or purchase fish at a Bay-area market containing PCBs with up to 2,000 ppb."

The FDA action level is developed with different assumptions than those used to develop water quality standards. The TMDL is designed to achieve water quality standards, and we have used appropriate procedures for deriving a fish tissue target consistent with EPA guidance. It is possible that FDA standards are not sufficient to protect human health.

Cal. Chamber/GE Comment 17: "No *Consideration Of Epidemiology* – The TMDL does not account for the extensive scientific literature showing that PCBs do not cause cancer or noncancer effects in humans. As no human study has shown that PCBs are a carcinogen, U.S. EPA considers PCBs to be only a probable carcinogen."

USEPA determined that PCBs are a probable carcinogen based on their review of biological effects of PCBs and, accordingly, developed PCBs water quality standards for the protection of human health. OEHHA later found that Bay concentrations of PCBs in fish potentially posed a potential human health risk to those consuming fish from the Bay. This finding resulted in the listing of the Bay as impaired by PCBs. Irrespective of other information in the epidemiological literature, these findings properly triggered the need to develop a TMDL for PCBs in San Francisco Bay.

Cal. Chamber/GE Comment 18 : " *Adoption Of Suspect United Nations' Toxicity Values* – The TMDL sets a fish tissue level for dioxin-like PCBs based on a United Nations approach to comparing the relative toxicities of dioxin with these PCBs, when federal officials including the National Academy of Sciences have called into question the UN approach."

The toxicity equivalency quotients (TEQ) approach is used by regulatory agencies, including USEPA, and by the regulated community to establish risk screening levels associated with the presence of dioxins, furans and dioxin-like PCBs. This method has also been broadly published in the peer reviewed scientific literature and is accepted by the overall scientific community. The assumption of additivity of the various dioxin, furan and dioxin-like congeners has been confirmed by the National Institute of Environmental Health Sciences and the National Academy of Science in its review of USEPA's dioxin reassessment. Based on its wide acceptance, our use of this method to determine a TEQ target is consistent with its normal usage and is defensible.

Cal. Chamber/GE Comment 19 : " Despite the pressing need for economic and environmental review, however, the TMDL contains no economic analysis that can be recognized as such, and the environmental review of the proposal is not adequate."

The discussion of economic considerations was revised. Please see Section 12.10, of the revised Staff Report. However, we disagree with the comment that our environmental analysis was not adequate. We provided a review of potential environmental impacts that may result from the reasonably foreseeable means of compliance with the TMDL. See Section 12 of the revised Staff Report, which fulfills the requirements for environmental impact review.

Cal. Chamber/GE Comment 20 : " The proposed TMDL is technically unsound and infeasible, may be impossible to achieve, and is being pursued at great cost and risk of serious, adverse environmental impact without promise of material benefit, when prudent alternatives exist."

We have responded to this general comment below under each more specific comment provided by the reviewer.

Cal. Chamber/GE Comment 21: "The TMDL's technical analysis has numerous problems, leaving RWQCB without an adequate understanding of the sources and processes that affect PCB levels in the Bay, and in turn without the requisite technical compass necessary to make rational decisions about whether and how to reduce PCB levels in fish – the TMDL's stated objective."

We disagree. We used well established methods, including a food web model and linkage analysis, which provided us with sufficient information to calculate our fish tissue target and to establish a TMDL and allocation scheme to attain the targets.

Cal. Chamber/GE Comment 22 : "The TMDL's fish-tissue target is based on an exaggerated assessment of the risk of eating fish from the Bay containing PCBs, and on hypothetical angler consumption of such fish that is at most an extreme conduct engaged in by only a handful of persons, and which has not been demonstrated to be occurring at all."

The TMDL is designed to protect the beneficial uses of the Bay, specifically the use designated to protect humans consuming Bay fish from harm. We used standard calculations and assumption to derive this target using data that reflect actual consumption of Bay fish, which will protect humans consuming fish from additional harm.

Cal. Chamber/GE Comment 23: "The TMDL's implementation focus on stormwater and contaminated sediments is misplaced, as the TMDL's stormwater analysis is compromised by significant error, the TMDL's stormwater goals are unattainable, and the TMDL's assumption that cleanup of contaminated sediments will accelerate attainment of the fish-tissue target is not correct."

We do not agree that the TMDL's stormwater analysis is compromised by significant error or that stormwater allocations are unattainable. We anticipate that reduction in PCB loads from urban runoff will require both source and treatment control BMPs. In the TMDL, we do not think of PCB loads from in-Bay contaminated sites as a mass loading to the rest of the Bay. Rather, we consider the role of increased PCB concentrations in bedded sediments as a source of PCBs directly to benthic and other aquatic organisms. The surface PCB concentrations at many of these hot spots can exceed ambient concentrations by a factor or more than 1,000. We consider the lowering of PCB concentrations in sediment as a direct benefit to the local aquatic population and fish consumers in these locations as a benefit.

Cal. Chamber/GE Comment 24: "In addition, it is very difficult to square the TMDL's suggestion that the TMDL will not be the but-for cause of greatly expanded cleanups of contaminated sediments with the TMDL's stringent numerical goals and standards."

This comment is speculative and appears to be based on the most extensive estimate of dredging possible and which is not required by the TMDL. The need for and choice of remediation alternatives for a specific PCB-contaminated site will be evaluated on a site-specific basis. These evaluations will likely consider a variety of remediation alternatives, including the no action alternative, since dredging is only one potential option for remediation.

Cal. Chamber/GE Comment 25: "The TMDL will require great public and private expenditures to achieve very little benefit, and also will result in significant adverse environmental impacts that RWQCB has not anticipated or characterized adequately."

The extremely high cost estimated by the commenters is based, in large part, on the assumption that the TMDL will result in the need for storage and treatment of most if not all urban runoff in the Bay area to attain the wasteload allocations for urban runoff. The TMDL will not result in the need to store and treat most of the urban runoff, although it does encourage strategic interception and treatment of stormwater when and where a treatment plant's treatment capacity will not be exceeded. Furthermore, it has been documented that there are far less expensive approaches available that, if implemented, would achieve high levels of compliance with current water quality objectives, and to a high degree satisfy the implementation section of this TMDL for urban runoff. This has been documented in the State Water Resources Control Board's "NPDES Stormwater Cost Survey" (2005), specifically in Appendix H-Alternative Approaches to Stormwater Quality Control.

Cal. Chamber/GE Comment 26: "The capacity of the Bay to assimilate and recover from PCBs is much greater than portrayed in the TMDL, and the TMDL materially understates the loss of PCBs from the Bay due to natural recovery processes. As a result, the TMDL analysis has overlooked several reasonable alternatives such as monitored natural recovery and institutional controls – alternatives which RWQCB fully should consider."

Natural recovery has now been explicitly accounted for in the long term fate model, which takes into account the role of natural attenuation on the decrease of PCBs in the Bay over time.

Changes were made to the Staff Report in Section 9.2, and Figures 28 and 30. We are not obligated to consider "any" alternative as the reviewer states. The Guidelines of CEQA require consideration of a "reasonable range" of alternatives. The only alternative (in addition to the project as proposed) that must be evaluated is the No Project alternative which relies on natural recovery.

Cal. Chamber/GE Comment 27: "Under these circumstances, and as more particularly described below, RWQCB must reformulate the TMDL based on sound science and in accordance with its statutory mandates to craft a reasonable regulation that strikes a proper balance among various objectives, including the objective of achieving the highest water quality that is reasonable, given economics and technical feasibility. Also, RWQCB should incorporate into the TMDL the safeguards necessary to ensure that the TMDL does not supplant typical PCB cleanup levels, which generally are orders of magnitude greater than the PCB values of the TMDL."

The TMDL is based on sound science, and as legally required, ensures attainment of water quality objectives. This TMDL is reasonable in that economic and technical feasibility are assured through the adaptive implementation approach imbedded in the TMDL.

We have incorporated safeguards in the TMDL to ensure that typical PCB cleanup levels are not supplanted by the TMDL as follows (see Basin Plan amendment page 11):

> The Water Board will coordinate clean-up actions with the U.S. EPA and the Department of Toxic Substances Control, and advise them that the fish tissue target and sediment goal do not constitute clean-up standards for ARARs. The Water Board will issue clean-up orders as necessary.

Cal. Chamber/GE Comment 28: "The TMDL documentation attempts to make a case for material risk to people from eating fish in the Bay; but the risk scenario is hypothetical, without plausible basis in fact, and is unrelated to any risk to which the general population may be exposed. The overall angler population in the Bay area is on the order of 125,000 persons. Using straightforward probability analysis, it can be shown that very few anglers – fewer than 100 – possibly would be engaging in the conduct assumed by the TMDL. The number may in fact be zero, as the year-long angler intercept survey conducted in the Bay area from July 1998 to June 1999 likely would have found such an angler, if he or she existed. In any event, this tiny group may be exposed to a slight incremental cancer risk, assuming PCB concentrations and toxicology as characterized in the TMDL documentation. The group is so small that not a single additional cancer would be expected to occur from the target exposure, or even much higher exposures.

"The minimal benefit is underscored further by the undisputed fact that no epidemiological study has shown PCBs to cause cancer in people. For this reason, U.S. EPA identifies PCBs as a probable human carcinogen. Not one of fifty epidemiologic studies have shown a link between cancer and PCB exposure – in many studies at concentrations well above levels present in the Bay. While one of RWQCB's peer reviewers believes that PCBs can be harmful to people at any levels, and offered that the TMDL is not stringent enough, this expert has

been disqualified as an expert in federal court, and has testified under oath that his assumption about PCBs being a threat regardless of threshold is based on faith – not science. RWQCB cannot rely on its peer reviewer's faith-based assumption, especially in light of the substantial empirical information showing an absence of human carcinogenicity.

"The benefits of a fish-tissue target of 10 ppb must be considered in light of the national tolerance level for PCBs in commercial seafood set by the federal Food and Drug Administration (the "FDA"). The proposed 10 ppb target of the TMDL is 200 times more stringent than the FDA tolerance level of 2,000 ppb. While the TMDL is designed to protect anglers from fish containing PCBs over 10 ppb, those very same anglers can buy fish in any fish market or restaurant in the Bay area with PCBs of up to 2,000 ppb."

We have developed the fish tissue target following USEPA approved methods, and it is consistent with the water quality standard promulgated in the CTR. Comments about the qualifications of our peer reviewer are responded to later in the document, where the comment is more specifically about our peer reviewers.

Cal. Chamber/GE Comment 29: "The stated objective of the TMDL to reduce PCB loads to the Bay to 10 kg/yr cannot be achieved. The plan requires dramatic reductions in PCBs in urban runoff that cannot feasibly be met with Best Management Practices and, as such, would require stormwater capture and treatment. It does not appear possible that the land requirements for stormwater capture on a regional scale could be met, because the land is neither available nor affordable. In addition, no known large-scale stormwater treatment technology has been demonstrated to meet the very low PCB concentrations required to satisfy the allocation for urban runoff; existing treatment technologies are prohibitively expensive on a regional basis, even if only a design-storm volume (not all stormwater) were treated."

To attain the stormwater wasteload allocations, we propose, as a first step, to evaluate and implement as appropriate pilot projects that have a proven or highly likely benefit. We do not propose to implement the drastic, large-scale stormwater collection and treatment envisioned in the comment. As such, we have not revised or evaluated costs and environmental impacts of an action that is not considered for implementation.

Cal. Chamber/GE Comment 30: "Other sources of PCBs not controlled under the proposed plan in combination or alone likely will frustrate the attainment of the TMDL's 10 kg/yr goal. The TMDL has not made the case that Central Valley PCBs will drop dramatically in the years ahead – declines that are fundamental to the 10 kg/yr goal, as RWQCB estimates that the current load from the Central Valley is 42 kg/yr, far greater than the goal. There is no present plan to control this source, as it is under the jurisdiction of a different agency, the Central Valley RWQCB, which has not developed a TMDL for these PCBs, and has found that future declines cannot be assumed or predicted. The SF RWQCB's estimate of this load is technically flawed and unreliable, and RWQCB has not made any independent evaluation

upon which it can reasonably assure that its proposed Central Valley allocation (5 kg/yr) will be met."

We have revised the estimate of current Central Valley loads based on comments received. Specifically, we have incorporated combined urban and non-urban stormwater loads extrapolated to 20 kg/yr by SFEI based on their monitoring of PCBs in local tributaries to the Bay. These are found in Section 7.2 External Sources, sub-section Urban and Non-Urban Stormwater Runoff. We have also included a timeframe for attainment of the load allocations.

Cal. Chamber/GE Comment 31: "The TMDL assumes that PCBs in nonurban runoff are minimal (0.1 kg/yr), and will not frustrate its 10 kg/yr objective, when recent studies indicate that this load is at least 2 kg/yr (20 percent of the 10 kg/yr goal), and may be as high as 11 kg/yr (110 percent of the 10 kg/yr goal). RWQCB needs to identify and quantify the magnitude of this source, which it has no plan to control, and which alone could absorb the 10 kg/yr goal, materially or even entirely."

We do not agree that non-urban runoff carries a significant load of PCBs. The commenter's conclusion was drawn from a single sampling location that integrates both urban and non-urban runoff from which it is difficult to separate individual contributions. Please note that sediments in the Bay area average the following concentrations of PCBs: 4,500 μg/kg in industrial areas, 2,200 μg/kg in residential/commercial areas, 720 μg/kg in mixed land use areas, and only 9 μg/kg in non-urban areas. It is therefore difficult to believe that the sediment load carrying PCBs to the Bay would be so much higher, at least two or three orders of magnitude, from non-urban zones to offset the three order of magnitude concentration difference between urban and non-urban areas.

Cal. Chamber/GE Comment 32: "The TMDL's estimate of PCBs entering the Bay from the atmosphere is questioned by RWQCB's peer reviewer, and likely is much higher than the TMDL assumes, providing yet another source beyond RWQCB's control that may frustrate the attainment of the 10 kg/yr goal. RWQCB would need to identify and quantify the magnitude of this source before it could ascertain with confidence that its 10 kg/yr goal can be attained, even if all other implementation measures were achievable."

We recognize that our estimate for direct atmospheric deposition has uncertainty associated with it, and further recognize the large loads estimated in studies done in the Great Lakes region. These studies showed that large quantities of PCBs were removed from the water via the atmosphere. However, the wind and the rain in the Bay area usually come from the ocean landward, rather than over land as for the Great Lakes. Therefore, wind and rain likely carry much lower PCBs than in the Great Lake area. Furthermore, the wind would carry PCB volatilized locally towards in land locations, and it has been shown that PCBs in the atmosphere are eventually deposited in arctic regions. Patterns of PCBs exchange between the Bay and the atmosphere are not comparable to that in the Great Lakes region. We have based our PCBs atmospheric exchange budget on the only study performed in the Bay area on this topic. This

study was conducted by SFEI and the results have been published in the peer reviewed scientific literature.

Cal. Chamber/GE Comment 33: "The TMDL proposes to accelerate attainment of its fish-tissue target through dredging and capping of contaminated sediments, which RWQCB defines as sediments with PCB concentrations greater than 10 ppb. Since dredging cannot achieve levels below the Bay ambient level of 10 ppb, even if all the sediments in the Bay margin were reduced to ambient levels, under the TMDL's logic bottom-feeding fish in the margin would not meet the fish-tissue target of 10 ppb. The TMDL assumes that PCBs in fish are 10 times higher than PCBs in sediment, and that fish derive their PCBs principally from the sediment. Under these assumptions, bottom-feeding fish in the margin would have PCB levels of about 100 ppb, even if sediments in the margin were reduced to ambient levels.

"In addition, the particular sites identified in the TMDL for possible remediation represent a very small percentage of the Bay; remediation of all of these sites will not materially promote attainment of the fish-tissue target, showing that the TMDL's focus is misplaced. Roughly 60 percent of the PCBs in the Bay are outside the Bay margin, and will continue to exert a significant influence on regional PCB levels, even if the entire Bay margin were to be remediated."

The TMDL does not define sites with sediment PCBs concentrations greater than 10 ppb as contaminated. A list of sites that have been identified for possible clean up, included in the Staff Report in Table 12, was developed as part of the Bay Protection and Toxic Cleanup Program and was evaluated by the State Board in its Functional Equivalent Document for the State's Consolidated Toxic Hot Spot Clean Up Program. These programs are not part of this TMDL. Furthermore, the RWQCB is prohibited from specifying the manner of compliance with its regulations, and as such cannot prescribe the method by which a contaminated site is remediated. Dredging with capping is only one among many potential clean up actions that might be selected; there are others, including 'no action' that would be evaluated on a site-by-site basis. In the TMDL, we state that the TMDL will be achieved without remediation of PCBs-contaminated in-Bay sites, but that any remedial activity that occurs with or without the TMDL will accelerate attainment of the target. Remedial activities at contaminated sites may be overseen by the Water Board as well as USEPA or DTSC within already established programs and following established procedures. We have clarified this issue in the Basin Plan amendment (Page A-11) and in the revised Staff Report (Section 11.2).

Cal. Chamber/GE Comment 34: "The cost information provided in the TMDL does not consider the economic impacts of measures to achieve the TMDL. The TMDL documentation has left the public with no meaningful information on the costs of the proposal. RWQCB must address this deficiency in order to satisfy its disclosure obligations, and balance these costs against potential benefits."

The discussion of economic considerations was revised and now includes more explanation of our estimate of the costs associated with reasonably foreseeable means of compliance with the

TMDL. Please see Section 12.10 of the revised Staff Report for details of these revised cost estimates.

Cal. Chamber/GE Comment 35: "The TMDL's use of current annual wastewater treatment costs to assess the costs of the stormwater proposals is not sound. Wastewater is treated at several Bay-area Publicly Owned Treatment Works ("POTWs") already in existence and designed to treat domestic sewage and industrial wastewater. Treating PCBs in stormwater would deploy different technologies (e.g., granular activated carbon versus activated sludge), has different land requirements (because of the need to capture and store for treatment large stormwater volumes that arrive in pulses), and entails different annual operating and maintenance costs.

"Capital costs to build the storage and treatment works for a 25-year storm volume (standard RWQCB design storm) is estimated to be $8 billion. These costs do not include land acquisition or the operation and maintenance of the stormwater treatment system, which would include replacing 700 tons of activated carbon per year and transporting over 8 million square feet of waste sludge to area landfills.

"Even this investment, however, will not achieve the TMDL's stormwater allocation, which calls for effluent concentrations that existing technologies have not been demonstrated to meet in the treatment of stormwater. Whatever PCBs exist in stormwater in excess of the design-storm volume will continue to enter the Bay unabated – a fact the TMDL does not acknowledge."

The Water Board is prohibited from specifying the manner of compliance with its regulations. Dischargers subject to the proposed TMDL and wasteload/load allocations are responsible for identifying compliance strategies, and conducting the requisite CEQA analysis of implementation of the selected strategies at the project level. In Staff Report section 12.6, we include a list of foreseeable methods of compliance with the PCBs TMDL. In this section of the Staff Report, we state that BMPs, including those for construction, operation, and maintenance of facilities/units to intercept, divert and treat storm water, should be evaluated to determine which BMPs are more appropriate and more effective at reducing or eliminating discharges of PCBs. Currently, there is no requirement to use BMPs, or for construction, operation, and maintenance of facilities/units to intercept, divert and treat storm water.

In addition, the high cost suggested by the commenter is based on the exaggerated assumption that the TMDL will result in the need for storage and treatment of most if not all urban runoff in the Bay area to attain the wasteload allocations for urban runoff. The TMDL will not result in the need to store and treat most of the urban runoff, although it does encourage strategic interception and treatment of stormwater when and where a treatment plant's treatment capacity will not be exceeded. Furthermore, it has been documented that there are far less expensive approaches available that, if implemented, would achieve high levels of compliance with current water quality objectives, and to a high degree satisfy the implementation section of this TMDL for urban runoff. This has been documented in the State Water Resources Control Board's "NPDES Stormwater Cost Survey" (2005), specifically in Appendix H-Alternative Approaches to Stormwater Quality Control.

Cal. Chamber/GE Comment 36: "The TMDL's discussion of dredging and capping costs similarly is deficient. If such costs should not be ascribed to the TMDL, as the documentation seems to suggest, RWQCB needs to explain why the TMDL contains these implementation measures, and how the TMDL's PCB goals, which are much more stringent than typical PCB cleanup levels, will have no influence on PCB cleanups.

"The TMDL suggests that its PCB goals are not applicable to PCB cleanups. RWQCB should make this point very clear and explicit. Under the ARARs cleanup programs established under federal and California law, the responsible agency can look to nonapplicable standards that may be "relevant and appropriate," or to standards or objectives that fall in the category of "to be considered." Absent very clear language from RWQCB, the PCB goals of the TMDL could be misinterpreted to be legally enforceable cleanup goals regardless of their status in RWQCB's regulatory regime. These concerns are particularly important give that portions of Bay, including Hunter's Point, have been designated as Superfund sites. RWQCB either must revise the TMDL to remove the focus on contaminated sediments and thereby create a clear separation between sediment cleanups and the TMDL, or properly analyze the costs and impacts of dredging and capping.

"The only cost contained in the TMDL for dredging is an estimate of the "tipping fees" for disposing of dredged spoils at a landfill ($10 to $100 per cubic yard). Tipping fees are only a single component of the myriad costs of a remedial dredging project. Overall unit costs are more accurately estimated to be in the range of $111 to $1014 per cubic yard."

We have clearly stated that the sediment goal is not a sediment clean-up standard and have removed the sediment target to ensure this. We cannot speculate on actions or interpretations of other regulatory agencies, as they could use this goal or a lower sediment PCB concentration as the desired condition for their concerns. We have used the best available disposal costs provided by the dredging community in the development of the LTMS to evaluate economic impacts of maintenance dredging. See page 11 of the Basin Plan amendment and Section 12.10 of the revised Staff Report for further clarification.

Cal. Chamber/GE Comment 37: "The TMDL documentation does not address how much dredging will be required. Since the TMDL classifies all sediments with over 10 ppb PCBs as contaminated, dredging of all such sediments is one scenario, although the scale and cost of this scenario plainly is not feasible. Even accelerated dredging at the particular sites identified by RWQCB would involve extraordinary activity and staggering cost."

The TMDL does not call for the extent of remedial dredging suggested by the comment. The selection of dredging as a remedial alternative and the dredging estimate presented by the commenter is speculative. The need for and choice of remediation alternatives for a specific PCB-contaminated site will be evaluated on a site-specific basis. These evaluations will likely consider a variety of remediation alternatives, including the no action alternative, since dredging is only one potential option for remediation.

Cal. Chamber/GE Comment 38: "In light of ongoing natural recovery (which the TMDL discounts without basis) it makes little sense to focus efforts on remediation of sediments where cleanups will take years, if not decades, of study and implementation to effect. An accelerated dredging program is not feasible, as dredging only the particular sites identified in the TMDL could result in one of the largest remedial dredging programs ever undertaken in the United States, requiring a massive commitment of equipment and manpower dredging six days a week for 14 years to complete. By the time such a massive, and probably infeasible, dredging program is completed, PCB levels in the target sites would have declined significantly, due to ongoing natural recovery. This rapid natural recovery undermines any perceived imperative for dredging, and avoids the adverse environmental consequences inherent in dredging. "

Natural recovery was explicitly accounted for in the long term fate model, which took into account the role of natural attenuation on the decrease of PCBs in the Bay over time. Declines in PCB concentrations estimated by the model include natural attenuation in both the Bay and the surrounding watersheds. As we have indicated, remediation of contaminated sites will occur without adoption of the PCBs TMDL. Site specific cleanup requirements will be determined via feasibility studies carried out independently from this TMDL.

Cal. Chamber/GE Comment 39: "The TMDL identifies as an implementation measure the remediation of on-land PCB-contaminated soils. But the TMDL omits any discussion regarding the costs of this measure; it does not even contain an inventory of industrial sites along the Bay margin where the TMDL might require such remediation. The costs of remediating on-land sites could be considerable; RWQCB must identify the sites it is targeting for such remediation and quantify the costs."

We have amended the Staff Report in Section 11 to say the following:

- Abatement of PCBs in runoff from areas with elevated PCBs in soils/sediments
    - Investigate ~~and cause remediation of~~ on-land PCBs contaminated soils and/or sediments – PCBs are a known historical contaminant in soils and sediments throughout the region, both in private and public properties, and public rights-of-ways. Although many contaminated sites have undergone remediation, it is likely that ~~many~~ PCBs contaminated sites remain and continue to contribute PCBs to stormwater. ~~Urban~~ Stormwater runoff management agencies are expected to conduct, or cause to be conducted by other agencies or responsible parties, identification ~~and abatement~~ of on-land sites with PCBs contamination, such as private properties, public rights-of-ways, and stormwater conveyances. Stormwater runoff management agencies would be expected to report investigation results, including identifying potentially contaminated properties and/or responsible parties to the Waterboard and/or DTSC, and/or in some instances to local agencies with authority to conduct oversight of hazardous materials. The Waterboard, DTSC, or local agency would be expected to follow up on further investigation and oversee any necessary abatement.

The TMDL Implementation Plan doesn't directly require remediation of properties. Other existing regulatory authorities would be relied on to require remediation of PCBs-contaminated properties where appropriate.

Cal. Chamber/GE Comment 40: "RWQCB has failed to properly assess the true cost to implement the proposed TMDL. The secondary economic consequences of the TMDL, such as the impacts on jobs, housing and competitiveness, have not been considered at all. RWQCB must undertake an economic analysis that begins with a definition of the actions that will be necessary under the TMDL, who will be responsible for such actions, and what those actions realistically will cost."

Many of the concerns expressed here and elsewhere by this commenter are predicated on the faulty assertion that the PCBs TMDL would result in dredging of 110 million cubic yards of material from the Bay. This is not the case, as we have explained elsewhere (see our response to Comment #98). In both the original and revised versions of the Staff Report, we devoted considerable discussion to potential methods for implementing the TMDL, although we cannot mandate which methods or technologies will be adopted. We have provided additional information in this section which clarifies agency responsibilities. The revised Staff Report also gives a more complete description of how adaptive management and our phased approach should address many cost-related concerns, particularly since the initial phases after adoption of the TMDL only require studies and pilot testing of implementation methods (please see Section 11.6 of the revised Staff Report.)

Cal. Chamber/GE Comment 41: "*The Adverse Environmental Consequences Of The TMDL Are Significant*. The plan to reduce PCBs will be disruptive from an environmental standpoint. Not only will the TMDL's implementation measures result in significant adverse impact, its new classification scheme whereby all sediment with over 10 ppb PCBs is classified as contaminated could complicate and potentially frustrate habitat restoration and beneficial reuse opportunities for dredged sediments. Since loss of habitat is a significant environmental threat to the Bay, any impediment to restoration such as the proposed TMDL must be tailored carefully to avoid negatively impacting restoration projects."

The TMDL does not propose to classify sediment with PCB concentrations of 10 ppb as contaminated. Furthermore, comments suggesting potential loss of habitat may result from implementing the TMDL are unfounded and speculative.

Cal. Chamber/GE Comment 42: "The TMDL's classification scheme also could complicate and impede levee reinforcement and maintenance, with life safety, property and economic implications. Private and public economic activity, development and redevelopment may encounter Bay sediments classified as contaminated under the TMDL's scheme, potentially delaying and/or reducing such activity, with potential economic and environmental costs."

We support the beneficial reuse of sediments or dredged material for levee maintenance and restoration. The TMDL does not place a restriction on these uses of sediments or dredge

material with ambient PCB concentrations. Appropriate reuse of sediments is determined by what if any level of contamination exists; this is an important consideration irrespective of adoption of the PCBs TMDL.

Cal. Chamber/GE Comment 43: "The direct impacts of the TMDL's implementation measures also are apparent. The energy needs to construct and operate stormwater treatment plants and to dredge and cap sediments are sizeable, and will produce greenhouse gases, and air pollution, including emissions for which the Bay area is in non-attainment. In addition, dredging the Bay will destroy healthy benthic communities, which typically require four years to re-colonize the impacted area. The habitat modification and turbidity caused by the dredging may impact sensitive species, including juvenile fish. Land uses would be impacted, as stormwater treatment and staging areas for dredging will occupy significant land, and the designation of dredged material as "waste" will impede the beneficial re-use of that material in habitat restoration and redevelopment projects."

This comment is based on speculation. It assumes that all urban runoff in the Bay area will be collected and treated at a wastewater facility. It further assumes that vast areas of the Bay will be dredged resulting in the need to dispose of an exaggerated amount of material. Both these assumptions are incorrect. None of these actions are required on the scale suggested by the reviewer, nor are they required by the TMDL. The TMDL foresees the need for strategic diversions and treatment of urban runoff, and remediation contaminated sediment sites. Determination of the most appropriate remediation method and the extent of remediation will be determined on a case-by-case basis; dredging is not uniformly chosen and the best method of treatment. Given this more accurate picture of potential actions, the commenter's concerns about impacts to benthic communities, air quality issues, and loss of the potential benefit of reuse of dredged material for habitat restoration are speculative and unfounded.

Cal. Chamber/GE Comment 44: *"Prudent Alternatives To The TMDL Exist, And Must Be Considered By RWQCB.* Feasible alternatives to the TMDL have not been considered by RWQCB. The TMDL cannot dismiss natural recovery by equating it with the No Project alternative. When natural recovery is monitored, it represents a viable alternative, typically combined with institutional controls. A realistic assessment of natural recovery in the Bay shows that half of the PCBs are dissipating every six to twelve years. This robust level of recovery is promoted by tidal flushing, which has not been modeled properly in the TMDL."

We have not dismissed natural recovery. In fact, we have incorporated natural attenuation in the model from which we derived the TMDL. As such, we have explicitly considered natural attenuation in the TMDL. Furthermore, the mass budget model used a scaling factor to simulate the loss of PCBs to the ocean via the Golden Gate. Without further PCBs load reductions, the mass budget model predicts that the Bay will not recover for 100 years. However, with the proposed TMDL, the model predicts recovery within 40 years after achievement of the allocations. We, therefore, selected the proposed TMDL as a preferable alternative to natural attenuation.

Cal. Chamber/GE Comment 45: "To satisfy its obligation to consider feasible alternatives, RWQCB must direct that the assessment of natural recovery be corrected and that monitored natural recovery with institutional controls be assessed properly as a stand-alone alternative to the proposed TMDL."

Natural recovery was explicitly accounted for in the long term fate model, which took into account the role of natural attenuation on the decrease of PCBs in the Bay over time. Therefore, it is not necessary to assess natural recovery as a stand-alone alternative since it is already incorporated in the modeling on which the TMDL is based.

Cal. Chamber/GE Comment 46: "Other feasible alternatives exist. U.S. EPA sponsored a recently released report on TMDLs which describes two alternatives that RWQCB must analyze. The first approach is to require equal-percent reductions across all sources – an approach that has been used in other TMDLs. The equal-reduction approach stands in contrast to the proposed TMDL, which arbitrarily requires each county to meet vastly different stormwater concentrations, and purports to require no reduction of PCBs from POTWs (although this assertion does not seem correct). As an alternative to treating stormwater and wastewater differently, and placing disproportionate burdens on different counties, RWQCB must examine an equal-percent reduction approach, as identified in the EPA-sponsored TMDL report.

"The other alternative recommended in the EPA-sponsored report is an allocation that meets the TMDL at the lowest possible cost. This alternative is consistent with the balancing RWQCB must undertake, and the legal requirements to consider the cost of complying with the TMDL. This approach, too, has been used in other TMDLs, and must be evaluated by RWQCB.

"Another alternative that RWQCB should evaluate is a TMDL designed to protect against real risk from bioaccumulation as opposed to theoretical effects in a hypothesized but unobserved population. This alternative is consistent with the narrative standard for bioaccumulation, which protects against increasing concentrations of toxic substances that are "detrimental" – rather than theoretical risks from PCB concentrations that are declining."

Cal. Chamber/GE Comment 47 : "The other alternative recommended in the EPA-sponsored report is an allocation that meets the TMDL at the lowest possible cost."

This response applies to comments 46 and 47. We revised the Staff Report to include the two alternatives suggested by the commenter. Thus, the Staff Report (see Section 12.9) now includes an evaluation of the following alternatives: No Project alternative, alternative TMDL of 20 kg/yr, equal percentage reduction alternative, and lowest possible cost alternative.

Cal. Chamber/GE Comment 48: "The TMDL materially understates the Loading Capacity of the Bay, and does not provide reasonable estimates of the key sources of PCBs to the Bay.

The Loading Capacity incorrectly assesses natural recovery; the fish-tissue target, which drives the TMDL's calculation of Loading Capacity, is too low due to an exaggerated assessment of risk. Current loading estimates for stormwater, the Central Valley, POTWs, and the atmosphere are indefinite and in error for a variety of reasons. Similarly, the load reductions proposed in the TMDL are problematic and either unattainable or unnecessary. These problems leave RWQCB without the proper technical conditions necessary to support adoption of the TMDL as proposed."

We have incorporated natural recovery in the long term fate model from which we have derived the TMDL. This model takes into account the role of natural attenuation on the decrease of PCBs in the Bay over time.

The fish tissue target was developed following USEPA approved methodology in conjunction with local fish consumption data, and it is consistent with the water quality standard promulgated in the CTR. Current load estimates have been changed based on comments received from SFEI (see Section 7 of the revised Staff Report).

Cal. Chamber/GE Comment 49 : "We pointed out the importance of natural recovery in our February 2004 comments, and indicated that RWQCB could not achieve a realistic assessment of natural recovery unless it accounted for the ebb and flow of the tides in the Bay which promote the removal of PCBs from the system. While a tidal component has been added to the model, the model remains inaccurate, in large part because it artificially limits the outflow of PCBs in the Bay, trapping them in the Bay when in reality they flow out under the Golden Gate Bridge. This artifact of the model prevents a reliable characterization of the Bay's ability to recover from and assimilate PCBs.

"The TMDL used a scaling factor in the one-box model to account for a drop in PCB concentrations near the seaward boundary of the Bay. But the drop is explained fully by dilution with ocean water, and mixing processes, and is related to transport of PCBs from the Bay on the outgoing tide. Introducing the scaling factor interfered with the model's conservation of mass equations, and mis-defined the boundary between the Bay and the ocean. The results are model calculations that retain PCBs in the Bay that actually exit the Bay in the outgoing tide, and false conclusions about natural recovery and assimilation because of a basic failure to conserve mass. Correcting this single error shows that the Loading Capacity of the Bay is at least 2.5 times greater than assumed in the TMDL.

"The TMDL continues to rely on the inaccurate application of the one-box model instead of using available empirical information and data that unequivocally demonstrate natural recovery. Available data for mussels, the water column, and sediment uniformly show that PCB concentrations are declining, such that PCB levels are cut in half every six to twelve years. Fish-tissue data has shown a decreasing, long-term trend since the 1950s, although more recent data are insufficient to support a short-term trend analysis. There is no evidence that the rate of recovery is slowing; the natural, ongoing processes at work in the Bay may result in sediments in the Bay reaching an ambient PCB level of five ppb (half the current estimated level) in six to twelve years."

We do not agree that the Bay's assimilative capacity has been underestimated due to the model used. In fact, the model used to calculate this quantity accounts for PCBs outflow through the Golden Gate. To do this, the model uses a technique called "scaling of PCBs outflow". Scaling of PCBs outflow was first implemented by Davis (2004) (Davis, J.A., 2004. The long-term fate of polychlorinated biphenyls in San Francisco Bay (USA). Environmental Toxicology and Chemistry, 23(10), 2396-2409) to account for a persistent pattern of declining PCB concentrations in water near the seaward end of the Bay. PCBs concentrations in water in Central Bay, the Bay segment with a direct connection to the Pacific Ocean, are consistently lower than the Bay-wide average concentration. This drop in concentration is partially explained by the dilution of Bay water by ocean water and the recognition that this dilution processes does not occur equally in every region of the Bay; Central Bay experiences higher dilution by ocean water than other Bay segments. Regional differences in external PCB loads and internal processes also account for spatial patterns in PCB concentrations not explained by tidal dilution. In the end, the application of the outflow scaling factor is a means of accounting for the spatial heterogeneity of PCBs concentrations. It recognizes that, in reality, a majority of the non-oceanic water, and thus non-oceanic PCBs, that exit the Bay through the Golden Gate under normal conditions is from Central Bay. The outflow scaling factor thus helps constrain modeled PCB outflows to a rate in agreement with what is conceptually possible, and brings an element of spatial realism into the simplified representation of the Bay captured in the one-box model.

Mass conservation in models can be a challenge in a well-mixed volume when outflows are constrained. Such constraints are achievable, however, if the model equations are correct. In the case of the one-box PCBs model, only the outflow of the PCB residues are constrained, leaving the overall water balance unaffected (i.e., water outflows are equal to water inflows). The scaling of PCBs outflow can be thought of as a selective filter at the Golden Gate. The PCBs concentration of the outflow is reduced by this filter and the filtered PCB mass is then mixed back into the Bay before the next incoming tide.

SFEI has performed tests of the one-box model in its current formulation to demonstrate that PCBs mass is indeed conserved. When run without outflow scaling and a total external load of 80 kg/yr, a maximum of 6.0×10^{-13} kg (or 0.6 nanograms) PCBs are unaccounted for on a daily basis. At the end of a 100-year run, a total of 1.9×10^{-9} kg (or 1.9 micrograms) PCBs are unaccounted for. To put this number in context, total mass inputs and exports over the 100 year period are 8.2×10^{3} kg and 1.0×10^{4} kg respectively. Thus, total PCBs mass unaccounted for amounts to 2.3×10^{-11} % of total PCB inputs and 1.9×10^{-11} % of total PCBs exports. When running the model with outflow scaling and a total external load of 80 kg/yr a maximum of 6.3×10^{-13} kg PCBs are unaccounted for on a daily basis. At the end of 100 years, a total of 3.6×10^{-9} kg PCBs are unaccounted for. This represents 4.3×10^{-11} % of total PCB inputs (8.2×10^{3} kg) and 3.7×10^{-11} % of total PCBs exports (9.8×10^{3} kg). The results suggest that conservation of mass within the one-box model is acceptable.

Cal. Chamber/GE Comment 50 : "The TMDL's estimate of current PCBs in stormwater is based on an uncalibrated model, the predictive ability of which has not been established, making the proposed use of the estimate suspect. PCB concentrations in storm sewer

sediments vary throughout the region, and the majority of the PCB stormwater load enters the Bay during storm events. For example, the average PCB concentrations in sewer sediment samples collected from Alameda and San Mateo Counties are 156 and 1,042 ppb, respectively, reflecting significant variation across the region. Yet, the TMDL relied on an uncalibrated model of rainfall and subsequent stormwater runoff that held PCB concentrations for each land use invariant across the region, and ignored the temporal peaking that is inherent in stormwater loads. The TMDL documentation ignored both the spatial and temporal variability of PCB loads, and did not calibrate the model, which would have enabled the agency to evaluate the influence of the TMDL's assumptions. In the absence of a calibration, and given the assumptions which are not consistent with known conditions, the TMDL's calculations of current stormwater loads are speculative, and not technically defensible."

First, we have updated our estimates of current loads based on comments received (Staff Report Section 7 and proposed Basin Plan amendment Table A-1). Second, we concur that there are uncertainties in the load estimate, but the nature and timing of stormwater loads make them very difficult to estimate. Thus, stormwater load estimates will always have a degree of uncertainty. We will continue to evaluate new data and information on loads as it is generated and will revise the TMDL as appropriate. Furthermore, in the TMDL, we have proposed requirements to monitor discharges to improve our load estimates and to evaluate the effectiveness of load reduction actions.

Cal. Chamber/GE Comment 51 : "The TMDL states that PCB levels on sediments in stormwater must be reduced to one ppb in order to achieve the sediment goal and the fish target. This approach assumes that the Bay has no capacity to assimilate PCBs in stormwater as it requires PCBs entering the system in stormwater pipes to be at the same concentration (one ppb) as the sediment goal (one ppb), and is akin to setting a numeric effluent limit for urban runoff of one ppb sediment PCBs. The TMDL documentation offers no study of assimilative capacity to support its implicit conclusion that the Bay cannot assimilate PCBs in stormwater. The TMDL's own analysis inadvertently demonstrates that the Bay can assimilate PCBs in stormwater."

The mass budget model explicitly includes a natural attenuation of PCBs in the Bay, which is equivalent to the assimilative capacity. Furthermore, the TMDL shows that relying solely on assimilative capacity will result in a significant delay in attaining the target compared to reducing loads to 10 kg/yr.

Cal. Chamber/GE Comment 52 : "As can be seen in the last column above, the proposed TMDL does not require PCBs in stormwater sediment to be reduced to one ppb. In fact, PCBs in stormwater sediment range from a low of two ppb (Napa and Sonoma Counties) to a high of 79 ppb (San Francisco County), with an average of about eleven ppb. The inconsistency between the stormwater allocations and the TMDL's goals relates to an order-of-magnitude error in the translation of the sediment goal of one ppb into these allocations. If corrected, the proposed allocations and the associated concentrations would be reduced by

a factor of ten (e.g., the corrected Waste Load Allocation is 0.2 kg/yr). But, by concluding that the fish-tissue target can be met with a two kg/yr load from stormwater and eleven ppb PCB levels in stormwater sediments, the TMDL actually has demonstrated that stormwater need not have sediment PCB levels at one ppb. In other words, the Bay does assimilate PCBs in stormwater at concentrations in excess of the TMDL's goals. Thus, the TMDL documentation erred in implicitly assuming that the Bay has no such assimilative capacity. QEA's independent analysis of assimilative capacity and natural recovery also demonstrates the Bay's ability to achieve recovery with sediment PCBs entering the Bay at concentrations in excess of one ppb."

We have updated our estimates of current loads based on comments received. The linkage analysis in the TMDL estimates that the target will be met within 40 years with a total load yearly load of 10 kg. The comments are incorrect in assuming that the TMDL does no consider the assimilative capacity of the Bay. The mass budget model has been revised to explicitly include a natural attenuation of PCBs in the Bay, which is equivalent to the assimilative capacity. Furthermore, the TMDL shows that relying solely on assimilative capacity will result in a significant delay in attaining the target compared to reducing loads to 10 kg/yr.

Cal. Chamber/GE Comment 53 : "The county-by-county allocations in the above table are arbitrary, incorrect and unachievable with any known large-scale stormwater treatment technology. The current PCB stormwater loads (column two) were based on an assumed association between land use and PCB levels. In allocating that load among the various Bay-area counties (column three), however, the TMDL departed from this association, and, instead, distributed the assigned load on the basis of county population. This approach was inconsistent with the land-use based approach through which the current loads were calculated, and also arbitrary in that the TMDL documentation provides no rational for why population centers should receive a greater PCB allocation than less populated areas. Thus, while Napa and Solano Counties have estimated current loads that are very similar (about two kg/yr), Napa's allocation is only half as much as Solano's allocation because Napa has a smaller population. San Francisco County can maintain PCB loads at 19 percent of current estimates, while less populated Marin and Napa Counties must achieve future loads that are a mere two percent of current estimates. These results are arbitrary and are not technically defensible, and also place burdens onto the counties disproportionately without plausible basis."

We have allocated loads to individual NPDES permit holders by population because population is a reasonable proxy for the amount of urban area under each permit; urban areas tend to be the largest sources of PCBs. Thus, such allocations are not arbitrary. As we gather more data, we will review wasteload allocations to the counties based on population as warranted.

Cal. Chamber/GE Comment 54 : "The TMDL's approach results in nondefensible allocations, where some counties will be required to achieve stormwater concentrations that are much lower than concentrations from other counties. The TMDL documentation offers no explanation as to why urban runoff from Napa County must be reduced to PCB levels of

640 ppq, whereas San Francisco County will be allowed discharges at levels more than ten times greater, at 8,050 ppq.

"Whether RWQCB persists with the proposed allocation of two kg/yr, or corrects the TMDL documentation's error and adjusts the allocation to 0.2 kg/yr, the allocation is unachievable. While the TMDL documentation makes the good point that Best Management Practices should be used to reduce sediment, and thus PCBs, in stormwater, Best Management Practices do not clean stormwater to the ppq levels in the above table. In fact, not even the best available technology is known to achieve these levels in stormwater. The best systems will produce PCB levels below 1,000,000 ppq, and maybe even below 65,000 ppq, but no one has demonstrated their ability to reach 8,050 ppq, or 640 ppq. With a corrected math error, the proposed TMDL allows only up to 805 ppq in stormwater – below any demonstrated technology for large-scale stormwater treatment."

We have allocated loads to individual NPDES stormwater permits by population as a rational first order surrogate approximation for the amount of urbanized area. As we gather more data, we will review wasteload allocations to the counties based on population as warranted. Furthermore, our implementation plan is based on principles of adaptive implementation. Specifically, our approach is to initially implement load reduction activities with a large chance of success, while we study or pilot test feasible implementation measures that carry more uncertainty in the effectiveness for reducing PCBs loads. Natural attenuation will also be a factor in bringing about lower PCBs levels.

Cal. Chamber/GE Comment 55 : "Further, the TMDL fails to adequately consider PCBs in nonurban stormwater that is not gathered in the region's public storm drain systems subject to the Clean Water Act's NPDES program. The TMDL estimates that the current PCB load from nonurban stormwater is only 0.1 kg/yr; the TMDL does not contain any measures to reduce PCBs from this largely uncontrollable source. More recent studies place the current load from this source in the range of two to eleven kg/year, potentially greater than the entire Loading Capacity of the Bay calculated by the TMDL, and raising questions about attainment. RWQCB needs to better characterize this source before it can demonstrate with confidence that implementation of the proposed TMDL will achieve water quality standards, as RWQCB has interpreted them."

We do not agree that non-urban runoff carries a significant load of PCBs. This conclusion was drawn from a single sampling location that integrates both urban and non-urban runoff from which it is difficult to separate individual contributions. Please note that sediments in the Bay area average the following concentrations of PCBs: 4,500 μg/kg in industrial areas, 2,200 μg/kg in residential/commercial areas, 720 μg/kg in mixed land use areas, and only 9 μg/kg in non-urban areas. It is therefore difficult to believe that the sediment load carrying PCBs to the Bay would be so much higher, at least two or three orders of magnitude, from non-urban zones to offset the three order of magnitude concentration difference between urban and non-urban areas.

Cal. Chamber/GE Comment 56 : "The TMDL did not use the available data correctly when it calculated the existing load of PCBs entering the Bay from the Central Valley. Both the flow data and the PCB concentration data have problems that render the TMDL's estimate of current loading from the Central Valley unreliable and unsupported. The rate of freshwater flow that the TMDL assumed (212,000 cubic feet per second) was too high by a factor of seven to ten. Actual river flow entering the Bay from the Central Valley is in the range of 22,000 to 30,000 cubic feet per second. Using the higher, incorrect value caused the TMDL to ascribe certain measured PCB concentrations to much more freshwater flow than it should have. We believe the problem arose from using flow information from an area affected by the ebb and flow of the tides, and from not isolating the net flow from the Central Valley towards the Bay from the influence of the tides.

"The PCB concentration data relied upon by the TMDL also was incorrect as these data were collected with a bias towards the summer dry season, when it is anticipated that the higher PCB loads would be associated with the rainy season. In addition, the data were taken at a point where Bay water and river water were mixed together; thus, the data cannot be assumed to be representative of the freshwater influence of the Central Valley rivers. The combined flow and concentration errors yield an unreliable, unsupported estimate of the PCB load entering the Bay from the Central Valley."

We have updated the current load estimates using newer data (SFEI, 2007). The updated load estimate for the Central Valley is 11 kg/yr. This estimate is based on water column monitoring at Mallard Island performed by SFEI extrapolated to 25 years of flows. This discussion has been added to the Staff Report in Section 7.2.

Cal. Chamber/GE Comment 57 : "Nor has the TMDL established the case for a dramatic reduction in Central Valley PCBs, which RWQCB predicts will drop from 42 kg/yr to 5 kg/yr without any implementation measures. Not only is the current loading value of 42 kg/yr unreliable, the TMDL did not include an independent evaluation of PCB sources in the Central Valley, an area outside its jurisdiction, to examine the potential for load reduction. The Central Valley RWQCB, however, has investigated the rate of PCB declines in that region, concluding that the rate of decline is unclear and cannot be predicted:

Despite the contrary conclusions of the Central Valley RWQCB's study of PCB sources and potential attenuation in that region, and without its own independent evaluation, the TMDL concludes that Central Valley PCBs will diminish dramatically to achieve the Load Allocation. This conclusion is not technically defensible, especially in light of the errors the TMDL has made in assessing PCB inputs from the upstream Central Valley."

We have updated the current load estimates using newer data (SFEI, 2007). The updated load estimates for the Central Valley are 11 kg/yr. These estimates are based on water column monitoring at Mallard Island performed by SFEI extrapolated to 25 years of flows. We have modeled the decay rate for PCBs from the Central Valley to show attainment of the target over time. This discussion has been added to the Staff Report in Section 7.2.

Cal. Chamber/GE Comment 57: "Absent New Treatment At Secondary Plants, PCB Discharges From POTWs Will Frustrate Attainment Of The TMDL; The TMDL Arbitrarily Favors Wastewater Over Stormwater. The effluent PCB levels from Bay-area POTWs vary significantly, even when comparing effluent data from POTWs that use comparable wastewater treatment technology. For example, both the East Bay Municipal Utility District ("EBMUD") POTW and the Central Costa County Sanitary District ("CCCSD") POTW are secondary treatment plants, yet the TMDL reports effluent PCB levels for these plants of 5,700-7,900 ppq and 1,100-1,400 ppq, respectively. Notwithstanding this documented five-fold difference, the TMDL assumed that the effluent concentrations from these two plants, and all other area plants with secondary treatment, were the same."

In the TMDL, we allocated wasteloads to wastewater and stormwater dischargers on a mass basis. As such, we set equal wasteload allocations for wastewater and stormwater discharges. We did this as we have demonstrated that attaining the yearly mass load will result in attainment of the target and removal of impairment of the Bay by PCBs.

Due to a limited data set of PCB concentrations in wastewater effluent, we used the mean concentration of PCBs in wastewater receiving secondary treatment to calculate current annual loads from secondary treatment plants. As stated in the TMDL, we are requesting that wastewater effluent be analyzed for PCBs, and as these data are generated, we will review and revise as necessary our assessment of loads from wastewater discharges.

Cal. Chamber/GE Comment 58 : "The total POTW load estimated using the uniform-concentration approach was 2.3 kg/yr, which value supposedly accounted for future growth and anticipated increases in wastewater flows. Had the TMDL used the available site-specific data, and assumed future PCB loads grow proportionately to future increases in wastewater flow (the standard and most reasonable assumption), the overall POTW load would have been 3.1 kg/yr. The 0.8 kg/yr incremental difference between these two values represents eight percent of the Bay's Loading Capacity as calculated by the TMDL documentation.

"The TMDL reduced its already-low estimate of 2.3 kg/year of PCBs in POTW effluent by 15 percent to a value of two kg/year. The TMDL documentation explained this reduction as a rounding adjustment. The effect of it, however, is to leave the POTWs with an allocation set at an artificially depressed estimate of current loading. Since the TMDL does not include implementation measures to reduce PCBs in POTW effluent, future discharges will be on the order of 3.1 kg/yr, which will cause the TMDL of 10 kg/yr to be exceeded by 1.1 kg/yr from this source alone, another indication that the TMDL will not be attained. Achieving the POTW Waste Load Allocation of two kg/yr would require a 35 percent reduction in PCBs from POTWs."

We realize that there is some uncertainty associated with municipal wastewater treatment plant PCB loads. This also the case for industrial wastewater PCB loads as loads from both these sources were calculated following the same methodology. These loads will be refined as more data become available.

Cal. Chamber/GE Comment 59 :"The TMDL does not explain its disproportionate treatment between wastewater and stormwater. For example, the EBMUD POTW currently discharges sediments with an average PCB concentration of 340 ppb. This value is more than four times greater than the highest PCB concentration allowed on stormwater sediments (79 ppb for San Francisco County; see above table). The TMDL does not explain why PCBs on stormwater sediments must be reduced to the 2-79 ppb range (0.2 to 7.9 ppb if RWQCB corrects the TMDL's math error) while POTW sediments can contain much higher levels, yet warrant no reduction.

"The TMDL proposes to allow EBMUD and other POTWs to discharge at concentrations of up to 500,000 ppq, as the TMDL proposes a numeric effluent limit ("NEL") of that value for the POTWs. In comparison, PCBs in county stormwater must be at or below 8,050 ppq (or 805 ppq if RWQCB corrects the TMDL's math error). This disproportionate treatment of these two sources is not explained and appears arbitrary. PCBs in stormwater are not understood to pose any greater threat than PCBs in wastewater effluent, suggesting that similar NEL values should be acceptable."

The TMDL is a total maximum daily load for PCBs discharge to the Bay, and as such we have developed the TMDL as the allowable total load that the Bay can assimilate. We have allocated current loads to the municipal and industrial wastewater dischargers as their current loads are small, and further reduction would necessitate large costs for little benefit. Conversely, stormwater loads are larger, and there is very little source and treatment control for PCBs currently being implemented. Our implementation plan for stormwater runoff management is based on principles of adaptive implementation.

Cal. Chamber/GE Comment 60 : "Moreover, the TMDL does not account for the local effects of discharges by POTWs. For example, the EBMUD plant discharges between 17 to 73 percent of the regional PCB load within the vicinity of its discharge. Because the plant accounts for such a large percentage of the regional PCB load, it is unreasonable to assume that reductions in stormwater loads alone would be beneficial without EBMUD load reductions."

We have no reason to believe there are localized effects due to wastewater discharges of PCBs. Most wastewater discharges, including discharges from EBMUD undergo an initial large dilution and mixing, therefore resulting in a large nearly instantaneous dilution of any PCBs in their effluent. Furthermore, wastewater discharges to the water column should result in an effect in the water column. However, bivalves deployed in the water column in a nearby location have shown a steady decline in the uptake of PCBs over the last few years. Uptake of PCBs by these bivalves reflects PCB concentrations in the water column and not PCBs in sediment. In the Bay, human health risks from PCBs arise mostly from PCBs transfer from bottom sediments to bottom feeding fish, not from PCBs in the water column as those discharged by wastewater treatment plants such as EBMUD.

Cal. Chamber/GE Comment 61: "The TMDL assumes that more PCBs leave the Bay by volatilizing into the atmosphere than enter the Bay through atmospheric input. But this assumption is based on an estimate that only 0.35 kg/year of PCBs enter the Bay through the atmosphere which, according to RWQCB's own peer reviewer, is "simply not believable." Staff Report at C-11. In contrast, up to 90 percent of the PCB load to Lake Superior is through the atmosphere, and atmospheric inputs into Lakes Ontario, Erie and Michigan are 64, 257, and 3,200 kg/yr, respectively. Given that the Bay is bordered by a largely urbanized area, with industrial centers in the cities of San Francisco, Oakland, and San Jose, and in light of atmospheric loads to other water bodies, the TMDL's loading estimate is suspect."

Cal. Chamber/GE Comment 62: "The 0.35 kg/yr value is not based on site-specific data, which are essential to obtaining accurate loading estimates of atmospheric deposition. The report containing the 0.35 kg/yr value acknowledges that, "[o]btaining comprehensive measurements of site-specific parameters is critical to the accurate estimate of the magnitude as well as direction of the fluxes for . . . PCBs over the Estuary." Critical site-specific data regarding PCB concentrations in the air and wind speed were not used to calculate the 0.35 kg/year value. Measurements of PCB concentrations in air were taken at only one monitoring station, despite the size of the region, and its various microclimates."

Cal. Chamber/GE Comment 63: "The 0.35 kg/yr value is based only on dry deposition of PCBs from the atmosphere. But PCBs are known to enter water bodies in rainfall as well. While the TMDL made no attempt to quantify this source of PCBs, scientific literature indicates that PCB loads in rainfall can be as large as, or greater than, PCB loads during dry periods. PCBs are present in rainfall at meaningful levels (80-520 ppq), in comparison with the TMDL's goal of achieving 19-49 ppq in the Bay. Because the TMDL ignored this source, the amount of PCBs entering the Bay in rainfall remains indefinite. Since available information indicates this source likely is significant, this source must be quantified as part of a proper demonstration that the TMDL, as proposed, could achieve the target water column concentrations and Loading Capacity."

Cal. Chamber/GE Comment 64: "Because the TMDL omitted the load from PCBs in rainfall, did not use site-specific data, and has not convinced its peer reviewer that the loading estimate is plausible, and in light of much larger PCB fluxes to other water bodies from the atmosphere, the true rate of atmospheric deposition to the Bay is unknown, and very likely is larger than the TMDL assumes.

This response applies to comments 61 through 64. We recognize that our estimate for direct atmospheric deposition has uncertainty associated with it, and further recognize the large loads estimated in studies done in the Great Lakes region. The Great Lakes studies showed that large quantities of PCBs were removed from the water via the atmosphere. However, the wind and the rain in the Bay area usually come from the ocean landward, rather than over land as for the Great Lakes. Therefore, wind and rain likely convey much less PCBs to the Bay than is the case

in the Great Lakes area. Furthermore, the wind would carry PCB volatilized locally towards in land locations, and it has been shown that PCBs in the atmosphere are eventually deposited in arctic regions. Patterns of PCBs exchange between the Bay and the atmosphere are not comparable to that in the Great Lakes region. We have based our PCBs atmospheric exchange budget on the only study performed in the Bay area on this topic. This study was conducted by the San Francisco Estuary Institute and the results have been published in the peer reviewed scientific literature.

Cal. Chamber/GE Comment 65 : "Federal Clean Water Act (CWA) Section 303(d) listing proceedings for the Bay, information on benthic ecology and aquatic life in the Bay, and wildlife screening values all indicate a healthy Bay ecosystem. As the TMDL documentation acknowledges, 'current conditions' in the Bay 'are protective of aquatic life from chronic toxicity.' Since aquatic toxicity could occur only at levels higher than chronic thresholds, aquatic life in the Bay is not at risk from PCBs. Therefore, a TMDL is not necessary to protect aquatic life and the TMDL will not produce benefits to aquatic life."

Cal. Chamber/GE Comment 66: "RWQCB previously has not identified PCBs as impairing the Bay for the EST, RARE and WILD beneficial uses. The TMDL provides no grounds upon which, for the first time, to find the Bay impaired for EST, RARE and WILD. If the Bay were impaired for EST, RARE and WILD, such impairment would have been identified during the semiannual process of updating the CWA Section 303(d) list of impaired waters, which requires RWQCBs to assemble and evaluate all existing and readily available water quality-related data and information to develop the list and to provide documentation for listing or not listing a particular region's waters as impaired (SWRCB, Water Quality Control Policy For Developing California's Clean Water Act Section 303(d) List, 2004). Neither the proposed 2006 CWA Section 303(d) list, nor the 2002 and 2004 lists, however, includes such impairment designations.

As neither the current nor prior 303(d) lists include listings for San Francisco Bay for RARE, EST, or WILD designated uses, and as the proposed TMDL does not provide data or analysis consistent with the listing policy, the ecological impairments claimed as a basis for the TMDL are unsupported."

This response applies to comments 65 and 66. The Bay was not specifically listed for impairment of RARE, WILD, or EST beneficial uses by PCBs. However, in developing the TMDL, we must ensure that all beneficial uses will be attained when the target is achieved. The TMDL makes this demonstration.

Cal. Chamber/GE Comment 67 : "The TMDL documentation states that the PCBs in the Bay are impairing estuarine and wildlife habitat (the 'EST' and 'WILD' beneficial uses), and also the preservation of rare and endangered species (the "RARE" beneficial use). The TMDL documentation, however, lacks a presentation of any information that establishes how current levels of PCBs are harming such habitats or species. The only information provided

in the Staff Report relating to potential ecological effects is the statement, 'evidence that wildlife may be affected by PCBs exists as bird egg PCBs concentrations that have been measured at levels near the effects threshold.' This statement does not indicate that bird egg concentrations are greater than a relevant and appropriate effects threshold and, therefore, does not support the contention that birds or any other ecological receptors are being impacted negatively by PCBs."

We have revised Staff Report and proposed Basin Plan amendment to remove the EST, WILD, and RARE beneficial uses. We should also point out, however, that any proposed TMDL is required not only to protect beneficial uses designated as impaired, but to ensure that all existing beneficial uses are maintained, as well.

Cal. Chamber/GE Comment 68 : "Concentrations of PCBs in fish tissue are below thresholds U.S. EPA has determined are protective of fish. Since 2000, all tissues from fish collected from the Bay have had PCB concentrations below 760 ppb – the concentration U.S. EPA set to protect the most sensitive fish species. Based on this conservative threshold, it is apparent that current concentrations of PCBs in fish tissues are not causing detrimental effects to fish in the Bay."

This is a site-specific ecological threshold determined by the Department of Defense at Pearl Harbor for lake trout as part of the baseline ecologic risk assessment that may not be protective of all wildlife in the Bay. For example, USFWS currently estimates that level of PCBs in tern eggs are at or slightly above effects thresholds. This TMDL seeks to reduce PCBs in the Bay, thus reducing PCBs in tern eggs.

Cal. Chamber/GE Comment 69 : "Concentrations of PCBs in sediment in the Bay are well below thresholds used by U.S. EPA as potential measures of harm. The risk-based sediment concentrations protective of ecological receptors developed for specific locations in San Francisco Bay under U.S. EPA oversight range from 97-24,000 ppb – well above ambient PCB concentrations in the Bay, and two to five orders of magnitude higher than the TMDL's sediment goal of one ppb. The fact that ambient Bay sediments do not exceed these values suggests that U.S. EPA would not find general harm to ecological receptors in the Bay from PCBs."

In a recent report, USFWS suggested that piscivorous birds feeding in the Bay's shallow waters, such as the Caspian terns, Forster's terns, and the federally endangered California least tern, are the primary wildlife foraging guild at risk in the Bay. As such, impairment of wildlife, aquatic habitat, and rare and endangered species beneficial uses cannot be dismissed. In order to adopt a TMDL, a demonstration that all applicable beneficial uses will be attained is required. In this TMDL, we have included that demonstration.

Cal. Chamber/GE Comment 70 : "Localized pockets of degraded benthic communities have not been linked to PCBs. For example, the benthic community in San Leandro Bay, one of the contaminated sediment locations identified in the Staff Report, is generally healthy and

is not considered injured from PCBs. Healthy benthic communities, or ones not harmed by PCBs, are located at other sites listed in the Staff Report."

The TMDL was developed to protect human health from the consumption of sport fish caught in the Bay and does not address direct impacts to benthic communities. The benthic community is a source of PCBs to sportfish via the food web.

Cal. Chamber/GE Comment 71 : "PCBs in the Bay pose no material risk to the general population. The TMDL is targeted at a hypothetical, small group of anglers that probably does not exist: anglers who (i) eat an average of eight ounces a week; (ii) of raw white croaker and shiner surfperch; (iii) caught in the Bay; (iv) every week for 70 years. Even if the TMDL's assumption that anglers who catch and eat fish in one four-week period will continue to do so for 70 years is correct, the TMDL would at most protect a population of 6,250 to 8,000 persons from a one in 100,000 cancer risk (which is roughly comparable to the one in 280,000 risk of being struck by lightning). But since it is very unlikely that any anglers are so consistent in their consumption of Bay-caught fish, the TMDL likely protects zero anglers from such a risk."

Cal. Chamber/GE Comment 72 : "The assumed fish consumption pattern is an unfounded extrapolation of an angler survey conducted by the San Francisco Estuary Institute ("SFEI"). Of 1,331 anglers, interviewed by SFEI, only 537 reported eating fish from the Bay in the prior four-week period. A small group (53 anglers) reported eating at least an average of eight ounces of fish from the Bay for each week in the prior four-week period. The TMDL applies these eating habits, based on the four-week period preceding the interview, to all 910 four-week periods over seventy years. But doing so is inconsistent with the SFEI survey results themselves, as such anglers were not identified. Had they existed, this kind of year-long angler intercept survey very likely would have identified them."

Cal. Chamber/GE Comment 73 : "In fact, very few consumers eat fish from the Bay every month for even a single year. Because the SFEI study reports the probability of a consumer of Bay fish eating Bay fish in a four-week period was approximately 50 percent, it follows from basic probability concepts that the probability of a person eating Bay fish in each of the 13 four-week periods in a year would be 0.513 (or less than 1 in 8000) if each period were independent. While each period may not be entirely independent, it is clear that very few, if any, consumers of Bay fish would fall into the extreme, every-month-for-70-years scenario assumed in the TMDL."

Cal. Chamber/GE Comment 74: "The eight-ounce rate, is the 95th percentile consumption rate over only a four-week period. This short-term rate is an overstatement of the true long-term rate. Even if it were applicable to the long term, any 95th percentile is not representative of the population of consumers of Bay fish, but represents an extreme scenario. The San Francisco angler population is estimated to be about 125,000, out of nearly 6.5 million Bay

Area residents. Assuming that five percent of the Bay angler population eats at least eight ounces per week of Bay-caught fish, the resultant population is only 6,250 out of 6.5 million. Protecting these persons from excess cancer at a risk level of one in 100,000, as the TMDL proposes to do, will not prevent a single cancer. From a public health perspective, the TMDL provides little, if any, cancer-prevention benefit."

Cal. Chamber/GE Comment 75 : "The TMDL documentation adds to its unrealistic assumptions by using white croaker and shiner surfperch as the measure of whether the 10 ppb PCB fish-tissue target is being attained. The SFEI consumption rates, however, were calculated over all species, not just croaker and shiner surfperch. The SFEI data show that only 28 percent of the consumer population is even willing to eat white croaker, and only 7.5 percent of consumers of Bay fish actually ate white croaker in the four-week period prior to their interview. For shiner surfperch, the figure was only 1.7 percent."

This response applies to comments 71 through 75. The TMDL is designed to protect the beneficial uses of the Bay, specifically the use designated to protect humans consuming Bay fish from harm. This beneficial use does not need to reflect current use, rather is a reflection of potential use. We derived the fish tissue using standard calculations and assumptions applied to local fish consumption data, which will protect humans consuming fish from additional harm. We have demonstrated that this fish tissue target is protective of water quality standards.

Cal. Chamber/GE Comment 76 : "The TMDL documentation does not account for the PCBs that are lost when fish are cooked, which reduces PCBs in fish on the order of 40 percent. The SFEI survey results show that eating raw fish is very rare among Bay-area anglers. Fully 99 percent of white croaker consumers never ate raw white croaker. It is unrealistic for the TMDL to assume that consumers are eating large amounts of uncooked fish."

A cooking reduction factor was not included. This provides an increased margin of safety in the TMDL.

Cal. Chamber/GE Comment 77 : "Meeting the TMDL would not reduce the amount of potential risk accepted for consumers of commercial fish in the Bay Area. The FDA enforces a Tolerance Level for PCBs of 2,000 ppb in commercially sold fish. The TMDL fish-tissue target is 200 times lower than the FDA Tolerance Level. More of the SFEI survey respondents (53 percent) reported eating fish from a store or restaurant in the preceding four weeks than reported consuming fish from the Bay (40 percent). Even if the hypothetical population of the TMDL exists, after implementation of the TMDL (assuming it could be achieved), the risk level would be unchanged within the general population, who could continue to eat fish from stores and restaurants containing up to 200 times as much PCBs as fish caught from the Bay."

The FDA action level is developed with different assumptions than those used to develop water quality standards. The TMDL is designed to protect the beneficial uses of the Bay, specifically the use designated to protect humans consuming Bay fish from harm. This beneficial use does

not need to reflect current use, rather is a reflection of potential use. We derived the fish tissue using standard calculations and assumptions applied to local fish consumption data, which will protect humans consuming fish from additional harm.

Cal. Chamber/GE Comment 78: "As discussed in our 2004 comment letter, RWQCB cannot rely upon the 1994 OEHHA advisory as a basis to claim that the TMDL will provide benefits. The advisory was issued in 1994, according to OEHHA, to "be prudent." It was a precautionary advisory, not based on the establishment of a safe/unsafe threshold but, rather, advising the public as to conservative practices that might be adopted to avoid any risk altogether. OEHHA never has claimed that failure to adopt the recommended practices will expose people to unacceptable risk. In fact, the primary finding made by OEHHA when it issued the advisory was that a "health evaluation and risk assessment" should be conducted in light of the data upon which the advisory was issued. Because no formal risk assessment has been conducted, the conditions and data on which the advisory was based have materially changed, and the advisory was not completed in accordance with current standards of the California Water Code, or then-applicable standards of the Fish & Game Code, the advisory provides no basis upon which RWQCB may conclude rationally that fish PCB levels must be reduced significantly to protect people."

The TMDL does not rely on the 1994 OEHHA fish consumption advisory as a basis to claim that the TMDL will provide benefits. The basis for the TMDL is a 303(d) listing, which in turn is based on the Bay not meeting water quality standards. The TMDL is designed to protect the beneficial uses of the Bay, specifically the use designated to protect humans consuming Bay fish from harm. The fish tissue target derived in the TMDL was calculated following standard USEPA guidance following USEPA approved methods, is in the same ranges as has been calculated elsewhere, and will protect humans consuming fish from additional harm.

Cal. Chamber/GE Comment 79: "Dr. Carpenter's opinions regarding the health effects of PCBs are not credible."

The Basin Plan amendment adopting the TMDL does not consist of Dr. Carpenter's opinions regarding the health effects of PCBs nor does it rely on such opinions.

Cal. Chamber/GE Comment 80: "There is little (if any) evidence that current exposure to PCBs in the environment causes cancer or neurological effects in humans. The overwhelming scientific literature regarding the potential human health effects of PCBs does not establish a link between PCBs and cancer or any other illness in humans. The TMDL does not account for this publicly available information and concludes, against the weight of scientific evidence, that PCBs cause cancer in humans."

Cal. Chamber/GE Comment 81: "In 2001, a comprehensive review of available scientific literature regarding the human health effects of PCBs was submitted to U.S. EPA. That

review included over 40 cancer studies, over 90 studies of non-cancer effects, and over 25 studies regarding neurodevelopmental effects. The review authors reported no credible evidence that PCBs cause cancer or any other illness in humans. Since 2001, a number of scientists who previously reported an association between PCBs exposure and human health effects published new reports finding no such link."

Cal. Chamber/GE Comment 82: "Additionally, recent studies show that human cells are many times less sensitive to PCBs than rat and monkey cells – significant findings as the current approach to human risk assessment is based on extension of the results from animal studies to humans. The National Academy of Sciences has reviewed the results of some of these studies and concluded that, if the toxic effect of PCBs on human cells is significantly less than the effect on non-human cells, the toxic equivalency factor for PCBs should be revised accordingly. National Research Council, Health Risks from Dioxin and Related Compounds—Evaluation of the EPA Reassessment at 61 (2006)"

Cal. Chamber/GE Comment 83: "The TMDL should be advised to take into account the current understanding of PCB toxicity, as reflected above and in the technical reports submitted herewith."

This response applies to comments 80 through 83. USEPA determined that PCBs are a probable carcinogen based on their review of biological effects of PCBs and developed water quality standards for the protection of human health for PCBs. OEHHA later found that Bay concentrations of PCBs in fish potentially posed a potential human health risk to those consuming fish from the Bay. This finding resulted in the listing of the Bay as impaired by PCBs. Irrespective of other information in the epidemiological literature, these findings properly triggered the need to develop a TMDL for PCBs in San Francisco Bay.

Cal. Chamber/GE Comment 84: "The TMDL improperly based its fish screening value for the so-called dioxin-like PCBs on toxicity information from the United Nations World Health Organization ("WHO"). WHO created a scheme whereby it tried to establish a correspondence between the toxicity of dioxin, a known human carcinogen, and certain congeners of PCBs, which apparently bear structural similarities to dioxin. WHO generated Toxicity Equivalency Quotients ("TEQs"), which purported to reflect the toxicity of the PCB congeners as a fraction of dioxin's toxicity. The TMDL used WHO's original TEQs from 1994 to derive the proposed dioxin-like PCBs fish-tissue value of 0.14 parts per trillion."

Cal. Chamber/GE Comment 85: "The proposed TMDL does not reflect any critical evaluation of the WHO TEQ scheme; it adopts it wholesale. This is problematic for several reasons. WHO has updated its TEQ values twice since 1994, yet the TMDL uses the outdated 1994 values without any indication of awareness of the more recent values, or explanation as to why they were not used."

Cal. Chamber/GE Comment 86: "More fundamentally, WHO did not publish the values through any kind of a public process, nor did WHO subject the values to peer review before publication. It has been up to the scientific community to ascertain to what extent WHO's TEQ scheme has any value in predicting and characterizing PCB toxicity. Such value has not been established to date."

Cal. Chamber/GE Comment 87: "The equivalency between PCBs and dioxin which WHO hoped to establish is fraught with assumptions, the truth of which have not been established. For example, the National Toxicology Program ("NTP") of the United States Department of Health and Human Services recently evaluated the chronic toxicity and carcinogenicity of dioxin, "dioxin-like" compounds, structurally similar PCBs, and mixtures of these compounds, in order to address "the lack of data on the adequacy of the TEQ methodology for predicting relative potency for cancer risk." NTP, Technical Report on the Toxicology and Carcinogenesis Studies of 2,3,7,8-Tetrachlorodibenzop-Dioxin (TCDD) (CAS No. 1746-01-6) in Female Harlan Sprague-Dawley Rats (Gavage Studies) (NTP TR 521), National Toxicology Program (2006). The stated purpose of NTP's evaluation indicates that the adequacy of the TEQ methodology to predict toxicity has not been established. The National Academy of Science review of U.S. EPA's draft Dioxin Reassessment, stated that "[i]t remains to be determined whether the current WHO TEFs, which were developed to assess the relative toxic potency of a mixture to which an organism is directly exposed by dietary intake, are appropriate for body burden toxic equivalent quotient (TEQ) determinations." National Research Council of the National Academies, Health Risks from Dioxin and Related Compounds: Evaluation of the EPA Reassessment of TCDD and Related Compounds (2006)."

Cal. Chamber/GE Comment 88: "Notwithstanding these problems, the TMDL uses the TEQ values without any recognition that they have not been established as a valid or reliable means to characterize PCB toxicity. The WHO TEQs do not provide a technically defensible basis to establish a fish screening value for dioxin-like PCBs."

This response applies to comments 84 through 88. We have updated our calculations of the TEQs using the 1998 World Health Organization Toxicity Equivalent Factors (TEFs) in order to be consistent with the SIP. See Section 6.2 and 8.1 of the Staff Report. The WHO TEQ approach has been widely used in academic research and by regulatory agencies, and is promoted by USEPA, to calculate potential health risk posed by dioxins/furans and dioxin-like PCBs in the environment. Furthermore, the determination of impairment of the Bay by dioxin-like PCBs was also based on the WHO TEQ approach. As such, we need to determine that the TMDL will result in the elimination of impairment of the Bay by dioxin-like PCBs in the manner that impairment was determined.

The toxicity equivalency quotients (TEQ) approach is used by regulatory agencies, including USEPA, and by the regulated community to establish screening levels of risk associated with

the presence of dioxins, furans and dioxin-like PCBs. This method has also been broadly published in the peer reviewed scientific literature, and is accepted by the overall scientific community. The assumption of additivity of the various dioxin, furan and dioxin-like congeners has been confirmed by the National Institute of Environmental Health Sciences and the National Academy of Science in its review of US EPA's dioxin reassessment. Based on its wide acceptance, our use of this method to determine a TEQ target is consistent with its normal usage and is defensible.

Cal. Chamber/GE Comment 89: "The presumed effectiveness of dredging sites with elevated PCB concentrations is predicated on the implicit belief that these sites are a major source of PCBs to the Bay. This assumption is not correct; remediation will yield minimal benefits because of the relatively small PCB mass contained in these sites. The TMDL documentation fails to demonstrate that the locations identified as "In-Bay Contaminated Sites" in Table 26 of the Staff Report are important sources of PCBs to the Bay. The maximum sediment PCB concentrations listed in the table are actually buried PCBs found well below the active sediment layer."

Cal. Chamber/GE Comment 90: "QEA used sediment PCB data to evaluate whether the identified PCB contaminated sites are a major external source of PCBs to the Bay, as the TMDL assumes, and concluded is that it is unlikely these sites contain sufficient PCB mass to limit the recovery of the Bay. For example, the bioavailable sediments in San Leandro Bay contain about 12 kg of PCBs, which amounts to merely 0.8 percent of the total 1,500 kg of PCBs in surficial sediments throughout the Bay. QEA concluded that the total PCB mass in San Leandro Bay sediments cannot keep the sediments of SFB contaminated or materially reduce the rate of ongoing natural recovery. Although insufficient data exist to make this type of quantitative assessment for other areas of the Bay, it is unlikely that similar analyses would show that any of the other PCB-contaminated sites are an important source of PCBs to the Bay."

This response applies to comments 89 and 90. In the TMDL analysis, we do not view PCB loads from in-Bay contaminated sites in terms of significant mass loadings to the rest of the Bay. Rather, we consider the role of increased PCB concentrations in bedded sediments as a source of PCBs directly to benthic and other aquatic organisms. We consider the lowering of PCB concentrations in sediment as a direct benefit to the local aquatic population and fish consumers in these locations as a benefit. There is a need to perform site specific investigations, feasibility studies, and remedial action evaluations. Data for most sites listed in Table 26 of the Staff Report are not sufficient to characterize the lateral and vertical extent of contamination so further site investigations are necessary. If these data show that a significant portion of the PCBs are buried, then depending on the extent of PCB contamination, the need for further studies will be determined. Further studies could include, but is not limited by, depth of burrowing of aquatic organism, stability of overbearing sediments, and rates of sedimentation or erosion.

Cal. Chamber/GE Comment 91 : "Any attempt to clean up contaminated sediments in the Bay margin would be undermined by recontamination from the main Bay. The identified sediment sites are likely depositional areas that trap particulate matter that enters the Bay with each tidal cycle and storm event. Ambient PCB concentrations in suspended particles exceed the sediment target by as much as an order of magnitude or more. Such particles would settle on remediated areas, re-contaminating them. While the PCB-contaminated sites the TMDL has identified have insufficient PCB mass to keep the Bay contaminated, the Bay has sufficient PCB mass to re-contaminate any such site that is remediated."

The potential for site recontamination is evaluated prior to remedial action as part of a site specific remedial investigation and feasibility study. All local on-land sources of PCBs must be controlled prior to clean-up to ensure success of in-Bay remedial activities. Recontamination from in-Bay sediments is unlikely if the remedial actions cleaned up the bulk of the contamination.

Cal. Chamber/GE Comment 92: "The inclusion of remediation of PCB contaminated sites in the implementation plan is inappropriate because no analysis has been done to establish potential benefits of such remediation on PCB levels in water and in fish; remediating such sites will yield minimal benefits because of the relatively small PCB mass contained therein; and recontamination will undercut the goals of any such remediation."

A wealth of scientific research has documented the relationship between increased sediment concentrations and increases in PCB body burdens in aquatic organisms, specifically benthic organisms. Bioaccumulation tests are routine analyses used to evaluate the potential for uptake of PCBs from sediment by aquatic organisms. These are used to determine the suitability of placement of dredge materials in aquatic environments and the need to remediate PCB contaminated sediments. These analyses have been performed for selected Bay hot spots and have shown increased uptake of PCBs at sediment hot spots compared to reference sediments. Inclusion in the TMDL of the evaluation of remediating hot spots (contaminated sites) is therefore warranted.

Cal. Chamber/GE Comment 93: "High-volume water sampling and U.S. EPA Method 1668, Revision A, likely will be necessary to show TMDL compliance, as conventional methods cannot detect PCBs in the parts per quadrillion range. Since Method 1668 has not been approved by U.S. EPA, RWQCB independently must develop a program to ensure consistency and accuracy of sampling analyses, based on the use of standardized procedures and periodic assessment of laboratory performance. The TMDL presents no such program, and the reliability of Method 1668 has not been established."

Cal. Chamber/GE Comment 94: "RWQCB is premising measuring attainment with the TMDL on the assumption that the large-scale use of unapproved Method 1668 can yield accurate, reproducible results – an assumption that the TMDL documentation does not

support, and one that is highly suspect. The proper technical conditions are not present for the TMDL to rely on Method 1668 for TMDL attainment demonstrations."

Cal. Chamber/GE Comment 95: "Method 1668 suffers from various technical challenges associated with detecting chemical compounds in the low ppq range. Interlaboratory calibrations and comparisons have been elusive, as results of samples split between laboratories have not been reproducible on a consistent enough basis. Quality assurance and control is a challenge, as high volume water sampling introduces significant opportunity for introduction of ambient and background PCBs, or interferents, into the sample. Simply obtaining samples that are adequate for testing is a time-intensive process that requires either using specialized equipment or collecting and shipping large volumes of water to the testing facility. Even with careful collection of samples, Method 1668 is so sensitive to background contamination that it may not be able to determine consistently whether ambient conditions meet the TMDL's water-quality objectives."

This response applies to comments 93 through 95. We are aware of the stated limitations in method 1668. We are requesting low detection analysis of PCBs on a regular basis to develop a baseline of PCB concentrations in effluent, which should over time show a decrease in PCBs. In order to measure a decrease, we need to start collecting this information. Quality assurance (QA) parameters and limits related to Method 1668 need to be provided by the laboratory. It is possible that the QA parameters and limits have not yet been developed by the laboratory due to a lack of analyses by this method on effluents. In that case, the laboratory will need to develop these as part of the data collection. Finally, we recognize that low level analytical methods often provide QA challenges resulting in limitations on the uses of the data.

Cal. Chamber/GE Comment 96: "Even if the TMDL could ensure consistency between the results of different laboratories and could avoid quality control issues, sampling to measure compliance with the TMDL will be expensive. The cost for collecting one sample and analyzing it with Method 1668 exceeds $1,000, and can approach $2,000, greatly exceeding typical costs to analyze a sample for total PCBs (about $50 to $100 per sample)."

We recognize the costs associated with this method, and therefore we are neither requiring a high frequency of sampling, nor a large number of samples. Laboratory costs for this method should be decreasing as more laboratories are forming it and more analytical requests are made to the laboratories for it.

Cal. Chamber/GE Comment 97: "The TMDL's analysis of project impacts is technically flawed; the TMDL as proposed will have significant environmental impacts that cannot be mitigated."

This comment appears to be based on the erroneous assumption that 110 million cubic yards of remedial dredging would be required by the TMDL. This is not the case. Remediation of in-Bay contaminated sediment is on-going at some sites and planned for others under existing programs and would not be triggered by this TMDL; such clean-ups may or may not use

dredging as their method for remediation. Given these facts and the very limited areal extent of clean-up activities, the commenter's evaluation of the magnitude of environmental impacts is greatly overstated.

Cal. Chamber/GE Comment 98 : "Because the project is not well-defined, we made certain assumptions in the assessment of the environmental impacts, including with respect to proposed implementation measures for contaminated sediments. We assumed that dredging at the sites identified in the Staff Report would be limited to a depth of four feet, and that the volume of dredging of such sites would be up to 110 million cubic yards. Dredging even just these sites would be a massive dredging operation – comparable to or larger than the largest remedial dredging projects in the country. An operating and processing area necessary to support the dredging project would require many acres of near shore land, which even if it were available, would have its own environmental impacts. Disposing of the dredged material would exhaust the landfill capacity at many existing facilities, and could result in the need for new landfills, which would have its own environmental impacts. Even if the actual area of dredging were substantially less, the conclusions below would still apply (though for some of them – such as air quality – at a different magnitude).

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These comments appear to be based on the assumed 110 million cubic yards dredging. However, this greatly overstates the amount of dredging that could be part of contaminated-site clean-ups in the Bay, thus the commenter is not correct in the assertion that the significance level of environmental impacts should be increased. The scope and appropriate method for clean up at in-Bay contaminated sites will be evaluated through feasibility studies that will determine, on a case-by-case basis, how each site should be handled. It should be pointed out that dredging is only one potential method for remediation and it appears that the commenter has assumed it is the only method that might be selected for site clean-ups. Also, the areal extent of any remedial dredging that does occur is likely to be much more limited in extent than this comment suggests. Thus the potential impacts are all much less than the reviewer claims.

Cal. Chamber/GE Comment 99 : "The likely designation of the dredged materials as "waste" would likely render them unfit for beneficial reuse, which is an important part of the San Francisco Bay Long Term Management Strategy. Beneficial reuse opportunities the TMDL would impact include habitat restoration, levee maintenance, and redevelopment."

The TMDL does not create new regulatory requirements for dredging or the placement of dredge material, rather it relies on decisions and actions agreed upon in the LTMS. The TMDL will not supersede current waste material designation regulations and therefore will not result in dredge material being designated as waste, unless it already meets current legally applicable criteria for designation as waste. The Water Board has already developed guidance on the beneficial reuse of dredge material for the Bay, which provides the regulatory framework by which we evaluate the suitability of dredge material reuse.

Cal. Chamber/GE Comment 100 : "Dredging 'contaminated sites' will result in emissions of criteria pollutants that exceed Bay Area Air Quality Management District significance thresholds – including nitrous oxides, particulate matter, and reactive organic gasses – and significant emissions of greenhouse gases. RWQCB has failed to consider these emissions."

Potential environmental impacts of contaminated site clean-ups at the scale suggested in the comment will be evaluated during feasibility studies of potential remedial actions considered at that site. Our Regulatory Analysis (see Section 12 of both the original and revised versions of the Staff Report) did discuss the potential impacts to air quality from dredging as a potential remedial activity. We also described numerous measures that could be implemented (and would be required by applicable permits) to avoid, minimize, and mitigate any such impacts. Again, it is important to note that this reviewer's comment stems from a misunderstanding of the relationship between this TMDL and site clean up activities, as well as the gross over-estimate of 110 million cubic yards as amount of remedial dredging that might occur.

We did, in fact, consider emissions related to dredging and hauling of the spoils by barge. However, since we do not anticipate dredging of anything approaching the areal extent assumed by this reviewer, we did not rank most impacts associated with dredging potentially significant. The reviewer notes that there are currently 22 identified sites on a list of 'hot-spots.' It should be pointed out that "treatment" for some of these sites may be "no action," thus dredging is not the only option. Furthermore, the impetus and the authority for clean up at these sites would not result from the PCBs TMDL, but rather from regulations such as the federal 'Superfund' legislation also known as CERCLA as well as other State agencies' clean up authorities.

Cal. Chamber/GE Comment 101 : "Dredging will damage benthic communities. Once destroyed by dredging or damaged by capping, it can take up to four years for benthic ecosystems to re-colonize. The TMDL does not characterize the health of the benthic communities at the "contaminated sites," but some of them are known to be generally

healthy, and localized pockets of degraded benthic communities have not been linked to PCBs."

Potential environmental impacts of contaminated site clean-ups will be evaluated during feasibility studies of possible remedial actions as appropriate for a specific site. The reviewer does not cite any references for the assertion that benthic communities take up to four years to recover, so it is difficult to assess the accuracy of this claim. Given the limited areal extent of clean up activities and the adaptation of benthic organisms to life in a very dynamic environment significant impacts are unlikely. Furthermore, it is important to note that this reviewer's comment stems from a misunderstanding of the relationship between this TMDL and site clean up activities, as well as the gross over-estimate of 110 million cubic yards as amount of remedial dredging that might occur.

It should also be noted that remediation of contaminated in-Bay sites will proceed as part of existing programs of the Water Board and other agencies even in the absence of this TMDL. Furthermore, the environmental impact of remediation at sites where the Water Board may oversee clean up were evaluated by the State Water Resources Control Board in the Functional Equivalent Document for the Consolidated Toxic Hot Spots Cleanup Program.

Cal. Chamber/GE Comment 102 : "Dredging 'contaminated sites' will cause significant impacts to species. The TMDL did not consider potential impacts to the long list of protected species that live in the Bay. Habitat modification, increased turbidity, and re-suspension of contaminants into the water column could result in significant impacts to some of those species."

Potential environmental impacts of contaminated site clean-ups will be evaluated during feasibility studies of potential remedial actions considered at that site. These feasibility studies will assess the extent and most appropriate method of remediation on a site-by-site basis. Once the scope and method of remediation are determined, then any necessary actions to avoid, minimize, and mitigate environmental impacts will be identified and included in site clean-up plans.

The reviewer does not identify which species are of concern apart from those comprising the benthic community. Relative to that community, it is important to note that the Bay is a highly dynamic environment with wide seasonal fluctuations. The species that populate the benthic community are well-adapted to survival in an environment subject to change. None of these species are considered rare, threatened, or endangered. Furthermore, they are very numerous and could readily re-colonize any areas disturbed by remediation of contaminated sites. Regarding other species, as pointed out on pages 98-99 of the Staff Report, by following the conditions of permits issued by the Water Board, BCDC, US FWS/NOAA-NMFS, and US ACOE and by using existing industry standards and practices, impacts to all species can be avoided, minimized, or mitigated. All of these agencies would be involved in permitting for projects involving biological resources in the Bay. This is particularly relevant to note with respect to the rare, threatened, or endangered species in the region– many of which are only present in the Bay environment seasonally, such as steelhead or migratory bird species. Given the much smaller areal extent of work that we expect at clean up sights as opposed to what the review has

suggested based on erroneous an interpretation, these impacts are not significant as the reviewer's 'worst case scenario' claims.

Cal. Chamber/GE Comment 103 : "The recently proposed organochlorine TMDL for Newport Bay corroborates that a large dredging operation will cause significant environmental impacts. In that TMDL (which includes PCBs), the Santa Ana RWQCB concluded that implementing the TMDL, and dredging in particular, would cause significant impacts to biological resources, air quality, noise, traffic, and landfill capacity. The proposed TMDL for SFB will cause greater impacts than the organochlorine TMDL for Newport Bay since the sediment goal for SFB is lower than the one proposed for Newport Bay, and SFB is larger than Newport Bay. The TMDL must address the significant discrepancies between the proposed Newport Bay TMDL and the proposed TMDL for SFB, and explain why Santa Ana RWQCB recognizes significant impacts despite having a much higher PCB sediment goal."

There is no basis for suggesting that the same level of impacts would occur in the San Francisco Bay region as in the Newport Bay area that was covered by the Santa Ana Regional Water Quality Control Board's organochlorine TMDL. The Newport Bay TMDL covers a wider range of chemicals which had more extensive use; the hydrological dynamics of Newport Bay are different than those of San Francisco Bay, making its current load and assimilative capacity substantially different. We determined in our analysis that dredging may pose some potentially significant environmental impacts to the Bay (see Section 12 of both the original and revised versions of the Staff Report). However, our analysis shows that these environmental impacts can be mitigated to be less than significant levels. Implementation measures include but are not limited to measures such as: use of electrical dredging equipment to minimize air impacts; consultation with USFWS, NOAA/NMFS, and CDFG; pre-project wildlife surveys and use of biological monitoring during the project to minimize any impacts to wildlife; compliance with local noise ordinances, use of noise dampening equipment, and appropriate location and timing of activities to minimize impacts of noise. Furthermore, the conditions in Newport Bay and San Francisco Bay are not comparable. For example, pre-existing air quality conditions are different, as are the climatological factors that affect air quality. The hydrological qualities of the two bays are also significantly different further limiting the usefulness of any comparisons between Newport and San Francisco bays.

Cal. Chamber/GE Comment 104 : "Further impacts will be caused by the treatment of stormwater, which will entail, among other things, constructing massive storage basins, the size of which is estimated to be up to 28 square miles. RWQCB has not examined the land use, economic, and habit impacts of this aspect of the TMDL."

The extremely high cost estimated by the commenter is based on the exaggerated belief that the TMDL will result (in part) in the need for storage and treatment of most, if not all urban runoff in the Bay area to attain the wasteload allocations for urban runoff. The PCBs TMDL's implementation plan identifies a series of options that may be adopted by public and private entities subject to the TMDL. There are two important points regarding implementation that must be noted. First, the Water Board is legally prohibited from mandating the adoption of any

one of these methods or technologies. Second, while the TMDL does identify treatment of stormwater as an option, the TMDL neither requires it, nor does it suggest doing so on a wide scale. Instead, we suggest that where strategically feasible this is a possibility. Further, the CEQA Guidelines are expressly clear in stating that speculation is not required of those preparing the environmental review. To suggest that up to 28 square miles of stormwater storage would be required is speculation. The rest of the reviewer's comment on this issue – failure to consider the "land use, economic, and habit [sic] impacts of this…," are therefore, based on faulty assumptions about the requirements of the TMDL.

Finally, it has been documented that there are far less expensive approaches available that, if implemented, would achieve high levels of compliance with current water quality objectives, and to a high degree satisfy the implementation section of this TMDL for urban runoff. This has been documented in the State Water Resources Control Board's "NPDES Stormwater Cost Survey" (2005), specifically in Appendix H-Alternative Approaches to Stormwater Quality Control.

Cal. Chamber/GE Comment 105 : "***The TMDL is defective as a matter of law as it cannot feasibly be met.*** **The PCA, the CWA, RWQCB's Basin Plan interpreting these statutes, and RWQCB's project objectives for the TMDL require RWQCB to adopt a reasonable TMDL that can be implemented feasibly, and accomplished. The proposed TMDL does not meet these standards."**

Cal. Chamber/GE Comment 106 : "The law requires water quality standards, and plans to implement them, to be achievable."

Cal. Chamber/GE Comment 107 : "The TMDL is infeasible and invalid on that basis."

This response applies to comments 105 through 107.Water quality standards and objectives for PCBs in the Bay have been promulgated in the Basin Plan and the CTR. This TMDL is designed to attain these standards and objectives. We propose to use an adaptive approach to implementing this TMDL which will allow for regular review and revision of implementation actions. This will ensure that only those actions that are feasible and achievable will be implemented.

We propose to use an adaptive approach to implementing this TMDL which will allow for regular review and revision of implementation actions. This will ensure that only those actions that are feasible and achievable will be implemented.

Cal. Chamber/GE Comment 108 : "The TMDL's references to adaptive implementation do not render the TMDL feasible."

We disagree. Adaptive implementation ensures that only actions that are feasible and achievable are implemented.

Cal. Chamber/GE Comment 109 : "To the extent the TMDL is impossible to meet, it is unlawful.

"The law never requires impossibilities." Cal. Civ. Code § 3531. The conditions called for by the TMDL discussed supra are so extreme, they may well be impossible to attain. Dischargers and other potentially responsible parties ("PRPs") cannot avoid violating the TMDL, as, for example, counties cannot capture and clean stormwater to the TMDL's arbitrary concentration requirements, and PRPs cannot achieve the fish-tissue target or the sediment goals due to ambient PCB concentrations, other sources, and the impossibility of remediating to the TMDL's standards."

This comment rests on the faulty premise that the TMDL is impossible to achieve. The Staff Report accompanying the Basin Plan amendment that incorporates the TMDL clearly establishes the bases for the TMDL, its analysis of loads and waste-loads, its allocation scheme and implementation plan. This report was subject to thorough scientific peer review and found to be sound and feasible. Furthermore, as a matter of scientific opinion, we disagree on the first premise – the TMDL is impossible to achieve. We believe that our linkage analysis clearly demonstrates it is, in fact, possible to attain our target. Finally, by using an adaptive implementation approach, we have provided sufficient time and latitude for the implementing parties to evaluate and adopt means of complying with the TMDL and meeting their allocations.

Cal. Chamber/GE Comment 110 : "Impossible dimensions of the TMDL violate not only the Civil Code, but also state and federal due process protections.

"RWQCB Must Disclose The Economic And Non-Economic Costs And Benefits Of The TMDL And Reasonably Balance All Factors Before Adopting The TMDL.

"PCA requires RWQCB to consider and balance the economic and environmental benefits and harms associated with the TMDL. The CWA does not prohibit such a balancing; guidance interpreting the CWA encourages the consideration of costs in developing TMDLs."

(Note: we have responded to this general comment under the specific points raised by this commenter below.)

"RWQCB is required to consider economics in developing the TMDL. Water quality targets and allocations must take into consideration that water quality which reasonably is achievable in light of social and economic factors. Cal. Water Code § 13241 (economics must be considered in setting water quality objectives.); 1994 State Board Memo at 7 ("For a TMDL whose goal is to achieve a standard based primarily on nonattainment of a designated beneficial use, for which there are no applicable objectives, a numeric target is established for each pollutant or stressor that interferes with attaining the use. Establishing a numeric target in these instances is analogous to establishing water quality objectives"); id. at 4 (acknowledging that RWQCBs 'cannot fulfill this duty [to consider economic impacts] simply by responding to economic information supplied by the regulated community.').

"CEQA requires a consideration of costs when an agency establishes a performance standard. Cal. Pub. Res. Code § 21159. SWRCB has acknowledged that TMDL 'numeric targets and load allocations would probably fall into the category of performance standards.'

Memorandum from William R. Attwater, Chief Counsel, Office of Chief Counsel of SWRCB, to Executive Officer of Santa Ana Regional Water Quality Control Board, 'Do TMDLs Have to Include Implementation Plans?' at 7 (March 1, 1999). Thus, '[u]nder CEQA, the Regional Water Board would have to identify the reasonably foreseeable methods of compliance with any TMDL provisions that established performance standards or treatment requirements [under Section 21159].'). Id. at 6-7. RWQCB also must analyze the costs of the TMDL under the California Administrative Procedures Act. Cal. Gov't Code § 11346.3."

The commenter cites two laws to support the assertion that the Board is required to consider economics in developing a TMDL. We agree that CEQA, one of the laws cited by the commenter, applies to the Board's action in adopting the TMDL. That law provides that when various environmental agencies including the Water Boards are considering adopting a performance standard, those agencies shall prepare an "environmental analysis of the reasonably foreseeable methods of compliance" which shall "take into account a reasonable range of environmental, economic, and technical factors…" (Publ. Res. Section 21159.)

We disagree with the commenter's assertion that Water Code section 13241 applies to the Board's action in adopting a TMDL. That law provides that in establishing water quality objectives, a water board is required to consider several factors, including "[e]conomic considerations." (Water Code section 13241(d).) The Board is not adopting water quality objectives, thus the law is inapplicable. Even if Water Code section 13241 were applicable, the Board would comply with its requirement to consider economics by complying with the CEQA requirement to "take into account…economic…factors…." (Public Resources Code section 21159.)

Cal. Chamber/GE Comment 111 : "A TMDL must strike a reasonable balance among economic and non-economic factors. Once RWQCB has characterized and disclosed the various costs, benefits and potential harms of a TMDL, it must proceed to balance these factors before adoption. "The regional boards must balance environmental characteristics, past, present, and future beneficial uses, and economic considerations (both the cost of providing treatment facilities and the economic value of development)." Study Panel Report at 13; see also City of Burbank v. State Water Resources Control Bd. (2005) 35 Cal. 4th 613, 618 (California law allows consideration of economics when imposing pollutant restrictions more stringent than required by CWA)."

We disagree with the commenter's contention that the two laws cited require the Board to strike a "reasonable balance" among economic and non-economic factors. Neither of the laws provides on its face that a "reasonable balance" must be struck "among economic and non-economic factors". There is no appellate court case law that have interpreted either of the two laws to require such balancing thus there is no basis on which to conclude that either or both require that the Board strike a "reasonable balance among economic and non-economic factors."

The commenter has cited a case that interpreted one of the laws, section 13241, as it applies to the issuance of an NPDES permit. (City of Burbank v. State Water Resources Control Board (2005) 35 Cal. 4 th 613. The California Supreme Court held in that case that when a water board adopts an NPDES permit it may not analyze the section 13241 factors (including economics)

when it imposes restrictions on pollutants that to implement those required by the federal Clean Water Act. (id. At 627.) The case has been interpreted to stand for the proposition that section 13241 factors must be analyzed if a Board imposes a restriction that is more stringent than required under that act. That case is inapplicable.

First, the law does not apply to adoption of a TMDL. It expressly applies to the adoption of water quality objectives, but the Board does not adopt water quality objectives when it adopts a TMDL. There is no appellate court case law that supports the commenter's contention that section 13241 applies to the Board's adoption of a TMDL. Second, even if section 13241 applied to the adoption of a TMDL, the appellate court decision cited by the commenter did not reach the conclusion that any sort of balance had to be struck as part of that economic analysis. Last, even if section 13241 applied to adoption of a TMDL, the proposed TMDL would not impose restrictions on pollutants that would be more stringent than required by the Clean Water Act thus section 13241 would not require that an economic analysis be performed.

Cal. Chamber/GE Comment 112 : "The TMDL does not reflect economics or a reasonable balance among all factors. The TMDL has not considered economics. Although there is a "Discussion of Costs" heading in the TMDL documentation, the report contains no meaningful assessment of the costs of the TMDL, and does not rise to the level of a consideration of economics. The disclosure and analysis of costs is far too thin to inform adequately RWQCB's decision making. The minimum level of assessment RWQCB must conduct for a meaningful consideration of economics and to satisfy PCA includes: (1) identifying baseline risk levels; (2) listing the benefits to be achieved; (3) identifying alternative strategies to achieve the benefits; (4) estimating the costs of each alternative; (5) assessing uncertainty; (6) comparing the cost effectiveness of each alternative; and (7) identifying the most cost-effective alternative. Absent such an assessment, RWQCB is without the information to balance economic considerations versus other factors, and the public is left without any assurance that RWQCB is proposing a properly balanced regulation.

Please see the response to Comment 110.

Cal. Chamber/GE Comment 113 : "The Technical Conditions To Support The TMDL Are Not Present. As discussed supra, and in the technical reports submitted herewith, the foundation for the proposed TMDL is not sound and the TMDL's analysis, modeling and data have significant problems. Because of these technical problems, PCBs in the Bay presently are not suitable to be regulated under the TMDL program, and the proposed TMDL is not technically defensible."

Cal. Chamber/GE Comment 114 : "PCBs are suitable for calculation of a TMDL only if proper technical conditions are met; those conditions are not present in the instant case."

This response applies to comments 113 and 114. We disagree with the commenter's opinion regarding the technical defensibility of the TMDL and the Staff Report and Basin Plan

amendment has undergone external technical peer review and was determined sound through that process.

Cal. Chamber/GE Comment 115 : "The TMDL has not established the Bay's loading capacity for PCBs."

We disagree. We determined the desired condition for PCBs in fish tissue based on local consumption rates. We then translated this fish tissue numeric target to equivalent ambient conditions in the Bay water and sediment using a food web model. We further determined the loads (and load reductions) needed to attain these ambient conditions in the Bay using a mass balance models. All models and calculations have received extensive peer review from qualified experts, have been used in a regulatory context in other water bodies across the US, and are available for review. As such, we have used a well documented and transparent approach to setting the TMDL that has itself been positively peer reviewed as part of the development of this TMDL. Section 9.1 of the Staff Report contains more details on food web modeling as it relates to the linkage analysis.

Cal. Chamber/GE Comment 116 : "The proposed sediment goal does not reflect a correct translation between fish-tissue PCBs and PCBs in sediment."

We disagree. The food web model, upon which the sediment goal is based, provides a valid translation between PCBs in fish tissue and in sediment. This model has been extensively published in the scientific literature, has been used for regulatory rule making, and has received positive peer review as part of the development of this TMDL.

Cal. Chamber/GE Comment 117 : "RWQCB has not demonstrated that full implementation of the TMDL will attain water quality standards."

We disagree. We have demonstrated that attainment of the TMDL will result in attainment of the numeric target and water quality standards. The mass budget model clearly showed that 40 years after attaining a load of 10 kg PCBs per year, the numeric target will be attained. Attainment of the numeric target is in itself a demonstration that the Basin Plan's narrative water quality objective for bioaccumulation is attained. We further demonstrated using Bay specific bioaccumulation factors that attainment of the numeric target will result in attainment of the water quality standard in the CTR.

Cal. Chamber/GE Comment 118 : "RWQCB lacks the necessary reliable, technically defensible data to adopt the TMDL."

We disagree. The TMDL was submitted for external technical peer review as required by California law. This review effectively includes consideration of our interpretation of available data. In general, the peer reviewers found that the technical basis of the TMDL relied on sound scientific methods and practices.

Cal. Chamber/GE Comment 119 : "The TMDL Erred In Assigning Half Of The Proposed 10 kg/yr Load To The Central Valley, Improperly Reducing The Loading That Should Be Assigned To Point Sources Such As Stormwater."

We disagree. We have assigned a smaller load reduction to the Central Valley as this source nearly attains water quality standards already. Water and sediments entering the Bay from the Central Valley have lower PCBs concentrations than that in the Bay. As such, only a small load reduction is necessary, if at all, to attain beneficial uses of the northern embayments of the Bay. Stormwater is the biggest source of PCBs to the Bay, and, as such, we require the largest load reductions from stormwater. Control of PCBs in stormwater will in itself result in attainment of the TMDL's numeric target.

Cal. Chamber/GE Comment 120 : "Adoption Of The Proposed TMDL Would Be Arbitrary And Capricious. At a minimum, the TMDL must satisfy the arbitrary and capricious test of California law, and also cannot be entirely lacking in evidentiary support. Various aspects of the proposed TMDL, alone or in combination, violate these standards. The problems with the TMDL are systemic, rendering any adoption of the TMDL without evidentiary support."

Note: this general comment is followed with the list of more specific comments, which we also reproduce below. Our general response is provided immediately below, with additional responses to each of the more specific comments in order as they appeared in the original comment letter.

The commenter contends that the Board would be acting contrary to California law if it adopted the TMDL. It contends that various aspects of the TMDL would be unlawful and it notes a number of issues concerning the TMDL that it argues are "illustrative" of its contention. The commenter does not provide an explanation in this section of why it believes that the Board's actions would be arbitrary and capricious.

We agree that a reviewing court would determine whether the Board's action to adopt a TMDL was "arbitrary, capricious or entirely lacking in evidentiary support". (See City of Arcadia v. State Water Resources Control Board (2006) 135 Cal. App. 4th 1392, 1492.). We also note that the petitioner in such an action would have "the burden of proof to show that the decision is unreasonable or invalid as a matter of law." (Id.)The commenter has not shown in its comments that the proposed action would be unreasonable or invalid.

Cal. Chamber/GE Comment 121 : "<u>Infeasibility</u> – An agency action establishing requirements with which compliance is not feasible, or requiring conditions that cannot be achieved, is arbitrary and capricious. An impossible order is "irrational" and may not be enforced: "[t]he condition was unreasonable, because it could not be complied with. [The district court] might as well have asked the plaintiff's attorney to hold his breath [for several hours]. . . . We cannot uphold an irrational ruling." Diehl v. H.J. Heinz Co. (7th Cir.1990) 901 F.2d 73, 75."

Our linkage analysis demonstrates that the TMDL is feasible and will achieve the target we have set. Effective, appropriate technology exists to implement measures which will control

sources and thereby reduce the loading of PCBs to the Bay. Further, the adaptive management plan allows for use of existing measures to reduce PCBs while additional study of the fate of PCBs in environment and associated models are further developed. The initial phase after adoption of the TMDL also allows the regulated community to test and evaluate a variety of means to comply with their allocations.

Furthermore, the commenter does not provide any explanation of why compliance would be infeasible. As discussed elsewhere in this document, it is feasible to comply with the actions required in the TMDL. Even if the commenter were able to demonstrate that compliance with some part of the TMDL would be infeasible (which the commenter does not do), the Board's action in adopting such a TMDL would not be arbitrary and capricious. The only appellate court decision that has considered a challenge to a Water Board's TMDL action concluded that the federal "statute applicable to establishing a TMDL…does not suggest that practicality is a consideration…." (Id., at 1428.)

Cal. Chamber/GE Comment 122 : ***"Setting Sediment Goals That Invite More Stringent Cleanups*** **– The TMDL's proposed sediment classification scheme, where sediments containing PCBs above 10 ppb are classified as contaminated, invites much more stringent PCB cleanups. If, as the TMDL suggests, the intent is not to make PCB cleanups any more stringent or frequent, the TMDL must be clearly separated from such cleanups, lest the TMDL's stringent PCB values drive cleanups as *de jure* or *de facto* cleanup standards. It would be arbitrary and capricious for RWQCB to invite unnecessary and wasteful cleanups to the levels of the proposed TMDL. It also would be arbitrary and capricious for RWQCB to not create a clear separation between sediment cleanups and the TMDL, especially given the potentially enormous stakes involved, and the dredging and capping implementation measures in the proposed TMDL."**

The commenter does not explain in this section why the sediment goals would invite more stringent cleanups. The commenter asserts that the "TMDL must be clearly separated from such cleanups." As discussed elsewhere in this document, the TMDL is not intended to affect cleanups and modifications have been made to clarify that intention and to include procedures to communicate that message to agencies that conduct and oversee cleanups.

Cal. Chamber/GE Comment 123 : ***"Acting In Contradiction To Stated Principles*** **– It is capricious to identify reasonable principles, and state that the TMDL intends to avoid high costs that are not warranted by environmental threat, but then set a TMDL at levels that are so unnecessarily low that almost any action, no matter how draconian, can be justified under the stated principles."**

We are not requiring implementing parties to implement any actions that are prohibitive in cost; we have used an adaptive implementation plan, which allows for a wide range of approaches to reducing loads and a long time frame to secure additional sources of funds, should additional funding prove necessary. Thus, we disagree with the contention that we are not making an effort to avoid high costs for implementation. In addition, the commenter does

not clearly state which actions would be arbitrary and capricious in this area. It appears that the commenter believes that the TMDL would be set at "levels that are so unnecessarily low that almost any action, no matter how draconian, can be justified…." The commenter does not explain in this section which actions would be draconian and why.

Cal. Chamber/GE Comment 124 : ***"Unexplained Departure From Precedent*** **– The draft TMDL departs significantly from the January 2004 proposal when RWQCB released a previous draft TMDL that contained a fish tissue target of 23 ppb and a sediment target of 2.5 ppb. The TMDL documentation provides no adequate explanation why a much more stringent TMDL is needed today than it was in January 2004, and largely has ignored the earlier version of its TMDL, and the many significant differences between it and the current proposal."**

The changes which were made to the PCBs TMDL as it appeared in the June 22, 2007 Basin Plan amendment and supporting Staff Report were partially based on additional data and results of research conducted in the intervening time period. However, some changes that were made were based on comments on the draft study that we received from stakeholders. The TMDL was revised to reflect our best understanding of the problem and to address stakeholder concerns.

In addition, the commenter is mistaken in believing that the earlier draft TMDL had some sort of precedential significance. It was a draft released by staff for the purpose of soliciting additional comments from stakeholders and other interested parties.

Cal. Chamber/GE Comment 125 : ***"Modeling That Violates Conservation Of Mass Principles*** **– The TMDL's reliance on a model that violates a first principle of physics – conservation of mass – is arbitrary and capricious and renders the TMDL wholly without evidentiary support."**

Please see the response to Comment 49.

Cal. Chamber/GE Comment 126 : ***"Reliance On An Erroneous Calculation Of Loading Capacity*** **– The principal feature of a TMDL is the Loading Capacity, to which the TMDL is equated. Here, Loading Capacity is depressed arbitrarily because modeling errors led the TMDL documentation to assume without rational basis that the capacity is much lower than it is in reality."**

We do not agree. The TMDL is based on the best available model. Please see response to Comment 49 for more details. However, we are continuing to improve our model, and are currently developing a multibox model. When the multibox model is complete, we will incorporate the information it provides into the TMDL as appropriate.

Cal. Chamber/GE Comment 127 : ***"Without A Valid Calculation, Dismissing Natural Recovery*** **– The basic flaw in the model causes an error with respect to natural recovery, which occurs much faster than the erroneous model predicts."**

We disagree. Natural recovery is explicitly considered in the TMDL and mass budget model for PCBs already in the Bay and PCBs loadings to the Bay.

Cal. Chamber/GE Comment 128 : ***"Arbitrary Reliance On Modeling Results That Are Contrary To Site-Specific, Empirical Information*** **– Rich data sets of mussel, sediment and water column PCB levels constitute material evidence of natural recovery and the Bay's ability to assimilate PCBs, but are not used to examine recovery and assimilation, or even to calibrate the TMDL's model. Instead, the TMDL uses a model that does not provide a good fit with these data and thus incorrectly predicts that recovery is slowing or minimal."**

Please see response to Comment 49.

Cal. Chamber/GE Comment 129: ***"Numerous Data And Analysis Errors*** **– The errors in the TMDL are such that RWQCB does not have a rational basis to act on the proposed BPA. The TMDL's stormwater values are speculative and based on an uncalibrated model, the current loads from the Central Valley are effectively unknown as they are based on incorrect flow data and biased PCB-concentration data, the estimate of POTW loads is incorrect as it does not use site-specific data, the estimate of the PCB load from atmospheric deposition is flawed and 'not believable,' PCBs entering the Bay in rainfall are ignored, and the TMDL documentation does not account for data that show the TMDL is not needed to protect human health or the environment."**

We have updated our estimates in Section 7.2 of the Staff Report concerning current stormwater and Central Valley loads based on comments supplied by SFEI. Current load estimates for POTWs (wastewater dischargers) are based on average loads of Bay area secondary and advanced treatment wastewater dischargers, and as such use site specific data. The model, as well as the rest of the TMDL, has been peer reviewed.

Atmospheric deposition of PCBs was quantified for dry deposition and represents a net loss of PCBs from the Bay to the atmosphere. It is likely that some small mass of PCBs are deposited during rain events. However, rainfall originates from the open ocean rather than from old industrial areas, and as such, is unlikely to contribute a large mass of PCBs.

Finally, we disagree that the TMDL is not needed to protect human health or the environment. We clearly demonstrated that load reductions will accelerate the recovery of the Bay by decades compared to the No Action alternative. See Section 12.9 of the Staff Report for more details on this topic.

Cal. Chamber/GE Comment 130: ***"Stormwater Loads Based On Population Statistics*** **– RWQCB is without rational basis to allocate stormwater loads on a flawed and illogical methodology that allocates PCB loads among the nine affected counties in a manner inversely proportional to county population size."**

This is incorrect. The allocations assigned to the various counties were not made on an "inversely" proportional basis. They were assigned based on the distribution of population near

the Bay. This is one of many approaches that could have been used, it is a rational basis for allocating loads and could be revised during later stages within our phased approach to implementation.

Cal. Chamber/GE Comment 131: ***"Arbitrary Allocation Of Loads*** **– The TMDL offers no rationale for its allocation of PCB loads among sources. For example, the TMDL offers no reason for allocating half of the 10 kg/yr load to the Central Valley or for discriminating among counties on the basis of their population density for stormwater allocation. There is no principled reason articulated for any of the allocations in the TMDL."**

We disagree that no rationale for allocations was provided. We have allocated wasteload allocations as follows:

Wastewater and industrial dischargers based on maximum effluent discharge permitted

Stormwater runoff dischargers based on estimates of maximum sediment flow

Central Valley loads based on predicted reductions from natural attenuation

Cal. Chamber/GE Comment 132: ***"Arbitrary Preference For Allowing Discharges Of PCBs From POTWs Compared With PCBs In Stormwater*** **– The TMDL offers no rationale as to why it does not propose implementation measures for wastewater and proposes to tolerate PCB discharges from POTWs at concentrations of up to 500,000 ppq, when each county must reduce PCBs in stormwater dramatically to levels no greater than 8,050 ppq, and in many cases far lower."**

We have revised the implementation requirements for wastewater discharges based on this and other comments. We have removed the interim limit of 0.5 μg/L (500,000 pg/L) and replaced it with requirements to maintain current performance and refine load estimates using low level detection limit analytical methods. This will help determine the need, if any, for further PCBs control measures in wastewater discharges. However, note that in allocating portions of the total maximum yearly load, we have assigned equal wasteload allocations to both wastewater and stormwater discharges. This is not a disproportionate wasteload allocation, instead it is an equal allocation. The need for increased load reduction from stormwater simply reflects the current disproportionate level of treatment between the effective treatment of wastewater and the relative lack of source and treatment control of stormwater.

Cal. Chamber/GE Comment 133 : "Reliance On An Unqualified Expert – RWQCB is without a rational basis to rely upon Carpenter's opinions as to the health effects of PCBs, and whether the TMDL should be set even lower."

We did not rely on the opinion of Dr. Carpenter in developing the TMDL.

Cal. Chamber/GE Comment 134 : "Noncompliance With Executive Order S-2-03 – Executive Order S-2-03, issued on November 17, 2003, required California agencies to cease processing

any "proposed regulatory action," in order to provide time to analyze the proposed regulation's potentially adverse impacts on the economy and business interests."

The executive order cited by the commenter contains a provision that required agencies to cease processing regulatory actions for a period of 180 days from November 17, 2003 to analyze the economic effect of those actions. Over three years have elapsed since that date, thus the requirement no longer applies. Any potential adverse impacts will be revealed by the phased adaptive implementation plan of the TMDL. The initial phase involves actions that are on-going or planned irrespective of adoption of this TMDL.

Cal. Chamber/GE Comment 135 : *"RWQCB Has Not Articulated Its Rationale Of Decision* – RWQCB has not demonstrated a satisfactory rationale for its decision to adopt the TMDL in light of all relevant factors and the statutory purposes of TMDLs"

The Water Board has provided the Staff Report that defines the problem of PCBs impairment, describes its sources, and establishes a target that will resolve the impairment of the Bay. The report clearly establishes the importance, scientific basis, feasibility of attaining a target PCB load toe the Bay that is protective of human health and other beneficial uses of the Bay.

The commenter contends that the Regional Board's narrative toxicity standard is unconstitutionally vague as applied in the TMDL. (It appears that the commenter meant this point to apply to the narrative bioaccumulation standard which is the narrative standard that would be implemented by the TMDL.) We disagree. First, the narrative bioaccumulation standard is not vague. The Clean Water Act's regulations expressly authorize states to adopt narrative water quality standards (40 CFR 131.3(b).). The State Board held that a narrative standard was not "void for vagueness" in the Union Oil Company order. (WQ 77-12.)

Second, the commenter is late in challenging the narrative bioaccumulation standard. The commenter could have challenged the standard when it was adopted by this Board but did not do so. If the commenter had raised such a challenge it would have been required to establish that the narrative standard would be impermissibly vague in all its applications. Village of Hoffman Estates v. Flipside, Hoffman Estates, Inc. (1982) 455 US 489 . The commenter could not have proven that it would be vague in all its applications.

Third, if the narrative bioaccumulation standard is applied in permit or other quasi-judicial action that directly regulates the commenter, then the commenter will again have an opportunity to challenge the narrative standard as unconstitutionally vague. The PCBs TMDL proceeding is a rulemaking in which the Board will consider adopting standards of general application rather than a quasi-judicial proceeding in which the Board could regulate individual dischargers.

Fourth, since the numeric targets in the TMDL are more specific than the narrative water quality standard about which the commenter complains, the TMDL would provide the very guidance that the commenter asserts is needed. The Board should be provided with deference in interpreting its toxicity standard especially since it is doing so through a rulemaking.

Cal. Chamber/GE Comment 136 : "The Narrative Toxicity Standard Is Void For Vagueness And Violates Due Process, As Applied In The TMDL."

Cal. Chamber/GE Comment 137 : "The narrative standard does not provide notice that it corresponds to various numerical proxies for PCBs, such as the proposed fish tissue target of 10 ppb."

This response applies to comments 136 and 137.The Staff Report clearly documents in Section 8.1 of the Staff Report how the fish tissue target was derived, as well as the links between the fish tissue target and concentrations of PCBs in sediment. During the seven-plus-year process of developing the TMDL, there were numerous public meetings that provided opportunities for public comment and questions. Additional meetings with individual stakeholders were also held when requested. The narrative objective of the Basin Plan was translated to a numeric fish tissue target following a US EPA-developed methodology consistent with the derivation of the water quality standards and the CTR.

Cal. Chamber/GE Comment 138: "The narrative standard provides no notice to the public that it will be adjudged to be violated on the basis of highly theoretical assumptions as to fish consumption and PCB exposure."

The narrative standard will be implemented and met through the TMDL. The supporting Staff Report includes a linkage analysis which demonstrates how the fish tissue target was derived and why it is protective of human health, once the TMDL is attained. Studies cited in the report provided the best available data on fishing and fish consumption. During the course of development of the TMDL, numerous public meetings were held offering the opportunity for public comments and questions.

Cal. Chamber/GE Comment 139:.."The narrative standard provides no notice to the public that it prohibits potential toxicity, no matter how theoretical."

Public notice has been provided in several ways. Numerous public meetings were held to discuss the TMDL during its development, which offered the public information about the project as well as the opportunity to ask clarifying questions or raise other types of concerns. Furthermore, signs have been posted notifying the public that eating fish caught in the Bay may pose a health risk.

Cal. Chamber/GE Comment 140: "The COMM Beneficial Use Standing Alone Does Not Provide A Basis For The TMDL."

The PCBs TMDL was not developed based on the COMM beneficial use, rather the beneficial use of sport fishing under the REC1 beneficial use. The TMDL was developed as required by the 303(d) listing of San Francisco Bay as impaired by PCBs as well as the human health advisory issued by the State's Office of Environmental Health Hazard Assessment regarding consumption of fish caught in the Bay.

Cal. Chamber/GE Comment 141: "The TMDL is far more stringent that [sic] the CTR value for aquatic life. As discussed supra, Section III, the TMDL is not based on protection of the ecosystem as current levels of PCBs in the Bay are not the cause of any injury to plants and animals, and as the Bay is not impaired for ecological uses."

The fish-tissue target contained in the TMDL was, as explained in Section 8.1 of the Staff Report, set at a level that is protective of human as well as wildlife that consume of Bay fish. Furthermore, San Francisco Bay was placed on the CWA 303 (d) list in 1998 for PCBs creating the basis for establishing a PCBs TMDL. As a result of this listing, the Water Board is obligated to take action to ensure that the impairment is resolved and that all beneficial uses of the Bay are attained.

Cal. Chamber/GE Comment 142: "RWQCB cannot equate the COMM standard with a series of proxies for PCBs in fish, sediment, and the water column. The TMDL has used extreme risk parameters and scenarios to conclude, contrary to empirical fact, that sport fishing behavior is placing anglers and others at risk from PCBs in the Bay."

OEHHA initially derived that PCBs concentrations in sport fish were elevated enough to pose a risk to persons consuming Bay sports fish at a rate greater than 2 meals per month. OEHHA derived safe fish tissue concentrations for PCBs using USEPA developed and approved methodology. We derived the target using this same methodology, although we used Bay-specific fish consumption rates not available to OEHHA at the time.

Cal. Chamber/GE Comment 143: "*The TMDL's Alternatives Analysis Is Not Adequate.* PCA, CEQA, and SWRCB's regulations require RWQCB to analyze alternatives. RWQCB is required to develop and analyze any feasible alternatives that would result in fewer environmental impacts than the TMDL.

This is incorrect; we are not obligated to consider "any" alternative as the reviewer states. The Guidelines of CEQA require consideration of a "reasonable range" of alternatives. The only alternative (in addition to the project as proposed) that must be evaluated is the No Project alternative.

Cal. Chamber/GE Comment 144: "*The alternatives analysis does not meet minimum standards*. The alternatives discussion consists of one page of the Staff Report (and an additional half page discussing the project itself). The discussion consists of a mere identification of three alternatives (no project, alternative load allocations, and an alternative fish-tissue target). There is no discussion, analysis, or data regarding the potential environmental impacts of these alternatives. Each of the alternatives is rejected summarily as not meeting the project objectives."

The CEQA Guidelines indicate that a reasonable range of alternatives must be considered. We identified and discussed several alternatives. We agree that additional explanation might prove

helpful to our reviewers and so have provided additional information on how the alternatives were evaluated and have revised the Staff Report accordingly. See Section 12 of the revised Staff Report.

Cal. Chamber/GE Comment 145: *"RWQCB must revise the alternatives analysis*. RWQCB must describe both the project and each alternative and their environmental and economic impacts in enough detail to allow a meaningful comparison."

As stated above, the Alternatives Analysis portion of the Staff Report has been revised to provide more detailed description of project alternatives and the reasons none of these alternatives was selected. See Section 12 of the revised Staff Report. The project itself is described in detail by the first 11 sections of both the original and revised versions of the Staff Report.

Cal. Chamber/GE Comment 146: "In addition, RWQCB must broaden the alternatives discussion to include an analysis of alternatives that would meet most of the basic project objectives. At a minimum, RWQCB must analyze the alternatives described below.

Monitored natural attenuation with institutional controls."

This option essentially describes the current situation and therefore, is very similar to the 'No Project' alternative examined in Section 12 of the Staff Report. Monitoring is currently underway via the Regional Monitoring Program at numerous sites around the Bay Area. This alternative is not acceptable because it does not achieve the objectives of the project within a reasonable time frame. Because the Bay is on the Clean Water Act 303 (d) list as impaired by PCBs, the Water Board is obligated to develop a plan to restore beneficial uses that are not attained as a result of the impairment. In this case, the best option is to fulfill that obligation through preparation of a TMDL.

Cal. Chamber/GE Comment 147: *"Monitored natural attenuation with institutional controls.* This alternative would involve adopting a TMDL with an implementation plan that consists of letting PCBs in the Bay naturally attenuate coupled with institutional controls such as an outreach program to educate any subpopulations that RWQCB believes are susceptible to PCBs in fish caught in the Bay. An effective suite of institutional controls should be just as protective as the TMDL, but would avoid the environmental and public health impacts of implementing the TMDL. U.S. EPA has adopted this adopted this alternative in other PCBs TMDLs, including the PCBS TMDLs for the Shenandoah River, the Missouri River, and Lake Worth."

See response to comment 146 above. In addition, institutional controls would not be a sufficient remedy in that educating recreational anglers to not fish for species susceptible to PCBs may result in more consumption of fish with higher mercury levels; some fish species with lower PCBs concentrations, e.g., leopard shark and striped bass, have higher mercury levels.

Cal. Chamber/GE Comment 148 : "Evidence of the efficacy of natural recovery exist if there are long-term decreasing trends in higher tropic level biota, water column concentrations, sediment core data or surface sediment concentrations. Contaminated Sediment Remediation Guidance at 4-9. Given that PCBs in Bay sediment meet all of the factors above, the cited U.S. EPA guidance strongly suggests that monitored natural attenuation is a feasible alternative for the PCBs TMDL.

"This alternative also is consistent with RWQCB policy, and has been adopted by RWQCB as the final remedy for site cleanups in other contexts. See, e.g., San Francisco Regional Water Quality Control Board, Order No. 01-053, WXI/696 Realty LLC and Quebecor World, Inc., 696 East Trimble Road, San Jose, Santa Clara County – Adoption of Final Site Cleanup Requirements (May 22, 2001)."

Natural attenuation is included in the TMDL and is therefore consistent with Regional Water Board policy. However, Order 01-053 is not relevant to the TMDL as it refers to a release of chlorinated solvents whose physical and chemical properties differ greatly than those for PCBs.

Cal. Chamber/GE Comment 149 : "*Equal reduction of PCBs across all sources.* The recently-released report, Adaptive Implementation of Water Quality Improvement Plans: Opportunities and Challenges, describes two alternatives that RWQCB must analyze. L.Shabman et al., Adaptive Implementation of Water Quality Improvement Plans: Opportunities and Challenges (2007 draft). The first approach is to require equal-percent reductions across all sources. Id. at 32. This alternative specifically is recommended when an adaptive implementation approach, such as the one the TMDL purports to be applying, is used."

The CEQA Guidelines clearly state that the lead agency is not required to evaluate any specific alternative (except the No Project alternative) but rather to assess a reasonable range of alternatives. The alternative the reviewer suggests is merely one among many that was not selected for evaluation, particularly in light of the purpose of the Alternatives Analysis provision of CEQA, which is to determine the least environmentally damaging practicable alternative. That noted, the option of requiring equal load reductions from all sources was evaluated during the development of the TMDL. This approach was rejected because it would be particularly expensive and burdensome to municipal and industrial dischargers who are already contributing the greatest efforts to reducing PCB loads to the Bay. Large reductions would still be required of stormwater sources and from the Central Valley. Finally, the implementation actions would basically be the same, except that POTWs and industrial dischargers would likely be forced to invest in prohibitively expensive treatment technologies.

Cal. Chamber/GE Comment 150 : "*Lowest-cost reduction of PCB loads.* This alternative is consistent with the balancing in which RWQCB must engage under PCA, the requirements of CEQA Cal. Pub. Res. Code § 21159(c), and the project objective that RWQCB avoid actions that will have unreasonable costs relative to their environmental benefits."

The purpose of the Alternatives Analysis required by CEQA is identification of the least environmentally damaging practicable alternative. The alternative suggested in this comment would not reduce any of the potential environmental impacts associated with the proposed TMDL. See the response to Comment 111 regarding the purported balancing requirement of CEQA Cal. Pub. Res. Code § 21159(c).

Cal. Chamber/GE Comment 151 :"d. RWQCB should develop an alternative that protects against non-negligible toxicity. The water quality standard for bioaccumulation indicates that the mere presence of PCBs does not violate the Basin Plan unless it is "detrimental" and causes an "effect." Basin Plan at 3.3.2. Consistent with this, RWQCB should develop an alternative that would protect against non-negligible risk to a sizeable population, rather than theoretical risk to a hypothesized, and unobserved population.

We are not required to evaluate all possible alternatives. Please see the response to Comment 47 for a description of the alternatives considered.

Cal. Chamber/GE Comment 152 : "*Organochlorines alternative*. The Bay is listed as impaired for dioxins, furan, DDT, and PCBs – all of which are organochlorines. RWQCB should develop and analyze an alternative TMDL that addresses all organochlorines in one regulatory action. This sensible alternative would reduce the regulatory burden and avoid overlapping, potentially inconsistent, rules for different classes of organochlorines. It also would prevent a "piece-mealing" CEQA violation by considering related parts of what appears to be a single project – reduction of organochlorines – as a whole. The Santa Ana RWQCB proposed a similar TMDL for Newport Bay that would replace the currently operative June 2002 TMDL. U.S. EPA issued an organochlorines TMDL for Newport Bay in Orange County in June 2002."

We chose not to combine these into a single TMDL because the uses for PCBs are distinct from the uses of other organochlorines: hence current sources of loads are also quite different. Thus separating them makes development of the respective TMDLs less cumbersome.

Cal. Chamber/GE Comment 153 : "The TMDL Does Not Comply With CEQA….The TMDL is not excused from a CEQA analysis because of RWQCB's certified regulatory program or alleged inability to conduct a project-level analysis [page 45]. RWQCB cannot limit its CEQA review because it proposes to adopt the TMDL under a certified regulatory program."

It is unclear to what this commenter is referring. Section 12 of the Staff Report, in both the original and revised forms, does contain a CEQA analysis. Under CEQA, the Staff Report is a 'substitute environmental document' consistent with CEQA's requirements for the Water Board, a Certified Regulatory Program.

Cal. Chamber/GE Comment 154 : "Even if Section 13360 applied to the TMDL, it does not purport to limit the scope of the CEQA analysis RWQCB must conduct."

We agree that section 13360 does not affect the analysis that the Board must do in order to comply with CEQA. The fact that the Board cannot mandate adoption of specific means of compliance makes it speculative in some instances to predict how the TMDL may be implemented by other public agencies that will have discretion in how to comply with the TMDL.

Cal. Chamber/GE Comment 155 : "A programmatic-level CEQA analysis is not appropriate here."

The Section 12 of the Staff Report has been revised to remove the reference to a programmatic review, while retaining the statement that the environmental analysis should be considered to be equivalent to that provided for a Tier One environmental review. We agree that 'tiering' does not allow deferral of identification of significant environmental effects.

Cal. Chamber/GE **Comment 156 : "As a certified regulatory program, RWQCB is required to respond in writing to all significant environmental points raised in public comments. 23 Cal. Code Regs. § 3779; Cal. Pub. Res. Code § 21080.5(d)(2)(D)."**

This document contains our responses to all of the comment letters we received. Furthermore, we not only take seriously our legal obligation to reply to comments, but we are also committed to working with stakeholders, other agencies and members of the public to develop the most appropriate, effective TMDL possible. In this spirit, we are happy to have the opportunity to respond to the comments, questions, and concerns regarding the PCBs TMDL.

Cal. Chamber/GE Comment 157 : "*The project description is inadequate*. The TMDL documentation falls short of providing an adequate project description by proposing a TMDL and then not describing in detail the measures "necessary for its implementation." The Staff Report's "TMDL Implementation" section provides only generalizations as to how TMDL allocations will be achieved in each load category."

We disagree with the commenter's assertion that our project description is inadequate. The Staff Report in full should be taken as the description of our project. The very brief description provided in the introduction to Section 12 of the Staff Report – if this is what the commenter is referring to – clearly states that it merely summarizes the project. The entire Staff Report contains information relevant to the project and implementation measures are more fully described elsewhere in the document, particularly in Section 11.

Cal. Chamber/GE Comment 158 : "The TMDL documentation does not quantify the amount of dredging that the TMDL will require, the boundaries of the dredging, the landing and dewatering sites for the dredged material, the disposal sites for the dredged material, the types and quantities of equipment that are expected to be used, and other critical elements of the dredging portion of the project."

The TMDL does not require dredging. There are two types of activities that entail dredging in the Bay. The first is maintenance dredging, which is required for upkeep of the navigational channels in the Bay. The second type of dredging is related to remediation of contaminated sediment sites in the Bay. Although there are some sites in the Bay known to be contaminated by PCBs, this TMDL does not require their clean-up. Remediation of such sites is on-going and planned, but dredging constitutes only one potential remediation action that may be taken. Furthermore, not all of the clean up activities of these sites is under the direct control of the Water Board; DTSC and the US EPA may also serve as the lead agency. For these reasons, it would be highly speculative to provide a total for possible remedial dredging in addition to the fact that this TMDL does not require it.

Cal. Chamber/GE Comment 159 : "Yet the TMDL documentation does not quantify the amount of dredged material the TMDL will cause to be unsuitable for in-Bay disposal, or determine the location and environmental suitability of alternate disposal sites."

Maintenance dredging is highly variable with a wide range volumes excavated from the Bay's navigational channels from year to year. Most of this dredged sediment goes to in-Bay disposal sites requiring no further handling; methods (and costs) for maintenance dredging are managed by the Dredged Material Management Office as described in the LTMS. The PCBs TMDL proposes no new regulations beyond those agreed upon in LTMS. For remedial dredging of in-Bay hot spots we are calling for preparation of initial feasibility studies and risk assessment reports that will evaluate a range of remedial actions, including dredging, if dredging is the selected as the appropriate method for clean up, all material removed will be evaluated in site specific plans and appropriate disposal methods and locations will be identified.

Cal. Chamber/GE Comment 160 : "…There is no description of the efforts that will be required for stormwater treatment."

Section 11.1 of the Staff Report contains a list of the general areas that we are directing stormwater agencies to investigate as potential means of compliance with the TMDL and thus meet their allocation. We have revised the implementation sections of the Basin Plan amendment and Staff Report (sections 11 and 12) that address stormwater treatment.

Cal. Chamber/GE Comment 161: "As described infra, Section IV.N, the TMDL appears to include adoption of a sediment quality objective; a 303(d) listing for RARE, EST, and WILD beneficial uses; and incorporation of the CTR and the WHO TEQs into the basin plan. None of these aspects of the TMDL are described as part of the project or analyzed for potential environmental impacts."

The TMDL does not include a sediment quality objective. We have revised the Staff Report to clarify this; see page 11 of the Basin Plan amendment and page 83 of the revised Staff Report.

The references to impairment from PCBs of the RARE, EST, and WILD beneficial uses have been removed. Although their mention was not intended as a 303(D) listing, it should be noted

that we are legally bound not only to restore impaired beneficial uses, but also to ensure that our actions are consistent with continued protection of all existing beneficial uses, including RARE, EST, and WILD beneficial uses, and to demonstrate that this TMDL will result in attainment of all beneficial uses potentially impaired.

We are not incorporating the CTR water quality standard for PCBs into the basin plan as we are not proposing the use of this value as a TMDL target. However, we are obliged to demonstrate that attainment of the TMDL target will result in attainment of all water quality standards and objectives, including that in the CTR. Nor are we incorporating the WHO method to calculate TEQ. Again, we need to demonstrate that attainment of the fish tissue target will result in the correction of all impairment. In this case, we demonstrate that attaining the fish tissue target for total PCBs will result in redressing the impairment due to dioxin-like PCBs which are listed on the 303 (d) list separately from total PCBs. In this version, we have recalculated TEQs with the World Health Organization 1998 TEFs, using the same PCB congeners in their report, in order to be consistent with the Policy for Implementation of Toxics-Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California.

Cal. Chamber/GE Comment 162: ***"The description of the environmental baseline is inadequate.*** **RWQCB must characterize the environmental baseline for each environmental resource listed in Appendix B of the Staff Report."**

We believe we have adequately characterized the environmental baseline for the environmental resources for which we have evaluated possible impacts.

Cal. Chamber/GE Comment 163: "The TMDL does not adequately assess the environmental impact of implementing the TMDL."

We disagree. Section 12 of the Staff Report is primarily devoted to evaluation of the potential environmental impacts of the TMDL as required in compliance with the Water Board's status as a certified regulatory program. In Section 12 of both the original and revised Staff Reports, we evaluated the potential environmental impacts that might result from the reasonably foreseeable means of compliance with the PCBs TMDL. The revised Staff Report provides additional information on how our evaluation and resulting rating of impacts was done.

Cal. Chamber/GE Comment 164 : "The TMDL documentation's assertion that RWQCB 'will not require any actions or project to implement the PCBs TMDL that would lead to significant, permanent, negative impacts on the environment' is not relevant to the CEQA analysis, and is unsupported. The project includes both a numeric target for PCBs concentrations in fish tissue and an implementation plan to achieve that target. For purposes of the CEQA analysis, RWQCB and any reviewing court must assume that the entire project will be completed – including all implementation actions necessary to meet the fish-tissue target. Stanislaus Natural Heritage Project v. County of Stanislaus (1996) 48 Cal. App. 4th 182, 206 ('While it might be argued that not building a portion of the project is the ultimate

mitigation, it must be borne in mind that the EIR must address the project and assumes the project will be built.')."

Note: the commenter goes on to suggest that the project will likely have impacts on land use, landfill capacity, air quality, global climate change, benthic communities, and species and habitat.

The Staff Report was revised (see Section 12) to provide more discussion of the potential impacts of project implementation. However, it is speculative to argue that the project will likely have impacts of the types suggested in this comment. Any such impacts would be caused by activities that are not part of the project, in particular in bay cleanup of contamination. As noted elsewhere, the TMDL has been revised to clarify that in-bay cleanups will not be affected by this TMDL. Additionally, the TMDL has been revised to clarify which actions are parts of the project's implementation and how the phased adaptive implementation plan will account for as yet unforeseen significant environmental impacts. To the extent that the impacts identified by the commenter would stem from possible treatment of stormwater by POTWs, it is premature to speculate whether or not that treatment would be undertaken. The TMDL provides that stormwater agencies must implement their load reductions through a phased implementation scheme based on first evaluating the feasibility, effectiveness, and impacts of controls such as routing runoff to POTWs or some other form of stormwater treatment. They will conduct studies to determine whether such treatment is feasible. If the studies indicate that treatment would be feasible, then a full analysis will be conducted of the impacts of implementing limited demonstration projects to evaluate that treatment. If the demonstration projects are implemented and prove to be successful then there will be further environmental documentation of any move to implement the process on a wider basis.

The Stanislaus case cited by the commenter is factually distinguishable in that it involved a project in which a known component of the project was not addressed in the environmental documentation. By contrast the impacts identified by the commenter are entirely speculative. As discussed above, this project either will not result in the activities that would cause the identified impacts or it will cause studies to be performed that will result in the development of information needed to evaluate future impacts. In Lake County Energy Council v. County of Lake (1977) 70 Cal. App. 3d 851, the Court of Appeal noted that "where future development is unspecified and uncertain, no purpose can be served by requiring an EIR to engage in sheer speculation as to future environmental consequences." (Id, at 854-855.) The California Supreme Court noted in No Oil, Inc. v. City of Los Angeles (1974) 13 Cal. 3d 68, 77, footnote 5 that where "sufficient reliable data to permit preparation of a meaningful and accurate report on the impact" of a possible future phase of project is not available that an environmental document need not analyze that future phase.

Cal. Chamber/GE Comment 165 : "The TMDL omits an assessment of cumulative impacts, as required by CEQA."

This section of the report has been revised to provide a more detailed discussion and explanation of how the finding of no significant cumulative impacts was determined. The

significance rating, however, that was assigned to this item from the CEQA checklist remains the same. See Section 12.8, of the Staff Report.

Cal. Chamber/GE Comment 166 : "The absence of a translation procedure violates the CWA.

"Where a state seeks to regulate the discharge of toxic pollutants into a water quality limited segment based on narrative criteria, as with the proposed PCBs TMDL, federal CWA regulations require the state first to adopt a translator procedure describing how such narrative criteria will be translated in a manner such that the standard can be applied to point source discharges. 40 C.F.R. § 131.11(a)(2)

"RWQCB's Basin Plan does not contain a translator procedure for the narrative toxicity standard, which is the basis for the TMDL. Nor did RWQCB identify the method by which it proposed to apply the narrative standard to water quality limited segments listed as impaired under CWA Section 303(d). RWQCB did not provide information that it would apply the narrative standard to PCB compounds, use a method that included a certain risk level, and make assumptions about PCB toxicity and exposure to PCB-containing fish. RWQCB did not explain that it would translate the narrative standard to regulate point source discharges like stormwater by assuming a scenario where anglers were eating PCB-containing fish at a rate of eight ounces per week, every week, for 70 years.

"The absence of a translator procedure violates the CWA, and renders the TMDL unlawful, as the translator procedure is a condition precedent to a TMDL in which a narrative standard is applied.

"(To the extent that the 1998 language in which RWQCB interpreted its narrative program as applying to observed – but not potential – toxicity may constitute the requisite translator, the TMDL violates any such translator in that it attempts to extend the narrative standard to theoretical toxicity alleged to be associated with long-term consumption of PCBs by a hypothetical population.)"

It appears that the commenter intends to argue that the Basin Plan should have included a translator procedure for the narrative bioaccumulation standard, which is implemented by this TMDL. The commenter is late in raising this argument as it could have done so when the Board adopted the narrative bio-accumulation standard in the Basin Plan. It did not.

In addition, Section 9 of the Staff Report provides a linkage analysis. In it, we describe how we used a well-accepted food web model that links fish tissue concentrations to water column and sediment concentrations of PCBs to develop our target. The model allowed us to back-calculate from the fish tissue target to water column concentrations using bioaccumulation factors. Therefore, the TMDL as a whole provides the translation in that it relates (links) point source requirements via the allocations that are part of a TMDL that are, in turn, linked via the target to attainment of the narrative standard.

Cal. Chamber/GE Comment 167 : "Because The TMDL adopts current treatment of municipal and industrial wastewater as stringent enough, RWQCB is without jurisdiction under CWA Section 303(d)(1)(A) to promulgate the proposed TMDL.

"TMDLs are promulgated for a specific class of water bodies, namely 'those waters . . .for which the effluent limitations required by section 1311(b)(1)(A) and section 1311(b)(1)(B) . . . are not stringent enough to implement any water quality standard applicable to such waters.' The referenced statutory sections set technology-based standards for municipal and industrial point source discharges of wastewater. The proposed TMDL would adopt current performance of PCB removal from such wastewater sources as sufficient treatment to satisfy the narrative toxicity standard. Accepting the TMDL at face value, one must conclude that the CWA Section 301(b)(1)(A) and (B) effluent limitations are stringent enough to implement the narrative standard. If these limitations were "not stringent enough," surely RWQCB would set Waste Load Allocations for these sources that were more stringent than its estimates of current performance.

"By setting the TMDL at current performance for municipal and industrial wastewater, RWQCB undermines the basis for it to take jurisdiction under CWA Section 303(d)(1)(A) to prepare a PCBs TMDL for the Bay. The CWA anticipates situations like this and does not leave RWQCB without recourse. RWQCB still could develop an information-only PCBs TMDL under CWA Section 303(d)(3)."

This is incorrect. TMDLs are required for water bodies not meeting water quality standards or beneficial uses when "Best Available Technologies" have already been employed, but have not resolved the impairment. Thus, in such a case, if wastewater treatment is not in place, it must be implemented. At this time, since POTWs are already performing well with respect to controlling PCBs in effluent, it is appropriate to address other sources of PCBs to the Bay and to develop a TMDL.

The commenter notes that the Clean Water Act provides that TMDLs must be promulgated for those waters for which permit limits that are technology based are "not stringent enough to implement any technology standard applicable to such waters". (Clean Water Act sections 301(b) and 303(d)(1)(A).) The commenter asserts that since the TMDL would hold municipal and industrial dischargers to their current performance for PCB removal, their PCB permit limits must be "stringent enough" and thus the TMDL is not authorized. The Board has issued permits for municipal and industrial dischargers that set limits for discharge of PCBs. Those limits are water-quality-based, not technology-based. Thus, the fact that those dischargers would be held to current water quality based limits is in no way inconsistent with the cited statute, which does not apply to water-quality-based limits.

Cal. Chamber/GE Comment 168 : "*The TMDL Violates The Applicable Peer Review Statute, Suspending RWQCB's Authority To Adopt The TMDL.* The TMDL violates the statutorily required procedures for scientific peer review and, therefore, RWQCB lacks the authority to take final action on the TMDL. The Health & Safety Code ("HSC") provides: 'No board, department, or office within the agency [California EPA] shall take any action to adopt the final version of a rule' unless certain conditions are met. HSC Code § 57004(d).

"Those conditions include submitting 'the scientific portions of the proposed rule, along with a statement of the scientific findings, conclusions, and assumptions on which the scientific portions of the proposed rule are based and the supporting scientific data, studies, and other appropriate materials, to the external scientific peer review entity for its evaluation.' If RWQCB 'disagrees with any aspect of the finding of the external scientific peer review entity,' it is required to 'explain, and include as part of the rulemaking record, its basis for arriving at such a determination in the adoption of the final rule, including the reasons why it has determined that the scientific portions of the proposed rule are based on sound scientific knowledge, methods, and practices.' HSC § 57004(d)(2). The TMDL documentation states that the peer reviewers 'concluded that the scientific basis of the proposed Basin Plan amendment is based on sound scientific knowledge, methods, and practices.' But this statement is at odds with certain specific findings by the peer reviewers.

The peer review conducted by Dr. David Carpenter finds: "With all of the cities and waste cites around the Bay it is simply not believable that only 0.35 kg/yr enter the Bay by atmospheric transport of gas phase PCBs." Staff Report at C-11 and C-12. Dr. Carpenter also expressed doubts regarding the rate of natural attenuation in the Central Valley: 'I do have some question as to whether the anticipated natural attenuation within the Central Valley watershed. . . is realistic . . . .' Id. at C-13. Both the rate of atmospheric deposition and the rate of natural attenuation in the Central Valley are key elements of the TMDL, yet the TMDL does not address Dr. Carpenter's critique. In addition, the peer review of Kevin J. Farley identifies a significant miscalculation regarding the net loss of PCBs due to sediment dredging. Id. at C-6. [all pg 51]

The TMDL documentation has explained neither why RWQCB disagrees with these aspects of the peer review (assuming it does), nor why it has ignored these points."

We disagree that the PCBs TMDL violates the applicable peer review statute. Our detailed written responses to the peer review comments are included in part V of this response document. We have taken the peer reviewers comments into consideration in our revisions to the Staff Report.

Cal. Chamber/GE Comment 169 : "The Proposed Action Improperly Includes A Sediment Quality Objective, Multiple 303(d) Listings, Adoption CTR, And Adoption Of The United Nations' WHO TEQs. The TMDL appears to include: a sediment quality objective; new 303(d) listings for the RARE, EST, and WILD beneficial uses; and an improper adoption of the CTR and the United Nations' WHO TEQs. RWQCB is without statutory authority to adopt a sediment quality objective under any circumstances, and did not comply with the statutory requirements for the 303(d) listing and adoption of the CTR or the TEQs. RWQCB may not adopt the TMDL as it currently is drafted. Note: the comments are addressed on a one-by-one basis below."

This is incorrect; the TMDL does not include a sediment quality objective or target.

Cal. Chamber/GE Comment 170 : "PCA defines a sediment quality objective as 'that level of a constituent in sediment which is established with an adequate margin of safety, for the reasonable protection of the beneficial uses of water or the prevention of nuisances.' Cal. Water Code § 13391.5. The draft TMDL proposes to establish such an objective for PCBs in Bay sediment. But the PCA mandates detailed procedures for adoption of a sediment quality objective with which RWQCB has not complied. Cal. Water Code §§ 13392.6(a), 13393. Only the SWRCB may adopt a sediment quality objective. Cal. Water Code § 13392.6(a). RWQCB must remove the sediment quality objective from the TDML.

"The TMDL documentation also states that PCBs impair the Bay's RARE, EST, and WILD beneficial uses. None of these uses are currently listed as impaired by PCBs."

This is incorrect in that the PCBs TMDL does not include a sediment quality objective. As noted earlier, to avoid confusion, the beneficial uses mentioned by the commenter were removed from the Basin Plan amendment and revised Staff Report. However, we must still establish a TMDL that protects all defined beneficial uses of the Bay, including RARE, EST, and WILD.

Cal. Chamber/GE Comment 171 : "The TMDL documentation states that the CTR applies to the Bay, but the CTR has not been made part of the Basin Plan."

This is incorrect. The CTR is a federal regulation with which the Water Board must comply; it does not need to be adopted in our Basin Plan. The CTR was promulgated by the US EPA and sets standards for a range of pollutants all of which apply to the Bay, except for those related to some metals. The Water Board must comply with all other provisions of the CTR, including those that apply to PCBs.

Cal. Chamber/GE Comment 172: *"RWQCB Has Not Provided The Documents Upon Which The TMDL Is Based As Required By The APA And CEQA*. RWQCB has not met its burden under CEQA and the California Administrative Procedure Act to disclose and make available for public review materials upon which the TMDL is based."

The Basin Plan amendment, supporting Staff Report, and Peer Review letters were all posted on our website as described in our Public Notice of June 22, 2007. We also provided contact information for all parties wishing to obtain hard copies from us. All other documents were and are available from us, as well. The commenter is aware of our procedures for obtaining documents for review related to development of this TMDL as demonstrated by the fact that, in the past, they have requested and received any and all related documents. In compliance with our legal requirements and in the spirit cooperation with and responsiveness to our stakeholders and the general public, we are happy to make these documents available as requested. Once the Basin Plan amendment and TMDL are adopted, an official Administrative Record will be prepared that will contain copies of all relevant documents. All of this material will become a permanent part of the public record.

Cal. Chamber/GE Comment 173: "*California Administrative Procedure Act.* The APA requires that '[e]very agency shall maintain a file of each rulemaking that shall be deemed to be the record for that rulemaking proceeding . . . and during all subsequent periods of time that the file is in the agency's possession, the agency shall make the file available to the public for inspection and copying during regular business hours.' Gov Code § 11347.3(a). The 'rulemaking file shall include: . . . (6) All data and other factual information, any studies or reports, and written comments submitted to the agency in connection with the adoption, amendment, or repeal of the regulation. (7) All data and other factual information, technical, theoretical, and empirical studies or reports, if any, on which the agency is relying in the adoption, amendment, or repeal of a regulation, including any cost impact estimates as required by Section 11346.3.' Cal. Gov Code § 11347.3(b)(6-7). Accordingly, RWQCB must provide the public with all the data, factual information, technical, theoretical, and empirical studies or reports that RWQCB is relying on in the adoption of the TMDL and/or in amending the Basin Plan."

The commenter suggests that the Board is subject to the requirements set forth in Government Code section 11347.3, which specifies requirements concerning documentation that an agency must make available when it is undertaking a rulemaking proceeding. Under Government Code section 11353 the Water Boards are subject to some but not all of the provisions of the California Administrative Procedure Act, the law referenced by the commenter. The Board is not subject to Government Code section 11347.3. Nevertheless, the Board has made available all the information that it is relying on in proposing amendments to the Basin Plan to adopt the TMDL.

Cal. Chamber/GE Comment 174 : "Similarly, the APA requires that a state agency fully explain the rationale for each regulation it proposes to adopt. This rationale must be set forth in the 'Initial Statement of Reasons,' which must be submitted to the Office of Administrative Law ("OAL") and made available to the public upon request. Gov. Code § 11346.2. The Initial Statement of Reasons must include, inter alia: 'An identification of each technical, theoretical, and empirical study, report, or similar document, if any, upon which the agency relies in proposing the adoption, amendment, or repeal of a regulation.' Gov. Code § 11346.2(b)(2).

"Accordingly, RWQCB must provide the public with the Initial Statement of Reasons submitted to the OAL, which hereby is requested pursuant to Government Code Section 11346.2."

The commenter suggests that the Board should have prepared an Initial Statement of Reasons which is a document required in most rulemaking proceedings. The Water Boards are subject to some but not all of the provisions of the California Administrative Procedures Act (Government Code section 11353). The Water Boards are exempted from the requirement to prepare an Initial Statement of Reasons.

Cal. Chamber/GE Comment 175 : "The content of administrative records in CEQA proceedings is governed by Public Resources Code Section 21167.6; subdivision (e) specifically enumerates what must be included, but does not exclude materials absent from the subdivision. See County of Orange v. Superior Court (2003) 113 Cal. App. 4th 1, 7….The broad language of Public Resources Code Section 21167.6 encompasses any and all expert reports reviewed by RWQCB, including any and all data underlying those reports.

"RWQCB is required to make all documents incorporated into the Staff Report available for public inspection.

"Similarly, RWQCB's Notice of Filing of a Draft Environmental Document ("Notice") was required to disclose the "address where copies of . . . all documents referenced in the . . . [Environmental Document] will be available for public review." CEQA Guidelines § 15087(c)(5). The June 22, 2007 Notice properly lists a website where "other documentation" will be available online. See Notice (available at http://www.swrcb.ca.gov/rwqcb2/TMDL/SFBayPCBs/pubnoticePCBsTMDL.pdf). To the extent the listed website does not include all of the documents referenced in the Staff Report, RWQCB has not complied with CEQA."

Cal. Chamber/GE Comment 176: "To comply with the APA and CEQA, RWQCB must make available to the public all of the documents and data considered in developing the draft TMDL. For example, we understand RWQCB has documentation regarding the inability of Best Management Practices to reach the TMDL's targets for stormwater – documentation developed with Proposition 13 funds under a RWQCB-led program entitled, 'Regional Stormwater Monitoring and Urban BMP Evaluation: A Stakeholder-Driven Partnership to Reduce Contaminant Loadings.' This documentation and other documents and data considered by RWQCB in developing the TMDL must be made available to the public."

This response applies to comments 175 and 176. We did make available at the website listed above the proposed Basin Plan amendment, supporting Staff Report, and the Peer Review letters. We did not offer to make all documents available online. The draft Basin Plan amendment, Staff Report, Peer Reviews, and all other documents are available from our office, the address of which was provided in the above referenced Public Notice. It should also be noted that the commenter is aware of the procedures for obtaining documents from us as evidenced by previous occasions when they have requested and received documents from us.

Furthermore, the commenter raises several concerns with the notice provided by the Board to the public about the environmental documentation prepared in connection with the TMDL. First, the commenter refers to a section of CEQA governing administrative records in litigation, which the commenter implies is somehow relevant to the environmental document the Board must make available to the public. The cited section expressly applies only to judicial challenges of TMDLs. This section is inapplicable to the Board's notice about which the commenter complains, however, if the Board is sued the record prepared will comply with the cited provision.

Second, the commenter notes that the CEQA Guidelines provide that documents incorporated by reference into an environmental document must be available to the public for inspection.

These documents are readily available from us on request and will be included in the administrative record, which will be submitted to the State Board once the TMDL is adopted.

Finally, the commenter suggests that the notice was defective because it stated that "other documentation" would be available at the Board's web site. The regulation provides in relevant part that an agency's notice of a draft environmental document shall indicate the address where copies of "all documents referenced in the EIR will be available for public review". The Board's notice complied with that requirement. Contrary to the commenter's assertion the regulations do not require that all documents be posted on the internet. The staff posted a number of documents on the Board's web site as a service to the public. Such posting was not required, thus the fact that not all documents were posted does not violate CEQA.

Cal. Chamber/GE Comment 177 : "*The TMDL Proceedings Must Be Reformed To Reflect Their Quasi-Judicial Character*. Although portions of the TMDL may be characterized as quasi-legislative, portions of the TMDL are directed at a small group of specifically known entities, and must be considered quasi-judicial."

Cal. Chamber/GE Comment 178 : "The Staff Report identifies specific 'contaminated sites' that are targeted for dredging and remedial action. RWQCB has identified specific parties that it believes are responsible for at least some of the contaminated sites. For example, RWQCB has been focusing on the Oakland Service Shop since 1980, when it issued a Cleanup and Abatement Order for the site. In its Consolidated Cleanup Plan adopted and approved on June 17, 1999, the SWRCB identified a specific Oakland facility when listing the basis for identifying San Leandro Bay as a candidate 'hot spot.' Thus, portions of the TMDL are focused on determining the rights and obligations of specific entities. This is the essence of a quasi-judicial proceeding. Department of Alcoholic Beverage Control v. Alcoholic Beverage Control Appeals Bd. (1987) 195 Cal. App. 3d 812, 817 ('the determination of specific rights in regard to a specific fact situation' is quasi-judicial conduct); Graves Advice Letter, 1998 WL 473136 at *7 ('The issuance of regulatory letters by the regional board (and subsequent compliance by responsible parties) for the purpose of investigating and remediating UST contamination are properly characterized as quasi-judicial proceedings since the regulatory actions involve specific parties.').

"When an agency engages in mixed rule-making and adjudication, it must segregate the proceedings, or adopt the more rigorous procedural protections of a quasi-judicial proceeding for the entire action. See, e.g., L & M Professional Consultants, Inc. v. Ferreira (1983) 146 Cal. App. 3d 1038. [pg 55]"

This response applies to comments 177 and 178. The commenter contends that parts of the TMDL should be considered to be quasi-judicial and suggests that the TMDL proceedings must include measures to "protect the procedural due process rights of the entities whose rights and obligations RWQCB is adjudicating." They state that additional procedural measures are needed for those parts of the TMDL that identify "contaminated sites" and identify specific parties that the Board "believes are responsible for at least some of the contaminated sites."

We disagree that any part of the proposed TMDL is quasi-judicial. The Board's adoption of a TMDL is quasi-legislative. (City of Arcadia v. State Water Resources Control Board (2006) 135 Cal. App. 4th.) The proposed TMDL does not adjudicate any rights or obligations concerning cleanup but notes that cleanup will be required in separate proceedings under the authorities of the Board or other agencies. The Board will consider whom to name to cleanup orders for PCB contamination in separate quasi-judicial proceedings that will include procedures necessary to provide due process

Cleanup at sites such as those listed in Table 12 of the Staff Report would be conducted under the Water Board's authority to issue Clean Up and Abatement orders, not as a result of the PCBs TMDL. The list of sites was not developed as part of the TMDL process, but rather was undertaken as a separate, independent project (Bay Protection and Toxic Cleanup Program).

Quantitative Environmental Analysis, LLC (QEA)

QEA Comment 1: "Natural recovery is ongoing and the Bay will attain ambient sediment concentrations much lower than the current level of 10 μg/kg even if nothing is done to reduce external sources."

Monitored natural attenuation is a core component of the proposed TMDL and associated implementation actions. However, current model estimates show that the TMDL cannot be achieved without reductions of PCB loads to the Bay. At a minimum, external load reductions will accelerate by several decades the relatively slow process of natural attenuation of PCBs in the Bay.

QEA Comment 2: "The assimilative capacity of the Bay is much higher than the current estimate of 10 kg/yr because of a fundamental error in the model used to calculate the assimilative capacity and because the risk associated with fish consumption has been overstated; "

We have recalculated the mass budget of PCBs over time and find that 10 kg/yr will result in attainment of the target in an acceptable timeframe (see Section 9.2 of the revised Staff Report).

QEA Comment 3: "The benefits of loading reduction are unknown because the loading estimates are highly uncertain and site-specific conditions have not been accounted for."

We disagree. The mass budget model predicts that recovery of the Bay will take 100 years if relying on natural recovery alone, whereas it will take 60 years less if the TMDL is implemented.

QEA Comment 4: "Remediation of sediment "hot spots" will be ineffective at accelerating recovery because of the influences of external sources, recontamination, and net sedimentation on PCB levels in these sediments."

Remedial investigations at each contaminated site include an analysis of the feasibility of the proposed remedial activities. We expect that these potential influences to be accounted for in the selection of remedial actions as part of the feasibility study. In the TMDL, we do not think of PCB loads from in-Bay contaminated sites as a mass loading to the rest of the Bay. Rather, we consider the role of increased PCB concentrations in bedded sediments as a source of PCBs directly to benthic and other aquatic organisms. A wealth of scientific information relates increased concentration in aquatic organisms to increased concentrations in sediments. Also, it is unlikely that water concentrations contribute a significant source of PCBs to fish. We consider the lowering of PCB concentrations in sediment as a direct benefit to the local aquatic population and fish consumers. Hence, performing site specific investigations, feasibility studies, and remedial action evaluations will provide the information necessary to select the most appropriate action at contaminated sites. Remedial actions when deemed necessary at these locations will result in lower localized PCBs body burdens in fish. Recontamination from

suspended Bay sediments would result in ambient concentrations of PCBs. Although greater than the sediment goal, ambient concentration is the lowest concentration attainable, but it is unlikely that remediation to ambient concentrations would occur.

QEA Comment 5: "These conclusions mean that the only reasonable approach is to institute an adaptive implementation (AI) plan that relies initially on natural recovery and monitoring to better quantify sources and their local and Bay-wide impacts. Sediment remediation should be abandoned and the benefit of reducing external sources should be weighed against the cost."

Our adaptive implementation approach relies on natural attenuation accelerated by reductions of loads from stormwater and the Central Valley, as well as a reduction of the reservoir of PCBs already in Bay sediment. The need to accelerate recovery of the Bay is illustrated by the long term fate model and by the slow recovery curves for fish. We have incorporated natural attenuation in the model from which we derived the TMDL. Relying solely on monitoring and natural recovery, the mass budget model predicts that the Bay will not recover for 100 years. However, with the proposed TMDL and PCBs load reductions, the model predicts recovery within 40 years. Although not explicitly called for in the TMDL, on-going in-Bay PCBs contaminated site remediation will further accelerate recovery of the Bay.

QEA Comment 6: "A long-term record of PCB levels in mussels, water, and sediment collected from multiple sites within the Bay shows consistent declines that have been ongoing for the last 20-plus years. The Staff Report fails to consider the extent of improvement that will be ultimately attained even without further control of PCB loadings to the Bay, despite the fact that concentrations are declining such that levels drop by half every 6 to 12 years. Within the next ten years, the "ambient" sediment PCB concentration may reach 5 ug/kg."

It is true that there have been PCBs concentration reductions in some, but not all monitored aquatic species in the Bay (SFEI. 2007. The Pulse of the Estuary: Monitoring and Managing Water Quality in the San Francisco Estuary. SFEI Contribution 532. San Francisco Estuary Institute, Oakland, CA.). The most recent sediment data indicate lower concentrations than past RMP or NOAA/EMAP sampling. We consider the most recent data the most reliable and representative of average concentrations in the Bay - they are based on high resolution GCMS and truly random sampling. Averages in all segments are less than 6 ng/g. Suisun Bay already appears to be below 1 ng/g, based on these data.

However, the PCBs fish tissue concentrations have not shown reductions. In fact croaker were higher in 2006 than other recent years, so the changes in estimated sediment concentrations do not alter the impairment status of the Bay, but rather how sediment concentrations link to food web uptake (i.e., the food web model developed by Gobas et al.), and the starting point for forecasting recovery. Below we briefly discuss the implications for recovery forecasts using the one-box model.

In addition to incorporating new sediment and water data, we have added an attenuation factor for loads into the one-box model. Details of the revisions to the model are provided below:

1) Initial PCB concentrations in water and sediment use recent RMP monitoring results. Based on 2004-2006 data, the Baywide-average PCB concentration in surface sediment is now 4.65 ng/g (sum of congeners). Based on 2002-2006 RMP data, the Bay-wide PCB concentration in water (sum of particulate and dissolved) is now 426.5 pg/L. These Baywide averages were calculated using the Generalized Random Tessellation Stratified (GRTS) sampling design and are therefore robust estimates of average PCB levels in the Bay. Using these estimates, the total mass of PCBs currently in the Bay is now 386 kg (383.6 kg in surface (15 cm) sediment and 2.4 kg in water).

2) The outflow scaling factor was reduced to reflect the change in Baywide average water concentrations mentioned above and the change in average PCB concentration in water at Yerba Buena Island (315 pg/L; previously 380 pg/L). The outflow scaling factor is now 315/426.5 = 0.74. The previous value of the scaling factor was 380/890 = 0.43.

3) A term to account for the expected attenuation of watershed inputs of PCBs was also added to the one-box model. Even with no further management action in our watersheds, PCB loads can be expected to decrease due to degradation, volatilization, and burial occurring in watershed soils and sediments, reduced emissions due to existing management efforts, and erosion of less highly contaminated material. An attenuation half-life of 56 years is applied to all external loads to account for these processes.

QEA Comment 7: "The model used to establish the assimilative capacity of the Bay is flawed because it inappropriately reduced the outflow of PCBs from the Bay (see Specific Comment 2). When this error is corrected, the model indicates that the assimilative capacity of the Bay is 25 kg/yr, rather than the 10 kg/yr in the Staff Report.

The assimilative capacity is the loading estimated to result in a fish tissue PCB concentration of 10 ug/kg, which the Staff Report indicates, is the level that must be achieved to reduce cancer risk to an acceptable level. As discussed in Specific Comment 3, it is likely that no realistic cancer risk exists at this fish tissue concentration and the assimilative capacity of the Bay is greater than the 25 kg/yr calculated by the corrected model."

The claim that the model used to establish the assimilative capacity is flawed is fully addressed in our response to Cal Chamber/GE Comment 49.

QEA Comment 8: "The external loads of PCB to the Bay were estimated by simple gross analyses that were fraught with errors (see Specific Comments 5 and 6). As a result, the current loads to the Bay are effectively unknown. More importantly; the locations of those loads have been given no consideration in evaluating the benefits to the Bay of loading reduction (see Specific Comment 4). Thus, there is little understanding of how the load allocation will benefit the Bay. The immense costs associated with the implementation cannot be justified when the benefits are unknown."

We have provided updated estimates of PCBs loads to the Bay based on scientific analysis provided by SFEI. These are the best available estimates at this time and are scientifically defensible. Furthermore, we have demonstrated using the mass budget model that reducing loads to the Bay to the level proposed in the TMDL will accelerate recovery of the Bay by 60 years compared to the pace of recovery due to natural attenuation alone (see Staff Report Section 9.2).

QEA Comment 9: "The presumed effectiveness of "hot spot" remediation is predicated on the implicit belief that the "hot spots" are a major source of PCBs to the Bay and are inhibiting the recovery of the Bay. No analysis was done to demonstrate that "hotspots" are inhibiting recovery, and it is hard to envision that the Bay could recover faster than it is, as indicated by the trends in mussels, water, and sediment. The majority of the PCB mass is in the main Bay, not the "hot spots." Moreover, it is not known whether external sources are inhibiting the recovery of the "hot spots" themselves (see Specific Comment 7).

Remediation of "hot spots" would have only a limited impact on PCB levels in fish. This is so for three reasons:

1. **1 PCB levels in water would be relatively unaffected and the PCBs in the fish originate, in part, from the water;**
2. **2 the fish of concern are not full-time residents of the "hot spots," rather they move around seeking prey and optimal temperature conditions; and**
3. **3 the sediments cannot be remediated to a PCB level lower than that of the main Bay; tidal mixing will recontaminate the sediments to this level."**

In the TMDL, we do not think of PCB loads from in-Bay contaminated sites as a mass loading to the rest of the Bay. Rather, we consider the role of increased PCB concentrations in bedded sediments as a source of PCBs directly to benthic and other aquatic organisms. A wealth of scientific information relates increased concentration in aquatic organisms to increased concentration in sediments, and it is unlikely that water concentrations contribute a significant source of PCBs to fish. We consider the lowering of PCB concentrations in sediment as a direct benefit to the local aquatic population and fish consumers in these locations as a benefit. Performing site specific investigations, feasibility studies, and remedial action evaluations will provide the necessary information to select the most appropriate activities at contaminated sites. Remedial actions when deemed necessary at these locations will result in lower localized PCBs body burdens in fish. Recontamination from suspended Bay sediments would result in ambient concentrations of PCBs. Although greater than the sediment goal, ambient concentrations are the lowest concentration attainable, but it is unlikely that remediation to ambient would occur.

QEA Comment 10: "The proposed implementation plan fails to integrate the AI process, which is justified given the uncertainties in both the loading assessment and the merit of the proposed load reductions. AI is "learning while doing" and is most appropriate when there exists substantial uncertainties in loading assessments or benefits of loading reductions. AI

entails significant monitoring in order to first reduce the uncertainty in the external loading quantifications and aid in implementing initial controls, where monitoring indicates they are both warranted and beneficial to Bay recovery. Although some text in the Staff Report mentions adaptive implementation, no specific details on how it will be applied to the Amendment are given. Furthermore, when adaptive implementation is mentioned, the Board indicates they will incorporate new and updated information into the TMDL, as it is available. However, the TMDL as it currently stands is not using up-to-date modeling or data to establish loads or determine the Bay's assimilative capacity. Finally, the proposed implementation plan ignores other feasible alternatives that should have been evaluated."

Our implementation plan is based on principles of adaptive implementation. Specifically, our approach is to initially implement load reduction activities with a high probability of success. At the same time, we will conduct pilot tests on feasible implement measures for which there is more uncertainty related to their effectiveness for reducing PCBs loads. We are using the most up-to-date and finalized model and monitoring data. A newer multi-box model is under development but is not final and available to use. Relevant monitoring data and scientific information are continually generated and will be incorporated in the TMDL as part of our regular review.

QEA Comment 11: "General Comment 1. The TMDL as presented in the Staff Report is not scientifically defensible due to errors in loading assessments, modeling, and allocation."

We have updated our estimates of current loads based on comments received (see Staff Report Section 7 for details). As for the broader issue of scientific defensibility, we disagree with the reviewer's opinion in this regard. In fact, the TMDL has undergone independent, scientific peer review from two qualified reviewers. Both reviewers independently found that the technical basis of the TMDL relies on sound scientific methods and practices.

QEA Comment 12: "General Comment 2. Proper technical conditions do not exist to support the development of a TMDL."

We disagree. We have proposed a TMDL based on the most rigorous and sound science available, much of which was developed by the Regional Monitoring Program and SFEI, as well as stormwater and wastewater permittees.

QEA Comment 13: "General Comment 3. The complexity of the San Francisco Bay supports the need for more data collection to better define loadings to the Bay and a more complex model to describe the fate and transport of PCBs in the Bay."

The commenter raises a fair point. However, in order to speed recovery of the Bay, the TMDL calls for reasonable and feasible actions to reduce PCB loads while we collect more data. Our adaptive implementation includes further data collection to continue to refine our understanding of the state of the Bay, response to implementation action, and long term trends in loads and load reductions.

QEA Comment 14: "Specific Comment 1. Natural recovery is occurring and should have been considered in the load allocation in the Basin Plan Amendment.

- **Data are available to evaluate the rate of natural recovery and should be considered.**
- **Natural recovery is occurring and should be a key component of the implementation plan.**
- **Natural recovery should be evaluated consistently in Basin Plan Amendment implementation and alternatives evaluation.**

Natural recovery has now been explicitly accounted for in the long term fate model, which takes into account the role of natural attenuation on the decrease of PCBs in the Bay over time. Accordingly, changes were made to the Staff Report in Section 9.2, and Figures 28 and 30.

QEA Comment 15: "Comment 2: "The one-box model used to establish the assimilative capacity of the Bay is flawed, provides inaccurate predictions of the response of the Bay to loading changes, and underestimates the assimilative capacity of the Bay.

- **The model violates the basic principle of mass balance.**
- **The model assumes a level of PCB contamination in the Bay that is at variance with data."**

We disagree that the model violates the basic principle of mass balance. Please see our response to Cal Chamber/GE Comment 49. We further disagree that the model assumes a level of PCB contamination that is at variance with the data. The mass budget model is based on the mean PCBs concentration in the Bay as determined in over ten years of monitoring performed by the Regional Monitoring Program.

QEA Comment 16: "Comment 3: The fish tissue target is unreasonably conservative and unrealistic and has contributed to an underestimate of the assimilative capacity of the Bay.

- **The fish target is based on multiple levels of conservatism.**
- **The evaluation of the fish target with two species that are consumed infrequently by anglers and cannot be caught year-round introduces yet another level of conservatism. "**

The TMDL is designed to protect the beneficial uses of the Bay, specifically the use designated to protect humans consuming Bay fish from harm. This beneficial use does not need to reflect current use, but rather is a reflection of potential use as provided for in our Basin Plan. We derived the fish tissue using standard calculations and assumptions applied to local fish consumption data, which will protect humans consuming fish from additional harm. We have demonstrated that this fish tissue target is protective of water quality standards and it is consistent with the CTR criterion established by the US EPA.

QEA Comment 17: "Comment 4: "The external loading estimates lack the spatial and temporal variability necessary to set a TMDL or establish an implementation plan.

- **Urban stormwater loading is grossly estimated with basin-wide averages and steady-state calculations, which do not provide the temporal and spatial variability critical to understanding the impact of stormwater loading.**
- **The loading assessment developed for the point source dischargers, specifically, the municipal dischargers, does not utilize site-specific information when appropriate and therefore, underestimates the impact of larger dischargers into the Bay.**
- **Not requiring any reduction in the point source dischargers (specifically the publicly owned treatment works [POTWs]) ignores the localized impact of the larger dischargers on the Bay recovery.**
- **Some areas of elevated PCB concentration may be controlled by external sources and external source controls may allow relatively rapid natural recovery to main Bay PCB levels (i.e., about 10 ug/kg).**
- **A site-specific assessment is necessary to determine where in-Bay sediment remediation would have a meaningful benefit and how localized that benefit would be. "**

First, we have updated our estimates of current loads based on comments received (see Section 7 of the revised Staff Report). Second, we concur that there are uncertainties in the load estimates. We will continue to evaluate new data and information on loads as it is generated and will revise the TMDL as appropriate. Furthermore, in the TMDL, we have proposed requirements to monitor discharges to improve our load estimates and to evaluate the effectiveness of load reduction actions. Third, we are requiring analysis of effluent from municipal and industrial wastewater dischargers to better estimate their individual loads. However, we have allocated current loads to the municipal and industrial wastewater dischargers as their current loads are small, and further reduction would necessitate large costs for little benefit. Conversely, stormwater loads are larger and few source and treatment controls for PCBs are implemented. We will continue to use the RMP to improve our understanding of PCBs loads to the Bay. We concur that site specific assessments of the benefits of in-Bay contaminated hot-spots must be made as part of a remedial investigation.

QEA Comment 18 "Comment 5: The Staff Report does not account for the uncertainty of the external loading estimates and the implication of that uncertainty on the implementation plan.

- **The stormwater loading estimate is based on a model that is not calibrated to data, making the loading assessment estimate speculative.The stormwater loading assessment ignores the load from non-urban land, which, based on recent San Francisco Bay studies, is the same order of magnitude as the urban stormwater loads and may exceed the 10 kg/yr target load.**

- **The loading attributable to municipal dischargers is uncertain and does not account for site-specific information and future growth..**
- **The Central Valley load is incorrect and highly uncertain, given that the load developed uses averages developed from sampling stations that are tidally influenced and flows that are unrealistic. "**

First, we have updated our estimates of current loads based on comments received (Section 7 and Table A-1). Second, we concur that there are uncertainties in the load estimate, but the nature and timing of stormwater loads make them very difficult to estimate. Thus, stormwater load estimates will always have a degree of uncertainty. We will continue to evaluate new data and information on loads as it is generated and will revise the TMDL as appropriate. Furthermore, in the TMDL, we have proposed requirements to monitor discharges to improve our load estimates and to evaluate the effectiveness of load reduction actions.

QEA Comment 19: "Comment 6: The Central Valley Load in the Staff Report and the Basin Plan Amendment is meaningless because the load was estimated using erroneous river flows and PCB concentrations not representative of the river.

- **The origin of the flow used to establish the Central Valley PCB load from the Sacramento and San Joaquin Rivers is unclear, cannot be independently confirmed, and grossly overstates the net freshwater inflow to the Bay.**
- **The PCB samples used to establish the Central Valley PCB load were sampled from stations that are tidally influenced and not representative of the freshwater inflow from the Central Valley. In addition, it appears that these PCB samples do not represent both dry and wet weather and are biased towards dry weather flows.**
- **The 42 kg/yr established in the Staff Report is questionable and most likely, an overestimate, given the gross overestimation of flow from the Central Valley. "**

We have updated the current load estimates using newer data (SFEI, 2007). The updated load estimate for the Central Valley is 11 kg/yr. This estimate is based on water column monitoring at Mallard Island performed by SFEI extrapolated to 25 years of flows. This discussion has been added to the Staff Report in Section 7.2.

QEA Comment 20: "Comment 7: The Staff Report wrongly contends that remediation of Bay margin or "hot spot" sediments would meaningfully accelerate recovery of the Bay.

- **On average, surface sediment PCB concentrations in the Bay margin are only slightly higher than main Bay sediments (18 ug/kg versus 10 ug/kg).**
- **About 60% of the PCB mass in Bay surface sediments is located outside the Bay margin and would serve to recontaminate remediated Bay margin sediments.**
- **Sheltered Bay margin sediments have the greatest potential for natural recovery because they tend to experience net sedimentation. "**

In the TMDL, we do not think of PCB loads from in-Bay contaminated sites as a mass loading to the rest of the Bay. Rather, we consider the role of increased PCB concentrations in bedded sediments as a source of PCBs directly to benthic and other aquatic organisms. The surface PCB concentrations at many of these hot spots can exceed ambient concentrations by a factor or more than 1,000. We consider the lowering of PCB concentrations in sediment as a direct benefit to the local aquatic population and fish consumers in these locations as a benefit.

Hence there is a need to perform site specific investigations, feasibility studies, and remedial action evaluations. Data for most sites listed in Table 26 of the Staff Report are not sufficient to provide for an understanding of the lateral and vertical extent of contamination. Further site investigations are necessary to determine the full extent of PCB contamination. If these data show that a significant portion of the PCBs are buried, then depending on the extent of PCB contamination, the need for further studies will be determined. Further studies could include, but is not limited by, depth of burrowing of aquatic organism, stability of overbearing sediments, and rates of sedimentation or erosion.

QEA Comment 21: "Comment 8: The load allocations presented in the Basin Plan Amendment and Staff Report are impractical, unrealistic, and may be unattainable.

- **The amount of stormwater that would require treatment to reach the allocated 2 kg/yr is too large to be effectively captured and stored.**
- **The assumption that all the urban stormwater load is permitted under MS4/ National Pollution Discharge Elimination System (NPDES) is wrong and implies a level of control that is not attainable.**
- **The non-urban stormwater load is too large to be ignored in the load allocation.**
- **Allocating urban stormwater load by county, after the loading estimates were established by sub-watershed is illogical and places an undue burden on those counties with small populations and relatively large amounts of urban land.**
- **The implication that the POTWs will not have to reduce their loads to meet the current load allocations is misleading, due to inaccuracies in the original loading assessment. In addition, the implied required load reductions are done without any site-specific analysis. "**

Our implementation plan is based on principles of adaptive implementation. Specifically, our approach is to initially implement load reduction activities with a large chance of success, while we study or pilot test feasible implementation measures that carry more uncertainty in the effectiveness for reducing PCBs loads. Furthermore, the RWQCB is prohibited from specifying the manner of compliance with its regulations. Specifically, we have combined load allocations for urban and non-urban stormwater runoff, and continue to allocate to stormwater management by population as this is currently the simplest approach. Finally, we have required low-level quantitation of PCBs in wastewater effluent to better understand loadings from this source. As part of our adaptive implementing the TMDL, we will review and adjust our allocations as necessary.

QEA Comment 22: "Comment 9: The Basin Plan Amendment fails to apply adaptive implementation (AD). The uncertainty in the external sources of PCBs to the Bay support the use of AI. The Basin Plan Amendment, while mentioning AI, fails to fully address and implement such a process in the Amendment. This omission leads to the implementation of unnecessary reductions once the ongoing natural recovery of the Bay is considered."

We disagree. Our implementation plan is based on principles of adaptive implementation. Specifically, our approach is to initially implement load reduction activities with a large chance of success, while we study or pilot test feasible implementation measures that carry more uncertainty in the effectiveness for reducing PCBs loads and removing the impairment of the Bay by PCBs.

QEA Comment 23: "Comment 10: Other implementation alternatives were not considered in the Basin Plan Amendment.

- **The 2007 PCB Basin Plan Amendment does not include alternatives for TMDL implementation as required by Public Resources Code Section 3777 of the Title 23 California Code of Regulation.**
- **Implementation and load allocation alternatives should consider remediation and load allocation methods previously adopted by the USEPA.**
- **Feasibility should be considered in developing implementation alternatives for the San Francisco Bay PCB TMDL."**

We have included an evaluation of the following alternatives in the revised Staff Report: no project alternative, alternative TMDL of 20 kg/yr, equal percentage reduction alternative, and lowest possible cost alternative. These constitute alternatives that were suggested by the commenter and that have been adopted by USEPA. Furthermore, feasibility have been considered as part of the CEQA and economic analysis requirements for this Basin Plan Amendment. The Guidelines of CEQA require consideration of a "reasonable range" of alternatives. The only alternative (in addition to the project as proposed) that must be evaluated is the No Project alternative.

QEA Comment 24: "Additional Comment 1: Method 1668A Critique As discussed below monitoring programs will face three major issues:

1. **High costs for sampling and analysis;**
2. **Quality control issues related to blank/background contamination; and**
3. **Imprecise results and/or comparisons for trends due to inter-laboratory differences."**

We realize the high costs associated with this method, and are therefore not requiring a high frequency of sampling nor a large number of samples. Laboratory costs for this method should be decreasing as more laboratories are performing it and more analytical requests are made to the laboratories for it. We are requiring low detection analysis of PCBs on a regular basis to

develop a baseline of PCB concentrations in effluent, which should over time show a decrease in PCBs. In order to measure a decrease, we need to start collecting this information. Quality assurance (QA) parameters and limits related to Method 1668 need to be provided by the laboratory. It is possible that the QA parameters and limits have not yet been developed by the laboratory due to a lack of analyses by this method on effluents. In that case, the laboratory will need to develop these as part of the data collection. Finally, we recognize that low level analytical methods often provide QA challenges resulting in limitations on the uses of the data.

QEA Comment 25: "Additional Comment 2: Atmospheric PCB Deposition Estimate Is Not Believable."

We recognize that our estimate for direct atmospheric deposition has uncertainty associated with it, and further recognize the large loads estimated in studies done in the Great Lakes region. These studies showed that large quantities of PCBs were removed from the water via the atmosphere. However, the wind and the rain in the Bay area usually come from the ocean landward, rather than over land as for the Great Lakes. Therefore, wind and rain likely carry much lower PCBs than in the Great Lake area. Furthermore, the wind would carry PCB volatilized locally towards in land locations, and it has been shown that PCBs in the atmosphere are eventually deposited in arctic regions. Patterns of PCBs exchange between the Bay and the atmosphere are not comparable to that in the Great Lakes region. We have based our PCBs atmospheric exchange budget on the only study performed in the Bay area on this topic. This study was conducted by SFEI and the results have been published in the peer reviewed scientific literature. We will continue to use these estimates until new data are available.

Nathalie D. Wilson

Wilson Comment 1: "The level of PCBs that FDA regulations permit in commercial fish and shellfish greatly exceeds the proposed TMDL numeric target. Meeting the TMDL numeric target would not significantly reduce the amount of potential risk inherently accepted for consumers of commercial fish. Among Bay Area Residents commercial fish consumers far outnumber San Francisco Bay."

The TMDL is designed to protect the beneficial uses of the Bay, specifically the use designated to protect humans consuming Bay fish from harm. This beneficial use does not need to reflect current use, but rather is a reflection of potential use as provided for in our Basin Plan. We derived the fish tissue using standard calculations and assumptions applied to local fish consumption data, which will protect humans consuming fish from additional harm.

Wilson Comment 2: "The existence of the OEHHA interim fish consumption advisory is not an indication that levels of PCBs in fish within San Francisco Bay are detrimental to human health or that the COMM beneficial use is impaired. Risk assessments indicate very low risk of potential health effects within the angling population or the general population from consuming San Francisco Bay fish containing PCBs."

The TMDL is designed to protect the beneficial uses of the Bay, specifically the use designated to protect humans consuming Bay fish from harm. OEHHA determined that Bay fish consumption should be limited to protect human health from cancer risk partially due PCBs in Bay sport fish. This determination in itself is an indication of impairment of the beneficial uses of the Bay related to sport fish consumption (e.g. REC-1). As such, the Bay was placed on the State's 303(d) resulting in the requirement that we prepare a TMDL to ensure elimination of the finding of impairment. This beneficial use does not need to reflect current use, rather is an expression of potential or desired use. We derived the fish tissue using local fish consumption data and standard calculations and assumptions based on USEPA guidelines, which will protect humans consuming fish from additional harm.

Wilson Comment 3: "On an equivalent risk-level basis, the TMDL's fish tissue target is much more stringent than the California Toxics Rule and hence overprotective of the general sport fishery."

In the TMDL, we demonstrated that the fish tissue numeric target is equally as protective as the CTR water quality standard using Bay-specific bioaccumulation factors (Section 8.1). The TMDL target is required to reflect attainment of beneficial uses and associated water quality standards the objective of this TMDL. TMDL targets must be at least as protective but can be more protective than water quality standards. Any additional protection serves as an implicit or explicit margin of safety.

Wilson Comment 4: "The TMDL screening value, numeric target, and attainment measures for PCBs in fish tissue rely on a hypothetical scenario that results in an extreme overestimate of exposure by anglers. When taken together, the calculation of the screening level, its use as a numeric target for PCBs in fish tissue, and the proposed method for measuring its attainment presume a human exposure scenario that is not supported, and in fact is contradicted by the underlying data and auxiliary information sources. The proposed screening value and numeric target are so low and the attainment measures so focused that the resulting TMDL is extremely overprotective of the angler population and the general population."

Please see the response to Wilson Comment 1.

Wilson Comment 5 (page 12) "When the need for costly remedies is suggested by simplistic or streamlined risk assessment approaches, it is customary and appropriate to conduct more sophisticated analyses to better understand risks and benefits prior to initiating any remedial decision making. The risks associated with implementing any sediment management strategies to meet the TMDL, which can be substantial in the cases of capping or dredging, should be quantified prior to remedy selection to assess whether a real risk reduction can be achieved."

We are developing a risk reduction strategy which could incorporate a review of the risk associated with PCBs in Bay fish. We will also perform site specific investigations, feasibility studies, and risk assessments prior to implementing site-specific remediation, such as environmental dredging and capping.

Wilson Comment 6 (page 15) "The TMDL screening value and numeric target for PCBs are based on estimates of potential cancer risks. The TMDL policymaking process should also consider the real observed health benefits of fish consumption."

The TMDL screening value and numeric is based on estimates of fish consumption rate by a subpopulation of the Bay: fishers who actually consume fish. It is therefore based on real consumption rates and real risk. Furthermore, we have demonstrated that this is also protective of the general population which consumes little, if any, Bay fish, and of subsistence fishers. We have not considered the potential health benefits of Bay fish consumptions as this is outside the goals of the TMDL.

AMEC Earth & Environmental, Inc.

AMEC Comment 1: "The following comments pertain to the deficiency of the Staff Report in its characterization of both potential human exposure and PCB toxicity. This deficiency is so material that the Staff Report does not provide a reasonable, or technically defensible basis for developing a target PCB concentration in fish, a TMDL for PCBs or an implementation plan for PCBs."

TMDLs are not intended as a review of the adequacy of water quality standards. Rather, TMDLs must demonstrate that attainment of the target will result in attainment of water quality standards. This TMDL makes such a demonstration. Furthermore, the development of this TMDL was necessary as PCBs were placed on the 303 (d) list as impairing the Bay due to the elevated PCBs concentrations measured in fish. The finding of impairment followed the release of a consumption advisory for sport fish in the Bay by OEHHA.

AMEC Comment 2: "However, setting aside the question as to whether this method should be used at all, the Staff Report does not explain why the TMDL uses the older WH094 TEFs, rather than the updated WH098 (van den Berg et al., 1998) values, or the latest set of WHO06 (van den Berg et al., 2006) TEFs. In addition, no mention is made as to what cancer slope factor (CSF) for TCDD was used in the calculation, nor is there any justification for the selection of whatever CSF was chosen. Such deficiencies should not pass an independent peer review of the document."

AMEC Comment 3: "B. Substantial evidence indicates that the TEQ approach does not accurately predict the toxicity of the so-called "dioxin-like" PCB congeners."

This response applies to comments 2 and 3. Please refer to our response to Cal Chamber/GE Comment 88.

AMEC Comment 4: "The proposed numeric target PCB fish concentration for the TMDL of 10 ng/g is not based on sound science, and does not provide a reasonable basis for regulating PCBs in San Francisco Bay. The numeric target is based on a hypothetical, worst case, maximum daily exposure over a 70-year lifetime, leading to an unrealistic estimate of individual risk. The numeric target, based on these computations, is unreasonably conservative, and the hypothetical population risks are greatly overstated. These points are detailed and discussed in the companion Expert Opinion report of Natalie D. Wilson. In addition to the substantive deficiencies in the exposure assessment, which are described in Ms. Wilson's report, the Staff Report's presentation and computational details for the TMDL calculation are deficient and fail to meet an acceptable level of transparency."

We have calculated the target following methods accepted and approved by USEPA. The entire technical basis of the TMDL, including this target, was subjected to independent, technical peer review and was found to be based on sound scientific methods and practices.

AMEC Comment 5: "The approach taken by the Staff Report [pp 24-25; Figure 9] of selecting certain PCB congeners in fish tissue and using the WH094 TEFs, presumably in conjunction with a CSF for TCDD, is not scientifically justified for "estimating the risk from environmental exposures to PCBs, " or for deriving a fish tissue screening value of 0.14 pg/g TEQ [p. 24-25; Figure 9]. The use of this approach is subject to a number of critical scientific limitations inherent in the application of the TEQ approach to PCBs."

Please refer to the response to Cal Chamber/GE Comment 88.

AMEC Comment 6 (page 10) "Substantial evidence indicates that the TEQ approach does not accurately predict the toxicity of the so-called "dioxin-like" PCB congeners. There is no need to apply the TEQ approach to PCBs because plentiful empirical data on PCB toxicity can be used to derive target PCB concentrations in fish tissue. More than 50 peer-reviewed, epidemiological cancer studies specific to PCBs have been published over the past 30 years. Many of those studies involved thousands of workers with occupational exposures far greater than those that would result from environmental exposures. Those studies do not support a finding, that PCBs are human carcinogens."

The TEQ approach to estimating risk from dioxins, furans and dioxin-like PCBs is well accepted in both the scientific and regulatory literature. Furthermore, OEHHA and USEPA's finding of the Bay' impairment by dioxin-like PCBs was based on this approach. We are therefore obligated to demonstrate using the same TEQ approach that attainment of the TMDL will result in elimination of the impairment of the Bay by dioxin-like PCBs. We have done so. However, we have updated our calculations to use the 1998 TEFs in order to be consistent with the approach used for the SIP.

AMEC Comment 7 (page 14) "The Staff Report's proposed numeric target PCB fish concentration for the TMDL of10 ng/g is not based on sound science and should be not be used. The numeric target is based on a hypothetical, extreme case, maximum daily exposure over a 70-year lifetime, leading to an unrealistic estimate of individual risk. The numeric target, based on these computations, exaggerates risk for several reasons. The hypothetical population risks are greatly overstated. These points are detailed and discussed in the companion Expert Opinion report of Natalie D. Wilson. In addition to the substantive deficiencies in the exposure assessment, which are described in Ms. Wilson's report, the Staff Report's presentation and computational details for the TMDL calculation are deficient and fail to meet an acceptable level of transparency."

We disagree. The numeric target was derived using required USEPA methodology that is used by regulatory agencies throughout the US to assess potential risk. The 70 year lifetime, along with all other default inputs, used to derive risk are those recommended in USEPA guidelines. Furthermore, we derived the numeric fish tissue target to be protective of the Bay's subpopulation that actually consumes sport fish from the Bay. This risk level is also protective

of the general population that consumes little or no fish from the Bay, as well as sustenance fishers who derive a large portion of their diet from Bay fish.

AMEC Comment 8 (page 14) "Section 8.1, page 50 incorrectly references the equation as Equation 2. In addition, Section 8.1 reports that a CSF of 1 (rug/kg-day)-1 was used to derive the numeric target, when, in fact, a CSF of 2 (rug/kg-day)-1 was used as reported correctly in Section 6.2. Unit errors are present in the discussion of parameter values on page 23, Section 6.2. With the units as stated, the appropriate units for the screening value (SVc) should be reported as g/kg; more appropriate would be to express CR as kg/day. The units for the CSF should be reported as 2 (mg/kg-day)-1."

We used a cancer slope factor for total PCBs of 2 (mg/kg-day)-1.

AMEC Comment 9 (page 14) "It is unclear how either the 1994 screening level of 3 ng/g or the updated screening level of 23 ng/g was derived. The CSF used as the basis of the 23 ng/g is provided; otherwise no other parameter values (e.g., risk level, fish consumption rate) are given."

We have added the references in Section 6.2 of the Staff Report to the document where the derivation of the screening level is detailed.

AMEC Comment 10 (page 15) "Similar issues with transparency occur in the discussion regarding the calculation of the dioxin toxic equivalent (TEQ) screening level of 0.14 pg/g for PCBs with dioxin-like properties (page 24). Reference is made that the same method and assumptions are used; however, it is unclear as to what are the assumptions. For example, no mention is made as to what CSF for TCDD was used in the calculation, nor is there any justification for the selection of whatever CSF was chosen."

We have added text in Section 6.2 of the Staff Report that explains that the TEQ screening level used the same parameters as was used to derive the fish tissue target.

GE Global Research Center

GE Comment 1: "The report is so deficient in its characterization of both exposure and PCB toxicity that potential benefits to human health from the agency's proposed TMDL are not apparent and may not be present."

Please see the response to QEA Comment 16.

GE Comment 2: "In part, this result is due to the way PCBs are measured in the report. First, the report uses several metrics for determining PCB levels in fish (total PCB, 3 PCB congeners, TEQ), but does not explain why anyone particular method would provide better guidance for decision making, and lacks transparency by providing very little information on how these values were determined."

GE Comment 3: "Second, the report uses more than one way to calculate risk (PCB vs. TEO CSFs), again, without explaining why one approach would provide better risk assessment than any other."

This response applies to comments 2 and 3. In the Staff Report, we demonstrated that attainment of the fish tissue target for total PCBs would result in attainment of the dioxin-like PCBs TEQ, as well as the CTR water quality objective. These are the only metrics evaluated in the Staff Report. The purpose of the Staff Report is not to provide all the details on how TEQs or the CTR values were determined. The interested reader should consult the relevant cited documents on these issues.

GE Comment 4: "Third, the report apparently sets, without justification, a new safe level for PCBs in water that is up to 9 times lower than existing standards [p C-4]."

The TMDL does not set new safe levels for PCBs in water. However, TMDLs must demonstrate that attainment of the numeric targets they establish will result in attainment of existing water quality standards. The PCBs TMDL makes this demonstration.

GE Comment 5: "Most importantly, the report contains no evaluation of substantial recent literature regarding the potential health risks of PCBs. Absent consideration of this literature, the agency's analysis of human toxicology is outdated, deficient, and not supported by proper technical conditions. The agency must consider this literature not only to render its evaluation of human toxicology technically defensible, but also to satisfy its own commitment of considering the most relevant and recent information. Because this proposal is so deficient in its evaluation of current PCB toxicology, the agency should obtain peer review of this specific issue by qualified reviewers."

GE Comment 6: "Cancer risk is estimated in "Proposed Basin Plan Amendment and Staff Report," but without reference to a number of cancer epidemiology studies that have been published recently. Some studies report associations between PCB exposures and cancer risk that are very weak."

This response applies to comments 5 and 6. The type of review suggested by the commenter may be applicable to the basis of the existing water quality standards. However, TMDLs are not intended to accomplish a review of the adequacy of water quality standards. Rather, TMDLs must merely demonstrate that attainment of the target will result in attainment of existing water quality standards. This TMDL makes this demonstration.

Kenneth D. Jenkins, PhD

Jenkins Comment 1: "Current concentrations of PCBs in surface water of San Francisco Bay are below levels that would affect RARE, WILD, or EST beneficial uses in San Francisco Bay and likely are declining.

"The California Toxics Rule (CTR) saltwater criterion continuous concentration (CCC for PCBs is 30 ng/L (or 30,000 pg/L). The CCC for PCBs is a federal standard intended to be protective of aquatic life over long term (chronic) exposure. The Staff Report acknowledges that "PCB concentrations in Bay waters are generally below the CCC water quality standard, indicating that current conditions are protective of aquatic from chronic toxicity" (page 20). The Staff Report summarizes median concentrations PCBs in waters collected from sub areas of the Bay in Table 10 (Page 32). These median concentrations (which are based on data collected more than 10 years ago in 1993 and 1994) range from 0.13 to 3.7 ng/l (e.g., 130 to 3,700 pg/L). Temporal data presented in Figure 11 (Staff Report, Page 30) suggest that concentrations of PCBs in surface waters entering the Bay and in sub areas of the bay have declined in recent years. Consistent with this trend, maximum water column concentrations since 2000 are even lower, falling below 2 ng/L (e.g., 2,000 pg/L; Figure 12, Page 32). Based on these data, the concentrations of PCBs in surface waters are one to two orders of magnitude below the CCC. Thus, concentrations of PCBs in receiving waters provide no basis for finding that the RARE, WILD or EST beneficial uses are not being met in the Bay."

We recognize that water column concentrations are below the CCC. However, the most likely at risk species such as the harbor seal and the least tern have a body burden of PCBs resulting from their consumption of fish, and in the case of the least tern also partially from foraging in tidal flats. Again the source of PCBs to the aquatic food web is the legacy PCBs in Bay sediments rather than the low levels of PCBs in the water column.

Jenkins Comment 2a: "Current concentrations of PCBs in tissues of fish are below conservative toxicity benchmarks and would not affect RARE, WILD, or EST beneficial uses in San Francisco Bay.

"There are no promulgated numeric standards (objectives) defining levels of PCBs concentrations in fish tissue that would be required for the protection of RARE, WILD or EST beneficial uses in San Francisco Bay. In the absence of a numeric standard, I have relied on the narrative standard, which indicates that, "Controllable water quality factors shall not cause a detrimental increase in toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered" (2007 Staff Report, Pages 19-20; emphasis added).

"In order to conservatively evaluate the potential for a detrimental increase in PCB concentrations in fish tissues on the fish themselves, I have compared recent data on concentrations of PCBs in fish tissue (Figures 6, 7, and 8; 2007 Staff Report) against fish tissue Ecotoxicity Reference Values (ERV s) that were developed in consultation with USEPA Region 9. These ERVs represent conservative estimates of concentrations of PCBs in fish

tissues that would be protective of fish. They were developed from studies published in the literature, in support of the Pearl Harbor Baseline Ecological Risk Assessment (BERA) (DON, 2002).

"Based on this review, lake trout were found to be most to be most sensitive of all fish species to PCBs (DON, 2002). The lowest concentration of PCBs in fish tissues at which adverse effects are observed is 7.6 ug/g dry weight (e.g., the lowest observable effects concentration or LOAEL). The concentration selected to represent a no effect level is 3.8 ug/g dry weight (e.g., the no observable adverse effects concentration or NOAEL). These values translate to a 1.5 ug/g LOAEL and 0.76 ug/g NOAEL wet weight'. These threshold vales are considered to represent very conservative thresholds for effects (i.e., there is high confidence that no deleterious effects are expected at fish tissue concentrations below these thresholds)."

The Bay was not specifically listed for impairment of RARE, WILD, or EST beneficial uses by PCBs. However, in developing the TMDL, we must ensure that all beneficial uses will be attained when the target is achieved. Not that the lake trout threshold is a site specific ecological threshold determined by the Department of Defense at Pearl Harbor as part of the baseline ecologic risk assessment that may not be protective of all wildlife in the Bay. For example, USFWS currently estimates that level of PCBs in tern eggs are at or slightly above effects thresholds. This TMDL seeks to reduce PCBs in the Bay, thus reducing PCBs in tern eggs.

Jenkins Comment 2b: "Concentrations of PCB in fish tissues collected in San Francisco Bay since 2000 are all below the conservative 0.76 ug/g wet weight NOAEC for lake trout discussed above (Figures 7 and 8; 2007 Staff Report). The only historical data that exceed the 0.76 ug/g conservative lake trout NOAEL are single sample results from 10 years ago (1997) for surfperch and croaker, and the Staff Report acknowledges that concentrations of PCBs in surfperch have declined with time (Staff Report, Page 24)."

The NOAEL are developed for adverse effects on development, reproduction, and survivorship. These end-points in fish are usually not as sensitive as that of human health cancer risk. This is reflected in the screening value 76 times greater than the TMDL's fish target, and this screening value is not protective of risks to humans who consume Bay fish.

Jenkins Comment 3: "The proposed goal of 1 ng/g PCBs in sediments is not required to protect RARE, WILD, or EST beneficial uses in San Francisco Bay.

"As with fish tissues, there are no promulgated numeric standards (objectives) defining PCBs concentrations in sediments that would be required for the protection of RARE, WILD or EST beneficial uses in San Francisco Bay. In evaluating the potential effects of PCBs in sediments RARE, WILD, or EST beneficial uses in San Francisco Bay the Staff Report relies on a screening level of 160 ng/g developed by USEPA (1997). This EPA screening level is 160 times the 1 ng/g sediment goal for PCBs proposed in the Staff Report (Page 22-23).

"The Staff Report estimates that that the ambient concentrations of PCBs in sediments are about 10 ng/g (page 17). Other studies conducted for the regional board have estimated that ambient concentrations fall between 18 and 20 ng/g in the open bay, and between 26 and 66

ng/g in near shore areas (i.e., within 500 meters of shore) to have average ambient concentrations between (CEP,2005). As part of their review of the Staff Report QEA (QEA, 2007) has developed estimates of ambient concentrations of PCBs in the Bay using 2000-2001 NOAA EMAP and 2000,2001,2004, and 2005 RMP surface sediment data. Based on QEA's calculations surface weighted average ambient PCB concentrations range from 10 ppb (in the open bay) to approximately 18 ppb in nearshore areas."

The Bay was not specifically listed for impairment of RARE, WILD, or EST beneficial uses by PCBs and we have removed references to these uses in our BPA and revised Staff Report. However, it must be noted that in developing the TMDL, we must ensure that all beneficial uses will be attained when the target is achieved. The PCBs TMDL makes this demonstration.

Jenkins Comment 4: "Recent 303(d) lists for San Francisco Bay do not include impairment designations for EST, RARE and WILD beneficial uses.

Section 303(d) of the 1972 Federal Clean Water Act (CWA) requires states to identify waterbodies where technology-based effluent limits are insufficient to meet water quality objectives, including beneficial uses, and to submit an updated list of impaired waterbodies to the U.S. EPA every two years. The proposed 2006 CWA Section 303(d) list of water quality limited segments, as well as the 2002 and the 2004 303(d) list, do not include any impairment designations (for any water quality segments in San Francisco Bay) for EST, RARE or WILD due to PCBs."

Jenkins Comment 5: "The proposed TMDL cannot be justified based on purported impairment of EST RARE, or WILD beneficial uses in San Francisco Bay.

As discussed in the previous comments, ambient concentrations of PCBs in surface water and fish tissue are all well below conservative thresholds for effect on EST, RARE and WILD beneficial uses. Ambient concentrations of PCBs in sediments are also well below thresholds for effect on EST, RARE and WILD beneficial uses. Localized areas of elevated sediment concentrations are addressed by other regulatory programs and are not considered in the allocation process proposed in the Staff Report. There is thus no basis for requiring a TMDL for the protection of EST, RARE and WILD beneficial uses, My conclusions are consistent with the most recent 303(d) lists which do not show impairment of EST, RARE or WILD beneficial uses in San Francisco Bay."

This response applies to comments 4 and 5. The Bay was not specifically listed for impairment of RARE, WILD, or EST beneficial uses by PCBs. However, in developing the TMDL, we must ensure that all beneficial uses will be attained when the target is achieved.

Anchor Environmental CA, L.P.

Anchor Comment 1: "The "project" as defined in the TMDL included only a cursory description of the implementation plan for dredging, which was not sufficient for CEQA analysis. As discussed on pages 76 to 78 of the Plan, dredging, possibly in combination with capping, was assumed to be performed in a manner that would achieve the project objectives. No additional details describing in-water operations were included however in the Plan. As the realities and logistical constraints affecting implementation of the Plan are fundamental to project implementation and CEQA determinations of effects in this case, a more detailed evaluation of the Plan is necessary. Technical analyses were performed for this report that considered a range of potential implementation scenarios (e.g., dredging/capping locations and volumes) that could occur if the Plan were to be adopted. Available data on the distribution of PCBs in San Francisco Bay is sparse for consideration of Bay-wide initiatives. Therefore; three implementation scenarios representing a range of possible outcomes for a reasonable range of contamination resulting from Plan implementation were evaluated, including: 1. Dredging all sediments in San Francisco Bay that exceed 0.01 ppm PCBs (i.e., 10 times the long-term sediment quality goal described in the Regional Board's Plan); 2. Dredging sediments in the San Francisco Bay margins that exceed 0.01 ppm, with margins defined based on the geographic extent of Bay Protection and Toxic Cleanup Program (BPTCP) screening surveys; and 3. Dredging sediments in the 22 particular contaminated sediment areas within San Francisco Bay identified in the TMDL that exceed 0.01 ppm (i.e., proximal to historical upland sources, with average sediment PCB concentrations in such areas of roughly 0.5 ppm)."

The TMDL does not create new regulatory requirements for dredging or the placement of dredge material. The reviewer notes that there are currently 22 identified sites on a list of 'hot-spots.' It should be pointed out that "treatment" for some of these sites may be "no action," thus dredging is not the only option. Furthermore, the impetus and the authority for clean up at these sites would not result from the PCBs TMDL, but rather from regulations such as the federal 'Superfund' legislation also known as CERCLA as well as other State agencies' clean up authorities.

Further, Alternatives 1 and 2 are outside the scope proposed in this TMDL. The need for Alternative 3 needs to be evaluated on a site specific basis. Specifically, the first decision point would be to decide if the available data warrant further investigation. Current data may not indicate a need to collect more information. Conversely, if data indicate a concern, extent of PCB contamination will need to be determined as part of a site investigation. Remedial actions would not occur until the completion of a feasibility study and a risk assessment. For now, the extent of Alternative 3 is speculative.

Anchor Comment 2: "The principal issue arises from the relatively large amount of sediment dredging required under the Plan, necessitating an unprecedented dredging operation. This massive-scale dredging operation would produce a number of significant effects, including:

- **Consumption of available regional landfill space**
- **Elimination of some beneficial reuse opportunities**
- **Limited effectiveness of dredging due to residuals**
- **Significant impacts to threatened and endangered species, and their habitat**
- **Significant impacts to air quality, including cumulative impacts and global climate change**
- **Significant issues related to dredging residuals and benthic communities**
- **Interruption of ongoing observed natural recovery"**

These comments are subjective/speculative, based on the most draconian dredging option not contemplated in the TMDL. Impacts based on these dredging scenarios do not need to be considered in the TMDL as these dredging scenarios are extremely unlikely, and as such, are not considered reasonable and feasible means of compliance. See also the response to the previous comment.

Berkeley Economic Consulting, Inc. (David Sunding)

The comments below are excerpted from the letter submitted by David Sunding on behalf of General Electric Company and the California Chamber of Commerce. Please note that they are given in the letter as the commenter's "Summary Comments" on the PCBs TMDL. We responded to them below, however, these comments are also included in the letter submitted by the California Chamber of Commerce and the General Electric Company and are answered in greater detail in our responses to that letter above.

Sunding Comment 1: "The staff of the Regional Board has not met its burden under Porter-Cologne to consider economics in the development of the TMDL. The plan for implementing the proposed regulation is not described in enough detail to permit an adequate calculation of costs. The report makes no mention of who will bear the costs of complying with the regulation (for example, public or private entities), or of the potential regional economic implications of the action. The report does not acknowledge the potential employment impacts of the proposed TMDL, or the effect of the cleanup plan on competitiveness of California businesses. It does not attempt to gauge the significance of the action and does not discuss costs in relation to the level of benefits likely to be achieved. There is no mention of discounting, let alone any actual attempt to control for the fact that positive and negative impacts will occur over a period lasting perhaps decades into the future. All of these errors and omissions place the Staff Report analysis outside the bounds of standard economic analysis, and should be remedied."

This comment raises several different issues. We answer each in turn. First, regarding the obligations of the Water Board under the Porter-Cologne Water Quality Act, we have satisfied the requirements to consider economics. Not only are potential costs discussed in Section 12 of the Staff Report, but we have identified a variety of implementation measures from which the regulated community may choose that meet their needs and budgets.

Regarding the comment about who will bear the costs of implementation, it is not entirely clear what the commenter intends to suggest. In our implementation plan (see Section 11 of the revised Staff Report) we describe activities which we contend are reasonably foreseeable means of compliance with the PCBs TMDL. The majority of these activities pertain to public agencies; a relatively small number of private companies – dischargers regulated via NPDES permits – are affected by the TMDL. To this extent, we did, in fact, identify who would be involved implementing, and thus paying for implementation of the TMDL. We are not required to speculate as to whom, exactly, will pay for implementation, nor are we required to do any broader, regional economic analysis.

Another claim made by the reviewer is that the regulation is not described in sufficient detail to all accurate estimation of costs. We disagree. The entire Staff Report including its implementation plan and regulatory analysis as well as the Basin Plan should be considered the description of the project. In response to these and other comments, we provided clarification of a number of sections of the documents. These revisions included, for example, clarification of

the relationship between the TMDL and remediation of in-Bay contaminated hot spots. We explained that the PCBs TMDL does not require dredging of contaminated sediment to clean up already identified hot spots. Clean up of these areas is part of existing programs operated by the Water Board as well as the California Department of Toxics Substance Control and the US EPA. Furthermore, although dredging may be selected as a remedial method, it is not the only option available and, in fact, may not be the preferred option at some sites (the preferred method will be chosen on a site-specific basis during feasibility studies).

Regarding potential impacts on employment or competitiveness, we assume that the commenter is referring to the Administrative Procedure Act (APA) which is the law that applies to state agencies when they adopt regulations. Under Government Code section 11353 the Water Boards are subject to some but not all of the provisions of the Administrative Procedure Act. The Board is not subject to the APA section that requires that agencies evaluate proposed regulations' possible impacts on businesses. Nevertheless, Section 12.10 of the Staff Report includes a consideration of economics as required by CEQA.

We would also argue that any connection to the competitiveness of businesses in California is tentative at best. It is unclear what the commenter intends by suggesting that we have not attempted 'to gauge the significance' of the TMDL. We have, in fact, considered the significance of this TMDL in a number of ways. We assessed its environmental significance, both from a perspective of evaluating potential impacts as required by CEQA as well as from the perspective of the Clean Water Act, which requires us to develop a TMDL to address the impairment of the Bay by PCBs. Both of these assessments were done with a long-term view of what is likely to result from adoption of the TMDL. We also considered the economics involved in implementation of the TMDL. Finally, this commenter suggests that the Staff Report is 'outside the bounds of standard economic analysis,' to which we reply that we have complied with all of the requirements of the State of California for adoption of TMDLs and other similar programs. We are not bound by the same standards as for adoption of federal programs, as this reviewer suggests. Specifically, neither CEQA nor the Porter-Cologne Act requires this Board to conduct a cost-benefit analysis of the TMDL.

Sunding Comment 2: "The costs of the proposed regulation are not adequately described in the Staff Report. Available information demonstrates that the assertions of the Staff Report regarding the costs of compliance are misleading. For example, the report does not accurately reflect dredging costs at other locations in the Bay and nationwide. The report also mischaracterizes the actual costs of impounding and treating stormwater to the levels required by the TMDL. Using more accurate information, the costs of the TMDL could reach into the hundreds of millions or billions of dollars."

We disagree. First, as explained immediately above, the commenter appears to grossly overestimate the amount of dredging that might occur and incorrectly assumes that such dredging would be required as a result of this TMDL. That said, we did make some clarifications in the revised Staff Report related to costs (See Section 12). We also disagree with the claim that we mischaracterize costs related to impounding and treating stormwater. We only suggest that 'strategic' diversion and treatment be evaluated and/or attempted where

possible, e.g. where identifiable, significant sources in stormwater are located close to treatment facilities, which have existing capacity to treat runoff. Thus the final claim about cost that the commenter makes is incorrect.

Sunding Comment 3: "The Regional Board staff erred in its description of the benefits of the proposed TMDL. The proposed screening levels are based on a flawed survey of recreational anglers, and the survey results were misapplied to the problem at hand. Controlling for actual exposure to PCBs in fish tissue, and recognizing that the proposed TMDL is designed to benefit only a small group of people engaging in an extreme behavior, I conclude that the action does not significantly reduce human health risk, and therefore does not result in significant benefits. This circumstance is in violation of the State requirement that major regulations are subject to a demonstration of economic value."

We disagree with the commenter's contention that the survey data are flawed or that they were misapplied with regard to health risks. The survey provided representative consumption data for people who actually consume Bay fish. We then used a US EPA-recommended methodology to calculate the TMDL's fish tissue target, a target that will protect human and wildlife consumers of Bay fish. We believe such protection is a significant benefit to the public.

We are required by law to develop a TMDL that protects all beneficial uses of the Bay. In this instance, the beneficial use is related to consumption of Bay fish; this use is currently impaired as demonstrated by the Clean Water Act 303(d) listing of the Bay for PCBs based on this use and by the OEHHA advisory regarding fish consumption. Our legal obligation to address this problem applies, irrespective of the number of people affected. It is not appropriate or legally defensible to determine that the number of people consuming fish is too small or the behavior too "extreme" to warrant protecting their health and safety. We believe the commenter's assertion that the TMDL does not significantly reduce health risks and his conclusion that is does not produce significant benefits are matters of opinion and on these points, we disagree. Lastly, the commenter is simply incorrect in stating that we are required to demonstrate economic value in establishing regulations. We are required to consider economics. See response to Sunding Comments 1 and 2.

Sunding Comment 4: "The proposed action is likely to result in an unacceptably high level of costs in relation to the actual benefits achieved. The Staff Report fails to demonstrate that the Regional Board considered alternatives to the proposed TMDL that would be less burdensome, or that it considered the relative cost effectiveness of alternative standards. This is inconsistent with basic principles of economic analysis of regulation, and in contradiction to established federal guidelines promulgated by the US Environmental Protection Agency and the Office of Management and Budget. It is also inconsistent with the stated objectives of the proposed action listed in the Staff Report."

We disagree that the TMDL is likely to result in "unacceptably high levels of cost." Once again, this appears to be based on vast overestimates of the amount of dredging that might occur related to this TMDL as well as impound and treatment of a large portion of Bay area

stormwater. As to the second part of this claim, we are not required to evaluate costs in relation to benefits – or, in other words, to conduct a cost-benefit analysis. We have explained our perspective on this point above (see response to Sunding comment 1). With regard to consideration of alternatives, we did, in fact, consider a number of alternatives. These are evaluated in Section 12 of the Staff Report in both its original and revised versions. The commenter incorrectly suggests that we are subject to the same standards (i.e., evaluation of alternatives that are less burdensome) that apply to the adoption of federal regulations. This is not a federal regulation and, therefore, is not subject to the same requirements as federal regulatory actions.

With disagree with the commenter's final assertion which states that we are "inconsistent" with the objectives of the Staff Report. We have developed a TMDL that is consistent with our stated objectives, including those related to cost.

Sunding Comment 5: "The high costs of the proposed TMDL, coupled with its insubstantial benefits, means that the regulation will result in a net increase in human health risk. Regulatory costs pose their own risks to human health as money is diverted away from actions that reduce health risk and improve wellbeing. Recent research in environmental economics shows that regulations with a cost in excess of around $21 million per life saved pose more health risk than the harms they are intended to address. The proposed TMDL fails this test and will thus do more harm than good. There are also direct health risks posed by the measures to implement the TMDL. For example, contaminated sediment will need to be trucked to landfills around the Bay Area, and dredging equipment will need to operate for a period of years. These machines emit particulate matter and other pollutants that pose their own health risks. The Staff Report does not adequately address such direct health risks in its benefits analysis, or net them out of the claimed improvements in human health resulting from the regulation. Finally, the proposed TMDL also poses risks to the environment that should be considered. Numerous wetland restoration projects at the Bay margins may be jeopardized by the Regional Board's labeling of large swaths of the Bay as contaminated zones."

We disagree with the basic premises that underlie the claim that the PCBs TMDL will only produce "insubstantial" benefits and will cause increased risks to human health through diversion of funds from other programs. The commenter uses exaggerated and speculative claims about the requirements stemming from the TMDL to derive astronomical costs of the TMDL and then goes on to speculate that such expenditures will necessarily divert resources away from providing for public health. The contention that the PCBs TMDL fails to meet an academic threshold for appropriate amounts of spending on a per-life-saved basis must therefore be regarded as highly suspect conjecture, and is likewise outside the bounds of what we are legally required to consider. Beyond that, strongly disagree with the claim that it will cost more than $21 million dollars per life saved. As noted previously here and in the summary comment letter from the California Chamber of Commerce, on behalf of whom this commenter prepared comments, the estimates of cost are based on faulty understanding of the amount of

dredging that might occur related to this TMDL as well as the amount of stormwater treatment that is reasonably foreseeable to result from implementation related to the TMDL.

ARCADIS-BBL

Arcadis Comment 1: "However, the PCB TMDL Amendment and Staff Report states that stormwater collection and treatment also will need to be employed to address PCBs in stormwater, including urban runoff. The collection and treatment of urban runoff from the entire Bay Area drainage is a monumental task, which is technically impracticable and economically infeasible for municipalities and industries that may be subject to this requirement."

We have not suggested collecting and treating urban run-off for the entire Bay area drainage and further agree that such a task would be infeasible. Instead, in the TMDL, we propose an iterative (adaptive) implementation approach to reducing PCBs loads to the Bay from stormwater. We are specifically calling for the implementation of load reduction activities with a high probability of success, while, at the same time, we conduct additional studies and pilot tests of other potentially feasible implementation measures entail some uncertainty in their effectiveness for reducing PCBs loads.

Arcadis Comment 2: "The scientific basis for many of the assumptions used in the PCB TMDL Amendment and Staff Report is suspect due to the number of significant math errors. While ARCADIS was not able to perform a thorough review of the data and calculations in the entire report, we discovered significant math inaccuracies. The mathematics presented in the PCB TMDL Amendment and Staff Report are critical to the overall evaluation of PCBs in the Bay Area, and, as such, deserve their own commentary."

The comment is generally unhelpful in identifying exactly which errors they discovered. Thus, this is a vague and general comment. As a result, we are unsure to which section of the PCB TMDL Amendment and Staff Report the commenters refer.

Arcadis Comment 3: "The PCB TMDL Amendment and Staff Report states that ongoing attainment of suspended solids effluent limits provides a surrogate indicator of PCB control."

PCBs, because of their chemical properties, are generally associated with the solid phase in the environment. As such, suspended solids (sediments) movement provides a first order indicator of PCBs transport and fate in the environment.

Arcadis Comment 4: "However, while there is a large body of knowledge that exists regarding the selection, implementation and effectiveness of BMPs for the removal of total suspended solids, there is no information on the effectiveness of BMPs alone to meet the target PCB stormwater concentrations of 640 – 8,050 picograms per liter (pg/L). Therefore, treatment of stormwater will be required as discussed below."

We agree that there is a lack of information on the effectiveness of stormwater BMPs to control PCBs. However, we also agree that there is a large body of knowledge on the effectiveness of sediment control BMPs. As stated previously, PCBs are mainly associated with solids (sediments) in the environment. Therefore, BMPs that are effective at controlling/reducing sediment in stormwater will also be effective in controlling PCBs in stormwater.

Arcadis Comment 5: "Implementing BMPs will reduce the overall PCB waste load to the Bay; however, active treatment methods will be required to approach the effluent levels consistent with the proposed total PCB waste load of 10 kilograms per year (kg/yr). Of the proposed 10 kg/yr total PCB waste load, 3.0 kg/yr is allocated to stormwater runoff (2.0 kg/yr – through public storm drains; 0.9 kg/yr treated through publicly-owned treatment works) and non-urban stormwater runoff (0.1 kg/yr) (see Table 22, p. 60 of the PCB TMDL Amendment and Staff Report)."

We agree that active source and treatment controls will be necessary to reduce PCBs loads to the Bay from stormwater. We are specifically requring that through the adaptive implementation approach to initially implement load reduction activities with a large chance of success, while we study or pilot test other potentially feasible implementation measures that carry more uncertainty in their effectiveness for reducing PCBs loads.

Arcadis Comment 6: "The PCB TMDL Amendment and Staff Report notes that stormwater collection and treatment will need to be employed to address PCBs in stormwater, particularly urban runoff. We concur with the CRWQCB's implication that BMPs alone will not result in compliance with the TMDL. We disagree, however, with the CRWQCB's conclusion that adding stormwater capture and treatment will achieve such compliance. In reality, achieving the stormwater PCB waste load of only 3.0 kg/yr is not feasible even with complete capture and treatment of the stormwater to effluent concentrations below current analytical method detection limits."

The TMDL proposes an iterative (adaptive) implementation approach to reducing PCBs loads to the Bay from stormwater. We are specifically requiring an adaptive approach whereby dischargers implement initial load reduction activities with a high probability of success. See response to Arcadis Comment 6. As part of this process, we will evaluate the effectiveness of the BMPs implemented and determine whether the stormwater wasteload allocation is attained.

If it is determined that the wasteload allocations are not achieved as part of the review of the TMDL, we will then determine what, if any, further actions are required to achieve the TMDL allocations. These actions may be requirements for further stormwater PCBs load reductions, or decreased load and/or wasteload allocations from other sources to the Bay.

Arcadis Comment 7: "The collection and treatment of urban runoff from the entire Bay Area drainage is a monumental task which is technically impracticable and economically infeasible for municipalities and industries that may be subject to this requirement."

This repeats an earlier comment. Please see our response to Arcadis Comment 1.

Arcadis Comment 8: "As discussed above, BMPs alone will not remove PCBs in water in order to achieve the target PCB concentrations corresponding to the proposed TMDL stormwater waste load allocation (i.e., 640 – 8,050 pg/L PCBs in stormwater discharge). Therefore, collection and treatment of stormwater will be required. ARCADIS has conducted a thorough review of available treatment technologies for the removing PCBs from water, which included literature reviews, engineering evaluations of existing treatment systems and interviews with technology vendors. Thus, most systems designed to remove PCBs from water will first include aggressive solids removal systems (e.g., settling, sand filters, coagulation/flocculation, etc.) to remove solids prior to subsequent treatment processes. A number of systems then include advanced oxidation processes to further reduce (through chemical destruction) the concentration of PCBs in water."

We agree that treatment control BMPs alone are not likely to remove PCBs in water to achieve the stormwater wasteload allocation. This is based on known sediment removal effectiveness of treatment control BMPs. Therefore, we have specifically required that both source and treatment control BMPs be implemented, along with strategic diversion of stormwater to wastewater treatment plants, in order to achieve the stormwater wasteload allocations. We will review and revise this approach if necessary as part of our review of the TMDL.

Arcadis Comment 9: "Conventional treatment technologies for removing PCBs attached to suspended solids/particulates include: source solids removal (prior to water treatment), broad solids removal (e.g., oil-water separation, gravity settling), and/or enhanced solids removal (e.g., chemical or biological clarification, sand/multi-media filtration). These treatment technologies can remove PCBs down to the range of 1,000,000 to 100,000,000 pg/L."

This comment curiously appears to contradict Aracdis comment #5 which stated that "…there is no information on the effectiveness of BMPs alone to meet the target PCB stormwater concentrations…" We agree with the previous comment (#5) that there is no information available on the effectiveness of treatment control BMPs effectiveness to reduce PCBs loads in stormwater. However, we acknowledge, based on known sediment removal effectiveness, that treatment control BMPs in and of themselves will not be sufficient to achieve stormwater wasteload allocations. Therefore, we have specifically required that both source and treatment control BMPs be implemented, along with strategic diversion of stormwater to wastewater treatment plants, in order to achieve the stormwater wasteload allocations. We will review and revise this approach if necessary as part of our review of the TMDL.

Arcadis Comment 10: "Due to the large volumes of stormwater storage and treatment necessary under the proposed TMDL, it is highly unlikely that the existing POTWs can handle the addition of any significant stormwater flow; in fact, most POTW systems are designed and operated to minimize/eliminate stormwater inflows due to storage and treatment capacity limitations. Even if treatment capacity is available, storage of stormwater

would still be needed for the municipal systems and their use for treatment will not lower the total land requirements discussed above. The TMDL needs to address the storage and treatment capacity limitations, as well as the PCB removal efficiencies, of the existing POTWs. Removal of PCBs from stormwater to the target concentrations corresponding to the TMDL stormwater waste load allocation at the scale and magnitude necessary to attain the TMDL has not been demonstrated to be achievable."

This comment presents issues associated with treatment of stormwater during high flow (rain) events. During rain events, infiltration of stormwater into wastewater treatment conveyance systems can create a storage and capacity issue for wastewater treatment plants. We are well aware of this issue, and note that there are already efforts underway by wastewater agencies to minimize infiltration of stormwater (and groundwater). However, the type of treatment envisioned by the TMDL and already being considered by several wastewater treatment agencies is something distinct. The TMDL envisions treatment of dry weather flows when capacity exists, treatment of targeted street washings, and treatment of first flush flows prior to exceedance of storage and treatment capacity. This approach would provide one of several approaches needed to lower stormwater PCBs loads to the Bay.

Also on page 10 of their comment letter, ARCADIS presents assumptions for their estimation of cost. These assumptions essentially require the retention and treatment of a 24 hour storm event that amounts to 4.8 inches over this period. The result is that ARCADS presents cost information based on the assumption that 55 facilities around the Bay Area will need to be constructed to collect and treat 59 billion gallons of stormwater in a day. For comparison, all Bay Area POTWs treat about 700-800 million gallons per day. It is an understatement to say that these assumptions are fantastically overstated. It appears that these inappropriate assumptions originate from a misunderstanding of both the TMDL and stormwater permit requirements for designing such systems.

First, the TMDL does not require that *all* stormwater in the Bay Area would need to be captured and treated. In fact, it very clearly calls out a focus on historical or current industrial areas where PCBs are more likely to be found at higher concentrations. Second, the calculation assumptions cited by ARCADIS only apply to new and redevelopment, not the entire Bay Area. And, the commenter mixes design requirements applicable to the design of storage treatment systems (e.g., settling basin) with those that apply when designing flow-through systems (e.g., sand filter). The commenter erroneously applies both of these design criteria from the permit instead of selecting one or the other as the permit requires.

Arcadis Comment 11: "Potentially significant environmental impacts are likely to result from the construction, and operation and maintenance of 55 stormwater treatment systems in the Bay Area. These impacts include: removal of significant acreage from other potentially beneficial uses within the Bay Area for the construction of retention basins (e.g., conflict with habitat conservation plans); alteration of local hydrology and drainage patterns; emission of construction-related particulates and diesel/vehicle exhaust; transport and disposal of large volumes of soil generated during retention basin construction; increased noise from the construction and operation of the treatment systems; generation, transport,

and disposal of large volumes of potentially hazardous material (i.e., spent GAC and sludge); and increased energy consumption due to system construction and operation."

This comment presents an egregiously exaggerated interpretation of the TMDL's implementation plan. Nowhere in the TMDL, do we suggest such extensive implementation actions. Rather, we propose that we adaptively implement actions, starting with those that have a large chance of effectiveness at reducing PCBs loads to the Bay from stormwater. At the same time, we require that other source and treatment controls, with lesser known effectiveness, be evaluated, and pilot tested and implemented if warranted. The discussion of issues in the comment associated with implementation of the TMDL is utterly speculative and such actions are not required to implement the TMDL.

Arcadis Comment 12: "The PCB TMDL Amendment and Staff Report calls for the use of USEPA Method 1668A on a periodic basis to verify continued attainment of PCB waste load allocations. The detection limits and quantitation levels in this method are usually dependent on the level of interferences and laboratory background levels, rather than instrument limitations (USEPA 1999c). This method can achieve a method detection limit of 5 pg/L for select PCBs with no interferences present, although the estimated minimum levels of quantitation (the lowest concentration at which individual PCBs can be measured reliably with common laboratory interferences present) are typically higher (range = 10 – 1,000 pg/L) (USEPA 1999c). Current analytical limitations prevent verification through testing that PCB waste loads in effluents are being achieved."

We are requiring low detection analysis of PCBs on a regular basis to develop a baseline of PCB concentrations in effluent and to develop water quality based effluent limits. We expect these data to show a decrease in PCBs concentrations in effluent over time as PCBs are naturally attenuating and the TMDL is implemented. Quality assurance (QA) parameters and limits related to Method 1668 are laboratory specific and will need to be provided by the laboratory. It is possible that the QA parameters and control limits have not yet been developed by all laboratories due to a shortage of analyses performed on effluents using this method. In that case, the laboratory will need to develop these QA parameters as part of the data collection. Finally, we recognize that low level analytical methods such as Method 1668 often provide QA challenges due to potential interferences and analyte recoveries resulting in the need to carefully analyze the resulting data and QA results, to ensure that data uses are consistent with data quality.

Arcadis Comment 13: " Dredging – (p. 46) – the PCB TMDL Amendment and Staff Report states that material containing 23 kg of PCBs are dredged from the Bay each year. Of this material 13 kg are disposed outside of the Bay Area and 10 kg are disposed inside of the Bay. The report erroneously reports the math to state that 13 kg are removed and 10 kg are placed in the Bay each year. The report concludes that the two amounts cancel each others respective positive and negative effects and that dredging does not have to be included in the overall calculation of PCBs in the Bay.

This is inaccurate. Since all of the 23 kg originally came from the Bay, the 13 kg disposed outside the Bay represent a net removal of 13 kg each year. This 13 kg represents over 15% of the 80 kg of PCBs entering the Bay as calculated by the PCB TMDL Amendment and Staff Report, which means this number is extremely significant and needs to be included in the subsequent calculations.

This particular math mistake was already spotted by one of the Board's own reviewers as noted in Appendix C of the PCB TMDL Amendment and Staff Report. Kevin Farley in his May 27, 2007 review of the TMDL states, "Based on the current wording, shouldn't the net loss be 13 not 3, kg of PCBs?" There is no explanation of why this was not corrected in the PCB TMDL Amendment and Staff Report."

We have amended the Staff Report and Basin Plan Amendment to reflect the net loss of PCBs to upland reuse and ocean disposal (Section 7.3). In doing so, we have recalculated the mass of PCBs to reflect the new mean sediment concentrations of 4.6 μg/kg calculated by SFEI. These changes are presented in section 7.3 of the Staff Report and in the Sources section of the proposed Basin Plan Amendment.

Arcadis Comment 14: "Cost of Treatment for Stormwater – (p. 99) - the PCB TMDL Amendment and Staff Report states:

Overall, the proposed urban stormwater runoff allocations will likely require the largest implementation costs. At this time, we project an upper bound to urban stormwater runoff expenditures of approximately $500 million annually. This is the current overall cost associated with municipal wastewater management. Municipal and industrial wastewater dischargers are not likely to have significant new implementation costs since their allocations reflect current treatment performance

The Staff did have data on flows, concentrations and effluent requirements for stormwater and PCBs. ARCADIS used the data provided in the reports to calculate our cost estimates presented previously in these comments. The costs of wastewater treatment in POTWs are very different than the costs of stormwater treatment for PCBs. The main costs of stormwater treatment are collection and storage, while the main costs of wastewater treatment are collection and treatment. There are no similarities between the two types of treatment systems (POTWs do not typically employ BAT for PCB removal) and we are not aware of any existing references that even try to compare these two systems. Therefore, there is no basis for using $500 million."

This comment is very similar to Cal Chamber/GE Comment 9. Please see response to that comment.

Arcadis Comment 15: "Total PCBs in the Bay – (p. 99) - the PCB TMDL Amendment and Staff Report states:

In-Bay sources of PCBs are primarily associated with Bay-margin sites that have concentrated localized deposits of PCBs-contaminated sediment. Efforts to remediate these "hot spots" are

currently underway at a number of locations and some projects have already been completed. Costs to remediate these sites may be substantial, but they are costs that would be incurred with or without the PCBs TMDL. (pg. 99, PCB TMDL)

ARCADIS' concern with this statement is that it states that the efforts to remediate these "hot spots" are already underway. However, we did not see any place where the staff tried to include the amount of PCBs removed with these efforts in their calculations presented in the PCB TMDL Amendment and Staff Report."

We reviewed the literature for the number of locations with elevated PCBs (see Section 7.1 of the Staff Report). This included a number of Department of Defense site investigation reports, several other off-shore site investigations, a SFEI study of San Leandro Bay, reports of dredge material evaluation for proposed dredging projects, and the Bay Protection and Toxic Clean-up report. From these, we selected sites with PCB concentrations above ambient. Feasibility and economic analysis of site clean-ups are included in these reports. However, we did not review the mass of PCBs removed at sites that had already undergone remediation.

Arcadis Comment 16: "PCBs in sediment – (p. 61, third paragraph) - the PCB TMDL Amendment and Staff Report states:

Existing PCBs loads from urban stormwater runoff are estimated at 40 kg/yr. The proposed total waste load allocation for urban stormwater runoff is 2 kg/yr. It reflects the resulting PCBs load when all sediment in urban stormwater runoff has a concentration of 1 μg/kg [microgram per kilogram], the sediment PCBs concentration goal, assuming the sediment loads used to calculate the current PCBs load do not change.

This statement is incorrect. If the PCB estimated mean concentration coming from all land uses is 1 μg/kg and the TSS load is unchanged, then the proposed urban stormwater runoff PCB load is actually 0.2 kg/yr, representing an order of magnitude difference from the proposed urban stormwater runoff waste load allocation as presented in the PCB TMDL Amendment and Staff Report."

We have updated our estimates of current loads based on comments received (Section 7.2), as well as our rationale for wasteload allocation to stormwater basing it on estimates of maximum sediment loads from local tributaries.

Arcadis Comment 17: "ARCADIS concludes that the conclusions reached in this report are not adequately based upon actual conditions in the Bay and the several parts of the evaluation process should be redone with careful and standardized review of each calculation. These parts include: The amount of PCBs currently being removed by dredging, The cost of stormwater collection and treatment , The environmental impact of stormwater collection and treatment, The calculation of the proposed urban stormwater PCB waste load allocation."

We have revised the dredging and the stormwater load sections (Sections 7.2 and 7.3). We do not propose to implement the drastic stormwater collection and treatment envisioned in the

comment. As such, we have not revised or evaluated costs and environmental impacts of an action that is not considered for implementation.

Arcadis Comment 18: "In summary, ARCADIS believes that had the external PCB load to the Bay been calculated more accurately and a true cost estimate of treating urban stormwater runoff been generated, the PCB TMDL Amendment and Staff Report may have reached a different conclusion regarding reliance on stormwater treatment as a necessary method to reach the TMDL."

We disagree. External loads were estimated based on the best available information, and have been subjected to both extensive stakeholder and peer review. These estimates of current loads point to stormwater as the highest controllable external sources of PCBs to the Bay. Furthermore, our approach to stormwater control has and continues to be to implement actions with high certainty of success while we evaluate the need for and types of future actions adaptively.

IV RESPONSES TO WRITTEN COMMENTS ON THE DECEMBER 3, 2007 STAFF REPORT AND REVISED DRAFT BASIN PLAN AMENDMENT

We received twelve comment letters during the public review period that closed on January 22, 2008. Two of these letters were submitted in October, in response to Board member requests made during the September 12, 2007 testimony hearing.

Comment Letters Received:

1. US Environmental Protection Agency, Region IX
2. California Department of Transportation
3. Bay Area Stormwater Management Agencies Association
4. Bay Area Clean Water Agencies
5. San Francisco Public Utilities Commission
6. East Bay Municipal Utility District
7. BayKeeper, Clean Water Action, Citizens for a Better Environment, Friends of Five Creeks
8. California Chamber of Commerce and General Electric Company, submitted by Latham & Watkins LLP
9. Quantitative Environmental Analysis
10. Dr. David Sunding, Berkeley Economic Consulting, Inc.
11. Latham and Watkins, Briefing Paper, October 31, 2007
12. Dr. David Sunding, Berkeley Economic Consulting, Inc., dated October 30, 2007

Comment Letter no. 1: U.S. Environmental Protection Agency Region IX, Diane Fleck, Esq.; January 17, 2008

USEPA Comment 1.1: "Regarding NPDES permit requirements for municipal and industrial dischargers, EPA understands that the NPDES permitting approach for municipal and industrial dischargers under the proposed TMDL has not been fully developed, and we agree that it is not necessary to do so as part of the TMDL language. However, the Water Board should be aware that numeric water quality–based effluent limits, consistent with the wasteload allocations in the TMDL, will need to be placed in permits. We look forward to working with you further on an approach for NPDES permits."

We intend to develop municipal and industrial wastewater NPDES permit numeric water quality–based effluent limits that are consistent with the wasteload allocations in the TMDL. However, the individual wasteload allocations are based on a limited dataset. Additional data collection is necessary in order to calculate performance based numeric effluent limits and ensure their consistency with the wasteload allocations. We find that while the data are adequate for determining the overall source wasteload allocation, it is not feasible to implement these allocations directly as numeric effluent limits at this time since they do directly account for individual plant performance and inter-annual and intra-annual variability of discharges.

NPDES permits will include data collection requirements to support the calculation of numeric effluent limits and to demonstrate attainment of individual allocations that account for inter-annual and intra-annual variability. We will work with USEPA to determine appropriate permit limits consistent with the allocations while additional data are collected. We expect the additional data may demonstrate that some individual wasteload allocations are not consistent with individual facility performance, and if so, individual wasteload allocations will need to be revised.

USEPA Comment 1.2: "On page 48 of the Staff Report, it states that the urban and non-urban stormwater runoff load estimate is revised from 40 kg/yr to 20 kg/yr. It states, "PCBs loads estimate for the Guadalupe River have been estimated from 0.7 to 1.2 kg/yr between 2003 and 2005 (McKee et al., 2005). SFEI extrapolated these loads to small urban tributaries and estimated a total load of 20 kg/yr (SFEI, 2007). We use this newer load estimate for combined urban and non-urban stormwater runoff." Without further description of the calculations, it is not clear that it is appropriate to extrapolate estimates from the Guadalupe River over the entire Bay area, to estimate the total PCB load from urban and non-urban stormwater runoff."

We consider the stormwater runoff load estimates from the San Francisco Estuary Institute (SFEI) more representative than those presented in the June 2007 version of the Staff Report. The earlier estimates were based on concentrations of PCBs in bedded sediment samples collected within stormwater conveyance systems for four different land uses, industrial, commercial, residential and open space. The median value for each land use was applied in a simple sediment transport model to calculate the load. Since these data were collected, the has collected and published data for PCBs loads in the Guadalupe River, a tributary to the Bay, based on water-column based PCBs data. The SFEI extrapolated these water-column data to other smaller urban tributaries and calculated the new estimates of loading to San Francisco Bay. These water-column data are more reflective of external loading to the Bay than the older bedded sediment data.

USEPA Comment 1.3: "Fish Tissue Numeric Target: While it is true in this specific instance that the fish consumption rate used in the TMDL is higher than that used in the CTR, we strongly recommend numeric targets be set at the same risk level as the underlying water quality standard, to clearly ensure protection of both the general population (at the same risk level) and any subpopulations."

Our proposed fish tissue numeric target will protect both the general population and any subpopulations at the same risk level as the CTR. Based on the currently available consumption data for recreational anglers in San Francisco Bay, a 95th percentile ingestion rate of 32 grams per day and a 10(-5) risk level were used to calculate the numeric target. The 10(-5) risk level reflects the fact that the recreational angler subpopulation is a smaller at-risk population. The fish tissue target is consistent with the CTR water column criterion, which is based on protection of the general population at a 10(-6) risk level. To demonstrate this, we calculated the expected concentration of PCBs in the Bay water column upon attainment of the fish tissue numeric

target, using bioaccumulation factors based on current Bay fish tissue and water column data. The calculations indicate that when the fish tissue numeric target is attained, levels in the Bay water column will be less than the CTR criterion.

USEPA Comment 1.4: "On page 58, under section 8.1 Fish Tissue Target, the last sentence in the first paragraph references Equation 2 in section 7.1; however, the discussion appears to reference Equation 1, in section 6.2."

We acknowledge the error and have corrected Section 8.1 of the Staff Report accordingly.

USEPA Comment 1.5: "On page 67 of the Staff Report, in Section 10.1, Total Maximum Daily Load, the report expresses the TMDL as an average annual load. As discussed in EPA's guidance memorandum dated November 15, 2006, EPA recommends that TMDLs and associated load allocations and wasteload allocations be expressed in terms of daily time increments. TMDLs and allocations may also be expressed in terms of both daily and non-daily time increments to help facilitate implementation of the applicable water quality standards."

Due to the inherent uncertainties in the TMDL and the estimate of current and allocated loads, we prefer to express the TMDL as a yearly load. The primary reason is that changes in bioaccumulation in fish, our TMDL numeric target, occur on a timescale greater than daily. We are also not able to calculate a TMDL in daily or monthly increments due to limitations in model capabilities and PCBs loading and fate and transport data.

USEPA Comment 1.6: "It is necessary for the Regional Board to explain and demonstrate in greater detail in this TMDL, with specific reasonable assurances, how the Central Valley load reduction will be achieved within 40 years and/or verified that it is occurring through natural attenuation, through specific RMP monitoring."

There is sufficient reasonable assurance that the Central Valley allocation will be achieved. Sediments currently entering the Bay from the Central Valley have lower PCBs concentrations than in-Bay sediments, a condition we expect will continue. We are not aware of any specific sources of PCBs in the Central Valley that would affect the Central Valley loading if they were regulated or remediated. Also, calculating the decline in PCBs over time due to natural attenuation (using a half-life of 56 years), we estimate that the Central Valley load allocation will be attained in about 40 years (see Figure 30 of the Staff Report), the same timeframe for attainment of the TMDL. Verification of ongoing Central Valley loads and load reductions will be a regular component of the Regional Monitoring Program. Accordingly, natural attenuation and loads monitoring provide reasonable assurances that the Central Valley allocation will be achieved and there is no need for further regulatory assurance.

USEPA Comment 1.7: "As lead agency on a Superfund cleanup, if EPA finds either the TMDL numeric target value or the sediment goal value to be a technically suitable numeric

value to use as a to-be-considered criterion (TBC), under the National Contingency Plan, 40 CFR Part 300 et.seq., EPA as lead agency has the authority to so designate the value as a TBC."

It is our position that the fish tissue target and the sediment goal should not be considered State ARARs. We accept USEPA's position that they may consider these to-be-considered criteria under the National Contingency Plan. The only change to the Basin Plan amendment is to refer to to-be-considered rather than to be determined and to refer to the specific federal laws. The Basin Plan amendment now reads " …nor should they be considered appropriate or relevant and applicable requirements (ARARs) or a to-be-considered ARAR under the National Contingency Plan, 40 CFR Part 300 et. Seq. or the 1986 Superfund Amendments and Reauthorization Act.

Comment Letter no. 2: California Department of Transportation (Caltrans), G. Scott McGowan; January 22, 2008

Caltrans Comment 2.1: "The PCB TMDL lacks the necessary flexibility respecting the Department's compliance activities. We request that this TMDL use a similar approach to that used in the Mercury TMDL. We strongly urge the RWQCB to include a provision in the PCB TMDL in the Implementation Plan subsection for Stormwater Runoff (pp. A-10, A-11) similar to the Mercury TMDL. This provision will allow the Department to implement a consistent regionwide PCB control program, if this approach is more effective….That provision is stated below:

> **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 a case, the Water Board will consider a separate allocation for Caltrans for which they many demonstrate progress toward attaining an allocation or load reduction in the same manner mentioned previously for municipal program."**

We agree that pursuing a consistent regionwide Caltrans PCBs control program has benefits. The phased Adaptive Implementation plan allows for the flexibility requested. We may consider a separate allocation for Caltrans in the future based on a demonstration by Caltrans that it is needed for implementation.

Caltrans Comment 2.2: "Caltrans suggests that the Basin Plan amendment retain the following statement in order to establish attainment of the load allocation by showing one ug/kg in runoff.

> **Load and wasteload allocations to Central Valley inflow, and urban and non-urban stormwater runoff are based on sustained constant sediment mass input with a sediment PCBs concentration of one ug/kg."**

This statement was removed from the Basin Plan amendment to be consistent with other sections of the amendment. It has been retained in the Staff Report to explain the rationale behind the allocations.

Caltrans Comment 2.3: "The current loading from urban and (now non-urban runoff) has been reduced from 40 kg/yr to 20 kg/yr. We will appreciate to know the reasoning for the reduction in current loading."

Based on the San Francisco Estuary Institute's monitoring of PCBs in local tributaries to the Bay, we have revised the source analysis to incorporate an updated combined urban and non-urban stormwater load estimate of 20 kg/yr. See response to U.S. EPA comment 1.2 above.

Caltrans Comment 2.4: "The commenter asks why we deleted the statement "wasteload allocations to municipal and industrial wastewater dischargers are set at current loads."

The wasteload allocation is set at 2 kilograms per year, as opposed to the 2.3 kilograms per year calculated to reflect current loads based on limited data. The TMDL Implementation Plan requires that dischargers collect data to better estimate wastewater discharger performance and refine the wasteload information. We also expect that loading s to the Bay will decrease due to implementation actions and natural attenuation of PCBs.

Caltrans Comment 2.5: "The commenter questions the need for implementation measures to control stormwater runoff. They state 'These proposed actions are required independent of any demonstration that a PCB problem exists. For example, if runoff sediment from a jurisdiction carries less than one ug/kg of PCBs, we question whether it should be required to implement pilot controls in the first permit cycle and then "effective control measures" in the second permit cycle."

The TMDL's phased adaptive implementation plan does not require control actions in every jurisdiction that discharges runoff to the Bay. The focus of pilot controls and effective control measures would be on those geographic locations within drainage areas that have runoff sediments with levels of PCBs that are much greater than one ug/kg, generally urban, former industrial portions of the Bay Area.

Caltrans Comment 2.6: "The commenter is concerned that the deletion of suggested methods for determining compliance with the stormwater runoff load allocations will make it difficult to demonstrate progress in attaining the allocations. The methods that were deleted from the December 3, 2007 Staff Report and Basin Plan amendment are listed below

1. **Quantify the annual average PCBs loads reduced by implementing (a) pollution prevention activities, and (b) source and treatment controls. The Water Board will recognize such efforts as progress toward achieving the wasteload allocations and the PCBs-related water quality standards upon which the allocations and corresponding load reductions are based. The aggregate wasteload allocation for urban stormwater runoff of 2 kg/yr represents a load reduction of 38 kg/yr from the aggregate load of 40 kg/yr, based on studies conducted in 2000 and 2001. Loads reduced as a result of actions implemented after 2001 may be used to estimate load reductions.**
2. **Quantify PCBs loads as a rolling five-year annual average using data on flow and water column total PCBs concentration. A five-year annual average should account for interannual variability.**
3. **Quantitatively demonstrate that the total PCBs concentration of suspended sediment that best represents sediment discharged from drainage areas is below the in-Bay surface sediment PCBs concentration goal of 1 μg/kg, which is the basis for the urban."**

We deleted the compliance determination methods cited and replaced them with a revised description of phased, adapted implementation requirements. The revised requirements are consistent with the deleted compliance determination methods, and these methods may still be

used by dischargers to show progress towards attaining load allocations. There also may be other methods, more relevant to PCBs, which would be appropriate to demonstrate attainment.

Caltrans Comment 2.7: The commenter asks why the Basin Plan amendment and Staff Report were revised to state that the fish tissue target of 10 ug/kg and the sediment goal of 1 ug/kg are not considered ARARs. They state further that "the BPA should identify cleanup standards in order to allow for remediation actions to proceed. By not establishing standards, the BPA makes compliance assessment, planning, and cleanup implementation much more difficult."

While no mention of clean-up goals was made in the June 2007 version of the Basin Plan amendment, the June 2007 version of the Staff Report did make the following statement:

> However, this sediment goal should not be interpreted as a clean-up goal, rather it is the long-term sediment PCBs concentration that will be attained after reduction of external loads, some targeted action on internal reservoirs of PCBs, and degradation or burial of PCBs in Bay sediments.

The December 3, 2007 version of the Basin Plan amendment added this language to be consistent with statements made in the June 2007 Staff Report and to define the project clearly for CEQA purposes. While we agree that in principal, establishing an upland soil and an offshore sediment cleanup standard would make compliance assessment, and planning easier, it is not clear that it would make implementation easier. The sediment goal represents the desired condition in the Bay in order to attain beneficial uses. The proposed approach to cleanup of PCBs-contaminated sites in the PCBs TMDL is consistent with existing efforts. We do intend to work with the implementing parties and responsible parties for on-land cleanups on a case-by-case basis to assist in the attainment of loading reductions for stormwater runoff required under the PCBs TMDL.

Caltrans Comment 2.8: "The comment calls out the changes below to the Adaptive Implementation section of the Basin Plan amendment:

> The Water Board, within ten years of the effective date of the TMDL, will review the San Francisco Bay PCBs TMDL and evaluate new and relevant information that becomes available through implementation actions, monitoring, special studies, and the scientific literature and consider amending modifications to the PCBs TMDL and implementation plan as necessary to ensure attainment of water quality standards in a timely manner while considering the financial and environmental consequences of new control measures.

The comment states that: "We support the consideration of financial and environmental consequences. This TMDL requires a 90% reduction in stormwater loading. While measures necessary to meet this allocation could become very costly, clarifying more specific objectives as discussed above would make more effective use of the public funds that will be required to comply with the TMDL."

We agree with the comment and have further revised the Adaptive Implementation section of the Basin Plan amendment to include an annual report on implementation progress to provide opportunity for public input and consideration of revisions to the TMDL and implementation plan.

Comment Letter no. 3: Bay Area Stormwater Management Agencies Association (BASMAA), Donald P. Freitas; January 22, 2008

BASMAA Comment 3.1: "With regard to periodic updates of the TMDL, the PCB Report/BPA calls for evaluation of new information and incorporation into the TMDL as needed any time within ten years. While this does not preclude review and potential update within a shorter period of time, BASMAA has requested that Water Board staff commit to a shorter timeframe. BASMAA additionally requests public noticing of the annual updates and that stakeholders be given the opportunity to present new information at the annual updates and request modification of the TMDL as appropriate"

We have included a call for an annual report to the Board on TMDL implementation progress that will provide opportunity for an annual review of technical studies and monitoring results that may provide cause to consider amendments to update the TMDL and implementation plan. These annual reports would be presented to the Board at a public noticed meeting, which would provide stakeholders the opportunity to present new information and request modification of the TMDL as appropriate.

BASMAA Comment 3.2: "BASMAA requests clarification and revision of the language on p.80 (first bullet) of the PCB Report/BPA with respect to the roles of agencies in investigating and abating on-land PCBs sites. Stormwater runoff management agencies and municipalities should not be held responsible for abatement of PCBs in areas with elevated PCBs in soils/sediments. Instead, municipal agencies would be available to assist with identification of on-land sites with PCBs contamination, and would report investigation results, including identifying contaminated properties and/or potentially responsible parties to the Water Board and/or DTSC, and/or potentially in some instances to Certified Unified Program Agencies, which are local agencies with the authority to conduct oversight of hazardous materials. The Water Board, DTSC, or, if they have the available resources, CUPA would be expected to follow up on further investigation and oversee any necessary abatement. We understand that staff will be recommending clarifications and revisions to this language at the upcoming public hearing that would address these concerns and objectives. This clarification and revision is very important to the BASMAA member agencies."

The Staff Report has been amended to include more specifics about clean up of on-land PCBs sites and roles of agencies in investigating and abating on-land PCBs sites. The language has been modified in the Stormwater Runoff subsection of Section 11.1 of the Staff Report.

BASMAA Comment 3.3: "the PCB Report/BPA projects that municipal wastewater management costs of approximately $500 million annually provide an upper-bound cost for stormwater dischargers to address PCBs and other pollutants of concern. This highly speculative estimate represents an annual cost well beyond anticipated future municipal resources and, according to the PCB Report/BPA, is a factor of five higher than estimated total current costs associated with all aspects of urban stormwater pollution management in

the Bay Area. We continue to emphasize that municipal actions to address PCBs in stormwater runoff will be constrained by available funding and that Proposition 218 severely limits the ability of local government to generate additional revenues for urban stormwater runoff programs[1].

[1]Section 6 of Article XiII D of the California Constitution, a part of Proposition 218, requires that property-related fees or charges shall not be imposed or increased unless such fee or charge is approved by either a majority vote of the owners of the affected properties or, at the option of the agency imposing the fee or charge, by a 2/3 vote of the voters residing in the area affected by the fee or charge."

We have included additional analysis regarding stormwater implementation costs in Section 12.2 of the Staff Report. We acknowledge the challenges and constraints that limit the ability of local government to generate additional revenues for urban stormwater runoff programs.

BASMAA Comment 3.4: "Table 19 (p.74) and Table A-5 (p.A-9) in the PCB Report/BPA show wasteload allocations for each Bay Area county, but do not include associated load reductions, as was done in the mercury Basin Plan Amendment. BASMAA requests inclusion of these load reductions by county to potentially compare to loads avoided that may be calculated by each countywide stormwater program. Calculating loads avoided on a countywide basis will be a possible means of demonstrating compliance with the wasteload allocations."

Calculating loads avoided by implementing control measures on a drainage area basis or on a countywide basis will be a possible means of demonstrating compliance with the wasteload allocations. However, the Basin Plan amendment provides a description of phased, adapted implementation requirements instead of specifying specific methods of demonstrating attainment of wasteload allocations. Inclusion of county-specific load reductions is also not possible at this time due to the uncertainty in current county specific load. The wasteload allocations implementation requirements could be revised in the future to include loads avoided based requirements once we have better information on loads and loads avoided by implementing control measures. Loads avoided requirements could also be included in permits if justified.

BASMAA Comment 3.5: "BASMAA agencies previously identified several potential PCBs release sites and requested that Water Board staff work with appropriate parties (e.g., PG&E, the Department of Toxic Substances Control and the Toxics division within the Water Board) to investigate the possibility that PCBs from these sites had entered storm drains.

BASMAA understands that Water Board TMDL staff has recently brought the potential PCB sites identified in our letters to the attention of the Water Board's Toxics division staff, which is now following-up on investigating these sites. Water Board staff has also informed BASMAA that after adoption of the TMDL, actions to implement the TMDL such as addressing these sites are likely to have a higher priority. BASMAA strongly supports the Water Board raising its priority for addressing such sites to expedite reducing impairment of the Bay's beneficial uses by PCBs."

As noted, TMDL implementation will be a high priority for the Water Board and its staff. This will include following up on potential on-land PCBs cleanup sites identified by municipalities.

Comment Letter no. 4: Bay Area Clean Water Agencies (BACWA), Michele Pla; January 22, 2008

BACWA Comment 4.1: "The December 2007 Basin Plan Amendment for the PCB TMDL includes a waste load allocation (WLA) for municipal wastewater dischargers of 2 kg/year in Table A-2. However, the estimated aggregate loading from municipal dischargers based on 2003 flow data is 2.3 kg/yr (Table A-I). Table A-3 further divides this WLA into waste load allocations for individual dischargers. The proposed allocations are based on a very limited data set, as acknowledged by Water Board staff on page 78 of the December 2007 Staff report. BACW A believes that the analytical data set is inadequate to establish either due to the great uncertainty associated with the available concentration data. The proposed individual allocations were developed based on PCB effluent concentration data for select dischargers as presented in the PCBs TMDL Project Report (December, 2003)"

The TMDL must include allocations for wastewater discharges. The proposed total waste load allocation and individual wasteload allocations are based on available, albeit limited data on current performance. We account for uncertainty in whether the individual allocations are representative of individual performance by calling for effluent limits in implementing NPDES permits that reflect actual performance at individual facilities. Permits will also include data collection requirements to support the calculation of effluent limits and to demonstrate attainment of individual allocations. Additional data may demonstrate that some individual wasteload allocations are not consistent with individual facility performance, and if so, individual wasteload allocations will need to be revised.

BACWA Comment 4.2: "BACWA requests that the Basin Plan amendment language be amended to technically qualify that the aggregate loading for Municipal Wastewater is:

1. an estimate based on the limited concentration data presently available;

2. that the aggregate waste load allocation for POTWs be based upon this estimate while adequate technical information is collected, and

3. that the table of individual allocations be eliminated from the TMDL, due to severe data inadequacies which do not provide a path for calculating these individual WLAs with any degree of confidence."

The Basin Plan amendment and supporting Staff Report include documentation of the limited data set used to calculate wastewater loading and establish wasteload allocations. Implementation requirements account for data limitations and uncertainties associated with individual allocations, so rather than eliminating the table of individual allocations at this time, we will consider revising the individual allocations in the future after the collection of additional data.

BACWA Comment 4.3: The commenter requests that more detail about implementation of permit effluent limits, as reflected in the Staff Report, be included in the Basin Plan amendment. They also request that the approach used in the Potomac TMDL be considered

by the Water Board to address the question of effluent limits in Wastewater NPDES permits. That approach is based on additional data collection and BMPs and relies on EPA's NPDES regulations at 40 CFR 122.44(k) that allow permits to use non-numeric, BMP-based WQBELs under certain conditions. This regulation states that BMP-based WQBELs can be used where "Numeric effluent limitations are infeasible; or the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA".

The detail about implementation of permit effluent limits, as reflected in the Staff Report is not necessary or appropriate for inclusion in the Basin Plan amendment. Future permit actions must account for Basin Plan requirements including consideration of supporting details contained in the Staff Report. We are aware of the approach approved by the U.S. EPA in the Tidal Potomac & Anacostia River Watershed in the District of Columbia, Maryland and Virginia

(USEPA Decision Rationale Total Maximum Daily Loads For Polychlorinated Biphenyls (PCBs) Tidal Potomac & Anacostia River Watershed in the District of Columbia, Maryland and Virginia. October 2007. Region III.

http://www.potomacriver.org/water_quality/final_report/Potomac_PCB_TMDL_Decision.pdf)

However, in respect to concerns raised by USEPA, we will not state that numeric effluent limitations are infeasible. We will work with USEPA, dischargers, and other interested parties to develop water quality based effluent limitations that are consistent with the requirements and assumptions of the wasteload allocations.

BACWA Comment 4.4: BACWA does not agree with the changes to the section on Risk Reduction Management (page A-13) of the Basin Plan Amendment. BACWA believes that the requirement for Risk Reduction should be consistent with the Mercury TMDL so that there is no question that these are not two different programs. We request that this new language be deleted from the Basin Plan amendment so that the regional interested parties can determine the best approach to this program.

The Basin Plan amendment language is consistent with that in the Mercury TMDL. The difference is that in addition to the requirements under the mercury TMDL, this TMDL provides clarification that studies needed to support health risk assessment and risk communication include collection of additional information on patterns of consumption of Bay fish. This was implicit in the Mercury TMDL language. We support the development of one program for risk reduction for PCBs and Mercury; however that program will require coordination since the patterns of contamination in fish are not the same for these two pollutants.

Comment Letter no. 5: San Francisco Public Utilities Commission (SFPUC), Arleen Navarett; January 22, 2008

SFPUC Comment 5.1: "Need to correct reference to San Francisco facilities. The footnote to Table A-5 should be modified to correctly address the facilities:

> **Does not account for treatment provided by San Francisco's combined sewer system. The treatment provided by the City and County of San Francisco's Southeast Plant and combined sewer control facilities (NPDES permit CA0037664) will be credited toward meeting the allocation and load reduction."**

We have revised the footnote to Table A-5 to specifically account for the Northpoint Wet Weather Facility. This does not preclude San Francisco from getting credit for other combined sewer control facilities.

SFPUC Comment 5.2: "We do not believe it is possible to translate averages from a handful of municipal dischargers into individual wasteload allocations for every San Francisco Bay Area POTW discharger. The previous version of the PCB TMDL included language that the NPDES permits implementing the TMDL would include an effluent limit of *0.5* ug/L. Why was this changed? (San Francisco also recommends that any effluent limit that is determined be established as a mass limit rather than a concentration limit).

"The text establishing a standard effluent limit was deleted and replaced with text stating that NPDES permits shall include effluent limits based on current performance. Unfortunately, enough data points are simply not available to establish current performance. Without any other information in the PCB TMDL, we have concerns that the wasteload allocations in Table A-3 will default to current performance. The San Francisco PUC recommends that Table A-3 be deleted as having no basis, or otherwise be explicitly qualified as not being representative of current performance for municipal wastewater dischargers."

The Basin Plan amendment and supporting Staff Report already contain sufficient recognition that the individual wasteload allocations are based on a limited data set and in implementation requirements account for data limitations and associated uncertainties. See responses to BACWA comments 4.1, 4.2 and 4.3 above. The TMDL was revised to eliminate reference to an effluent limit of 0.5 as this was originally intended to serve as a backstop limit based on a method detection limit. It was determined that this approach was not consistent with the wasteload allocations based on comments received from USEPA. We also expect any numeric effluent limits in permits will be expressed as mass limits in accordance with NPDES regulations.

SFPUC Comment 5.3: "Given that PCBS are legacy pollutants, San Francisco strongly supports the implementation of the PCB TMDL through best management practices of maintaining optimal treatment performance for solids removal."

Comment noted.

SFPUC Comment 5.4: "*Consolidation of stormwater and wastewater allocations.* The TMDL assumes that stormwater is a significant contributor of PCB pollutants to San Francisco Bay, because of legacy hotspots. Consequently, San Francisco PUC recommends that for this PCB TMDL and for future TMDLs developed, wasteload allocations established for San Francisco should allow the stormwater and wastewater wasteload allocations to be combined to be met collectively by the wastewater and stormwater effluent loads. This may require that a footnote be added to Table A-S *stating: "For San Francisco's combined stormwater and wastewater system,* stormwater and wastewater wasteload allocations can be combined and met collectively."

At this time, these allocations are separate (municipal wastewater discharge in Basin Plan amendment Table A-3; urban stormwater discharge in Table A-5) because San Francisco does not treat all of its stormwater. However, we have provided clarification via Footnote C to Table A-5 that attainment of the stormwater wasteload allocations will include accounting for stormwater treatment provided by San Francisco's combined sewer system. Also, we prefer to resolve uncertainties associated with the separate allocations before combining them. In the future, the Water Board may consider combining the allocations through its adaptive implementation review of the TMDL, if San Francisco presents quantitative evidence justifying a combined allocation scheme.

SFPUC Comment 5.5: "If POTWs are already achieving the optimum removal, we do not see the need for additional measures, which may not be cost-effective and may decrease the amount of funds available for higher priority pollution control efforts. Prior to requiring control efforts (including source control and studies), there needs to be a demonstrated problem, i.e., the source being addressed must be a significant source and the expected result must be a significant reduction in loading."

The TMDL does not require POTWs to implement additional measures which may not cost-effective. However, we do expect POTWS to identify and manage controllable sources of PCBs to their systems as part of existing source control programs.

SFPUC Comment 5.6: "*Obligations of POTWs.* If POTWs are not a significant original or current source of PCBs, why are they being targeted for paying for educational efforts, studies, etc. We believe the manufacturers and users of PCBs should bear these costs. (See page A-10)"

POTWs discharges account for 20% of the TMDL, and POTWs are expected to contribute their fair share along with other dischargers to educational efforts, studies, etc.

SFPUC Comment 5.7: "*Deletion of list of stormwater compliance options.* San Francisco does have small areas of separate sewers which will need to comply with the TMDL's stormwater

provisions. This version of the amendment has deleted the list of compliance options on page A- 11. This list provided useful options and helped discharges assess the alternatives for compliance."

We deleted the compliance determination methods cited and replaced them with a revised description of phased, adapted implementation requirements. The revised requirements are consistent with the deleted compliance determination methods, and these methods may still be used by dischargers to show progress towards attaining load allocations. There also may be other methods, more relevant to PCBs, which would be appropriate to demonstrate attainment.

Comment Letter no. 6: East Bay Municipal Utility District (EBMUD), Brian S. Haughton; January 22, 2008

EBMUD Comment 6.1: "EBMUD supports the four key elements of the proposed Basin Plan amendment's approach to controlling PCBs discharges from municipal wastewater dischargers (POTWs), as reflected" on page A-10 of the Basin Plan amendment.

Comment noted.

EBMUD Comment 6.2: "Available data are inadequate to support the Staff Report's 2.3 kg/yr estimate of POTWs' annual PCB loading to the Bay."

The comment refers to statements made in the Staff Report about the limitations of the data used to support the loading estimate for POTWs. We acknowledge there are uncertainties in this estimate, but maintain it adequately represents POTW loading for this TMDL. Also, the TMDL adaptive implementation plans calls for collection of additional data by the POTWs to resolve any loading uncertainties.

EBMUD Comment 6.3: "The proposed categorical load allocation of 2.0 kg/yr for the POTW source category is improper." The commenter expresses a concern that Staff rounded the wasteload allocation from 2.3 kg/yr to 2.0 kg/yr without providing an adequate explanation. They state that if the wasteload allocation represents loading based on current performance then the wasteload allocation should remain at 2.3 kg/yr."

We have revised Section 10.3 (Wasteload Allocations) of the Staff Report to explain that the wasteload allocations for municipal wastewater dischargers total 2 kg/yr, which reflects the current estimated aggregate load to the nearest kg/yr. Although this is lower than our actual estimate of 2.3 kg/yr, it reflects anticipated decreases in current loadings expected from implementation actions and degradation of PCBs in sources to wastewater systems.

EBMUD Comment 6.4: "The wasteload allocation of 0.3 kg/yr for EBMUD is improper." EBMUD's wasteload allocation in the PCBs TMDL is 42% lower than their estimate of EBMUD's current performance (0.72 kg/yr, based on available data. "It is unclear what method was used to calculate the individual POTW wasteload allocations."

The average concentration of PCBs, based on data for the group of secondary dischargers, was applied to data on flow volume for EBMUD to calculate the wasteload allocation. We acknowledge that this might not reflect the current loading of PCBs to the Bay from the EBMUD discharge. However, there will be no regulatory consequence since the TMDL implementation requirements call for EBMUD to collect additional data on PCBs in effluent low detection methods and for permit limits based on actual performance. We expect these data will result in recalculation of individual wasteload allocations and consideration of Basin Plan revisions.

EBMUD Comment 6.5: "The proposed Basin Plan Amendment should be modified to clarify that performance-based effluent limits in NPDES permits should use TSS until it is feasible to use PCBs."

We acknowledge there is a relationship between PCBs and TSS. However, it is not possible to quantify the relationship and establish TSS limits as a surrogate for PCBs due to data limitations. We have looked at in-Bay data generated by the RMP and found that there is too much noise in the data to discern a good relationship, whether it exists or not. Nevertheless, if EBMUD and other wastewater dischargers wanted to pursue this approach, we would consider the results as part of our recurring review and possible modifications of wasteload allocations and implementation requirements.

Comment Letter no. 7: BayKeeper, Clean Water Action, Citizens for a Better Environment, Friends of Five Creeks (Baykeeper et al), Amy Chastain, January 22, 2008

Baykeeper et al. Comment 7.1: "FISH TISSUE TARGET. The target does not adequately implement all applicable water quality standards and is not sufficiently protective of all populations.….The Board should take a more protective approach and calculate the fish tissue target using more conservative assumptions; i.e. a Bay area fish consumption rate of at least 32 grams per day and an acceptable increase in cancer rates of one in 1,000,000 (or 10^{-6}). This should result in a fish tissue target of at least 1.1 ng/g, which would provide a higher level of protection to the most at risk populations and ensure that the TMDL is calculated to implement the CTR criterion for the protection of human health."

Documentation of how the fish tissue target will implement all applicable water quality standards and that it is sufficiently protective of all populations is provided in section 8.1 of the Staff Report. Our proposed fish tissue numeric target will protect both the general population and any subpopulations at the same risk level as the CTR. Based on the currently available consumption data for recreational anglers in San Francisco Bay, a 95th percentile ingestion rate of 32 grams per day and a 10(-5) risk level were used to calculate the numeric target. The 10(-5) risk level reflects the fact that the recreational angler subpopulation is a smaller at-risk population. The fish tissue target is consistent with the CTR water column criterion, which is based on protection of the general population at a 10(-6) risk level. To demonstrate this, we calculated the expected concentration of PCBs in the Bay water column upon attainment of the fish tissue numeric target, using bioaccumulation factors based on current Bay fish tissue and water column data. The calculations indicate that when the fish tissue numeric target is attained, levels in the Bay water column will be less than the CTR criterion.

Baykeeper et al. Comment 7.2: "EPA policy requires that TMDL implementation plans "be sufficient to implement all wasteload and load allocations in a *reasonable* period of time," and that all TMDLs provide "reasonable assurances that wasteload allocations and load allocations will be implemented in a timely manner.… The Regional Board should develop an implementation plan that results in attainment of the fish tissue target as soon as possible. The expected timeframe for attainment should be explicitly stated in the BPA, as well as an explanation of why this timeframe is reasonable."

Section 9.2 provides documentation of how we used the mass budget model to select 10 kg/yr as the TMDL that will result in attaining the fish tissue target in about 30 years. Section 10.4 of the Staff Report provides documentation on how the Central Valley allocation will be attained through natural attenuation (see response to USEPA comment no.1.6). Section 11.1 of the Staff Report provides document of the phased implementation plan leading to attainment of wasteload allocations for stormwater in 20 years.

Baykeeper et al. Comment 7.3: "The TMDL should include a sediment target, not a sediment goal…. The Regional Board should reinstate the sediment target and remove all language from the Basin Plan Amendment stating that the sediment goal and fish tissue target should not be used as cleanup standards."

We disagree that a sediment target is a necessary part of this TMDL. The fish tissue target is a direct expression of desired conditions in the Bay that will protect sport fish consumers. A target for sediment is unnecessary because attainment of the TMDL and water quality standards will require, and in fact is based on, reducing concentrations of PCBs in Bay sediments. The TMDL is based on attainment of a sediment concentration that will result in attainment of the fish tissue target (see section 9 (Linkage Analysis) of the Staff Report). Establishing a sediment target provides no added value.

It is not possible to develop generic clean-up standards that apply to every foreseeable contaminated site. The usual approach taken by regulatory agencies has been to develop generic screening levels based on an average set of assumptions, but develop site-specific clean-up levels based on nature and extent of contamination, and feasibility considerations.

Baykeeper et al. Comment 7.4: "The TMDL fails to provide reasonable assurances that nonpoint source controls and natural attenuation will result in required load reductions…. In place of wastewater load reductions, the TMDL assumes that load reductions will occur almost entirely through the use of nonpoint source controls and natural attenuation. The TMDL implementation plan, however, lacks any assurances that these load reductions will occur.

The BPA and staff report must discuss, in detail, how the timeframe for implementation was selected and how the implementation plan will achieve the required load reductions. This discussion must include identification of specific actions that the Regional Board will take and/or require of others to ensure that the total maximum daily load of 10 kg/year will occur within a reasonable timeframe. We further recommend that the TMDL be revised to include interim wasteload allocations for storm water that will act as milestones to evaluate progress towards attainment of reductions.

See responses to USEPA comment no. 1.6 and NGO comment no. 7.2 for a discussion about the reasonable assurances for the Central Valley load allocation and the timeframe for implementation. Section 11.1 of the Staff Report provides document of the phased implementation plan leading to attainment of wasteload allocations for stormwater in 20 years. Although we see the benefit of load reduction milestones, it is not possible to determine and justify them as regulatory requirements at this time without more information. The results of required pilot studies may provide a basis for setting milestones in the further.

We deleted the compliance determination methods cited and replaced them with a revised description of phased, adapted implementation requirements. The revised requirements are consistent with the deleted compliance determination methods, and these methods may still be used by dischargers to show progress towards attaining load allocations. There also may be other methods, more relevant to PCBs, which would be appropriate to demonstrate attainment.

Baykeeper et al. Comment 7.5a: The proposed BPA and staff report identify storm water as the greatest source of external loading to San Francisco Bay and assign it the greatest load reductions. The TMDL and implementation plan, however, do not describe a specific strategy to ensure these reductions will be realized.

The TMDL implementation plan needs more detail regarding implementation of storm water load reductions. We appreciate the revisions made in attempt to clarify the schedule for implementing storm water controls through MS4 permits. We believe, however, that the level of detail in the BPA and the implementation plan is still lacking in necessary detail with respect to what actions storm water permittees and the Regional Board will undertake to ensure load reductions will occur."

We have provided as much detail as possible based on current available information, and we believe the description of phased, adapted implementation requirements in the Implementation Plan section of the Basin Plan amendment and section 11.1 of the Staff Report provide sufficient detail to track and monitor load reductions.

Baykeeper et al. Comment 7.5b: The TMDL implementation plan should state that all municipalities will be required to establish authority [to cleanup a site that has the potential to discharge PCBs-contaminated stormwater] before the end of the next permit cycle.

The regulatory mechanism to require remediation of these areas will be determined on a case by case and may involve federal, state, or local authority. We believe there are an adequate number of local agencies with authority to oversee cleanup of on-land contamination and therefore such a requirement in the implementation plan is not necessary.

Baykeeper et al. Comment 7.5c: The Regional Board also has regulatory authority to investigate and abate on-land contaminated properties. It is unclear to us how the Regional Board plans to exercise this authority to assist municipalities and other agencies in identifying and abating sites. The implementation plan should outline a program for (1) using section 13267 requests for information to assist municipalities in gathering information about potentially contaminated sites, (2) tracking and prioritizing sites requiring remediation, (3) using Cleanup and Abatement and Cease and Desist Orders to clean up privately-owned sites, and (4) working with other regulatory agencies to ensure that on-land cleanups occur to a level and in a manner that does not frustrate TMDL implementation.

See response to BASMAA comment no. 3.2. While the TMDL Implementation Plan doesn't specifically provide the details suggested by the commenter, all of the program elements suggested by the commenter are likely to be pursued by Water Board staff and the Water Board.

Baykeeper et al. Comment 7.5d: Another limitation of the TMDL, the draft municipal regional storm water permit, and current stormwater programs is that they do not require stormwater inspections of industrial facilities that are abandoned or no longer in operation.

The implementation plan should require permitees to expand their industrial inspections program to include inspections of inactive industrial sites and a description of what will be done at such sites when PCBs pose a threat to Bay water quality.

Inspection of abandoned sites is implicitly required by the proposed phase implementation plan. While the Basin Plan amendment does not call for this action specifically the Staff Report does call for *urban runoff management agencies to control/oversee the removal and disposal of PCBs-containing equipment.* It states further that *urban runoff management agencies are expected to conduct industrial inspections to identify and cause replacement of PCBs-containing equipment remaining in the urban environment.* The proposed phased implementation plan does not distinguish between active or abandoned sites.

Baykeeper et al. Comment 7.5e: Finally, the TMDL implementation plan should describe screening guidelines (or commit the Regional Board to establishing screening guidelines) for implementing control or abatement measures for on-land sites. The draft storm water permit requires permittees to qualitatively rank and map potential PCBs sources, confirm elevated levels by testing, and develop criteria for identifying areas for expedited abatement. The Regional Board, not storm water agencies, should establish screening guidelines that are based on water quality considerations for several reasons.

We agree that screening guidelines for implementing control measures for on-land sites are important. The Water Board currently has screening guidelines for PCBs, the Environmental Screening Levels, which can be applied to on-land cleanups.

Baykeeper et al. Comment 7.5f: Attainment of wasteload allocations for stormwater should be demonstrated using multiple methods. In the most recent draft BPA and staff report, the requirement that MS4 permitees quantify load reductions using specific methods was removed. The multiple methods approach should be reinstated and stormwater agencies should be required to use all of the methods consistently to demonstrate progress towards achieving wasteload allocations.

We deleted the compliance determination methods cited and replaced them with a revised description of phased, adapted implementation requirements. The revised requirements are consistent with the deleted compliance determination methods, and these methods may still be used by dischargers to show progress towards attaining load allocations. There also may be other methods, more relevant to PCBs, which would be appropriate to demonstrate attainment.

Baykeeper et al. Comment 7.5g; The BPA inappropriately codifies the MEP and BAT standards. As discussed in *Building Industry Association of San Diego County et al. v. State Water Resources Control Board et al.*, the State and Regional Boards have authority to go beyond the MEP standard and impose water quality-based conditions in MS4 permits.33 In *BIA*, the Court reasoned that the legislative purpose underlying the Water Quality Act of 1987, and section 1342(p) in particular, reflects Congressional intent to provide EPA (or the regulatory agency of an approved state) with the discretion to require compliance with water

quality standards in a municipal storm water permits. Restricting permit conditions to the MEP standard is illogical as those standards are not intended to implement Bay-specific water quality standards. The language in the draft TMDL unnecessarily and inappropriately restricts the Regional Board's ability to impose conditions that go above and beyond MEP but that which may be necessary to implement the wasteload allocations in the TMDL. Recommendation: The TMDL should state that stormwater permits shall contain requirements based on MEP and any more stringent requirements necessary to implement the wasteload allocations in the TMDL. This change will ensure that the Regional Board retains its ability to include in permits more stringent requirements should they be necessary to implement the TMDL and achieve water quality standards.

The TMDL does not codify MEP and BAT standards. The TMDL states that the allocations, which by definition are necessary to implement the TMDL and achieve water quality standards, will be implemented via stormwater permits. The reference to MEP and BAT only applies in the context of the phased implementation plan that anticipates iterative advances in MEP and BAT controls on a permit term basis leading to attainment of the water quality based allocations. The TMDL also states that all permits must be consistent with Section 4.8 - Stormwater Discharges of the existing Basin Plan, which already calls for requirements for stormwater discharges to attain water quality objectives.

Baykeeper et al. Comment 7.6a: Permits for wastewater dischargers should contain numeric effluent limits based on water quality, not current performance. We strongly recommend that this Regional Board not adopt a TMDL that fails to require any reductions in loading from wastewater.

Any discharge containing PCBs will cause or contribute to a violation of the Basin Plan's narrative bioaccumulation objective. Additionally, data collected on the PCBs concentrations in Bay area wastewater shows that most wastewater permitees discharge effluent with PCBs oncentrations in excess of the CTR's 170 pg/L criterion for protection of human health from consumption of aquatic organisms, and almost all in-Bay samples collected by the Regional Monitoring Program also exceeded the criterion. All wastewater discharges, therefore, have reasonable potential to cause or contribute to a violation of either the Basin Plan objective and/or the CTR criterion and must contain water quality-based effluent limits. Legally, because the TMDL fails to provide reasonable assurances that nonpoint source controls will result in attainment of the TMDL, all permits issued by this Regional Board must contain limits based on water quality and not current performance.

The Regional Board must reduce wasteload allocations and include numeric water quality-based effluent limits in permits. At a minimum, the TMDL should set wasteload allocations at a level that would require municipal and industrial point source dischargers to incorporate the most effective treatment methods and pollution prevention practices practicable for their discharges.

The wastewater wasteload allocations are water quality based and effluent limits that are consistent with these allocations are therefore water quality based. They are a component of the TMDL that is designed to attain water quality standards, and as such reflect wastewater

discharges potential to cause or contribute to exceedances of water quality standards. In determining proposed allocations we considered various factors including the ability to reasonably and feasibly reduce loads from all sources. We have allocated current loads to the municipal and industrial wastewater dischargers as their current loads are small, and further reduction would necessitate large costs for little benefit. Conversely, stormwater loads are larger, and there is very little source and treatment control for PCBs currently being implemented.

We disagree with the commenter's assertion that the TMDL fails to provide reasonable assurances that nonpoint source controls will result in attainment of the TMDL (see responses to NGO comments no. 7.2 and 7.4). The TMDL Implementation Plan already implementing wasteload allocations via water quality-based effluent limits in permits that would require dischargers to incorporate the most effective treatment methods and pollution prevention practices practicable for their discharges.

Baykeeper et al. Comment 7.6b: The wasteload allocation for wastewater must account for wet weather discharges. In order to accurately estimate loading from municipal wastewater, the TMDL must consider PCBs loading from wet weather events and then assign load reductions accordingly.

The wasteload allocations for wastewater are based on average annual flow data that include wet weather discharges. However, it is not possible to account for inter-annual and intra-annual variability associated with wet weather discharges at this time due to data limitations.

Baykeeper et al. Comment 7.6c: The BPA should set a deadline for refinement of loading from wastewater using Method 1668A. The BPA should require permittees to generate sufficient data using Method 1668A to more accurately estimate wastewater loading within five years.

The Basin Plan amendment circulated in December 2007 stated that dischargers shall evaluate attainment of load allocations every five years. The amendment has been modified so that the statement "every five years" has been deleted. The Staff Report states that refinement of loading from wastewater using a low detection limit is necessary. The Basin Plan amendment language supports the collection of data to better refine loading of wastewater to the B nay.

Baykeeper et al. Comment 7.6d: Compliance with effluent limits should be demonstrated using a method with a picograms per liter detection limit.

There is currently no approved analytical method with a picograms per liter detection limit that can be used for compliance determinations. At such time as the USEPA promulgates a low detection limit compliance method, its use will be required in NPDES wastewater permits.

Baykeeper et al. Comment 7.7: The TMDL must include a load allocation for in-Bay hotspots, erosion, and dredging.

It is not feasible to quantify loads and set allocations for in-Bay hotspots and erosion. The food web model and mass balance model that we used to derive the TMDL cannot explicitly account for these in-Bay sources. Moreover, there are insufficient or no site-specific data to estimate loading of from hotspots and the affect of clean ups. Regardless, remedial actions are likely to occur whether or not the TMDL is adopted due to adverse impacts in local biota associated with high concentrations of PCBs in sediments in hot spots. Erosion is the subject of special studies currently being conducted and this information will be evaluated as part of adaptive implementation. While it is not possible at this time to fully quantify loadings of PCBs associated with erosion of contaminated sediments, the mass budget model includes a constant degree of erosion through a profile of PCBs with initially increasing PCB concentrations. The model still resulted in attainment of the target within 40 years. The proposed in-Bay disposal requirements for disposal of dredged sediments serve as a de facto allocation, and dredged material management that is consistent with the Long Term Management Strategy for the Disposal of Dredge Material in San Francisco Bay will result in a net removal of PCBs from the Bay.

Baykeeper et al. Comment 7.8: In order to provide reasonable assurances that the Central Valley load allocation will be met, the TMDL and staff report should explicitly discuss the uncertainty in estimating load reductions from natural attenuation, identify specific critical data needs and specify a schedule for fulfilling those needs. The TMDL should also commit the Regional Board to working collaboratively with the Central Valley Regional Board to revise load estimates as necessary and to identify and reduce controllable sources of PCBs in the Central Valley.

There is sufficient reasonable assurance that the Central Valley allocation will be achieved. Sediments currently entering the Bay from the Central Valley have lower PCBs concentrations than in-Bay sediments, a condition we expect will continue. We are not aware of any specific sources of PCBs in the Central Valley that would affect the Central Valley loading if they were regulated or remediated. Also, calculating the decline in PCBs over time due to natural attenuation (using a half-life of 56 years), we estimate that the Central Valley load allocation will be attained in about 40 years (see Staff Report section 7.2). Verification of ongoing Central Valley loads and load reductions will be a regular component of the Regional Monitoring Program. Accordingly, natural attenuation and loads monitoring provide reasonable assurance Central Valley allocation will be achieved and there is no need for further regulatory assurance.

Baykeeper et al. Comment 7.9: "The implicit margin of safety is inadequate….. The TMDL's discussion of the margin of safety is deficient for two reasons. First, it fails to discuss the various sources of uncertainty in the TMDL and explain how these sources are accounted for in the TMDL's implicit margin of safety. There is a great amount of uncertainty in the assumptions on which this TMDL is based: the current loading estimates are based on relatively little data and models that still need refinement. Nowhere in the TMDL or staff

report, however, does the Regional Board attempt to quantify this uncertainty or articulate how other assumptions in the TMDL mitigate it.

Second, none of the assumptions identified in the staff report can be relied upon as the basis for the margin of safety. As noted previously in these comments and by EPA, it is unclear whether the fish tissue target is conservative enough to implement CTR criterion or to protect the most vulnerable populations, including subsistence anglers.

The Regional Board should revise the TMDL to include an explicit margin of safety that mitigates the uncertainty in load estimates and allocations. Additional explanation of how the margin of safety quantitatively relates to uncertainty in the TMDL must be added to the staff report.

The margin of safety is appropriate based on the modeling used to derive the TMDL. The margin of safety is linked to the fish tissue target set to protect human health. The target is based on protection of people who consume bay fish at the risk level of 10(-5), and is conservative since it was derived using an upper bound consumption rate for this subpopulation. It is reasonable to assume that this numeric target is protective of the general population as only a small fraction of the overall population catch and consume fish in the Bay.

Baykeeper et al. Comment 7.10: The Regional Board should specify a schedule for revising the TMDL based on model refinements and evaluating the implementation plan effectiveness….The proposed TMDL incorporates aspects of both a phased approach and adaptive implementation but does not clearly differentiate between the two or commit the Regional Board to a phased approach. Although the BPA and staff report are vague on this point, the current loading estimates from various sources and their effect on the Bay recovery are "preliminary." Significant data gaps related to sources, pathways, and loading exist, including with respect to the magnitude of loads from urban runoff, municipal wastewater, and the Central Valley, as well as the potentially large effect of remobilization of PCBs in buried bed sediments.

The Basin Plan Amendment should state that a revised TMDL will be undertaken the earlier of ten years or upon completion of the multi-box model and fulfillment of the critical data needs identified in the TMDL."

We have included a call for an annual report to the Board on TMDL implementation progress that will provide opportunity for an annual review of technical studies and monitoring results that will provide cause to consider amendments to update the TMDL and implementation plan at the earliest possible date. These annual reports would be presented to the Board at a public noticed meeting, which would provide stakeholders the opportunity to present new information and request modification of the TMDL as appropriate.

Comment Letter no. 8: California Chamber of Commerce and General Electric Company, submitted by Latham & Watkins LLP, January 22, 2008

Cal. Chamber/GE Comment no. 8.1: Measure compliance with the TMDL against the mix of fish species that people actually eat, rather than against shiner surfperch and white croaker—two species that are a very small part of the typical angler's diet. The approach we are recommending is the same one that the U.S. Environmental Protection Agency ("EPA") prescribes in its guidance.

The TMDL proposes to measure compliance by comparing the concentration of PCBs in the two species with the highest PCBs concentrations—white croaker and shiner surfperch—to the fish tissue target of 10 ppb. These two species are an insignificant part of the average consumer's diet. The San Francisco Estuary Institute study that the TMDL relies on indicates that only 16 percent of anglers eat white croaker—and only 3.7 percent eat shiner surfperch. Data from the Pacific Coast Recreational Fishing Network indicate that white croaker and shiner surfperch comprise less than 2 percent of the fish caught by Bay anglers, yet by measuring compliance with only these two species, the TMDL implicitly assumes that these two fish are the only species that people catch from the Bay and eat.

Using this incorrect assumption has the effect of lowering the fish tissue target from 10 ppb to roughly 3.2 ppb. White croaker and shiner surfperch have higher (often much higher) levels of PCBs than the fish people typically eat, and if the PCBs level in those two species reaches 10 ppb, the PCBs concentration in the typical basket of fish people consume will be about 3.2 ppb. Ignoring key empirical data and driving the de facto fish tissue target to less than a third of the already conservative 10 ppb target is not a "conservative assumption" or a margin of safety—it is unsupported by the science and inconsistent with the RWQCB's obligations to consider the empirical data. Chemical Mfrs. Ass'n v. EPA (D.C. Cir. 1994) 28 F.3d 1259 at 1265.

It also goes against EPA guidance, which recommends assessing risk by using data on local fish consumption patterns—data that are readily available from the SFEI study. RWQCB's own project objectives call for basing decisions on readily available information about fish consumption patterns. RWQCB should revise the TMDL to comply with EPA guidance and the project objectives and to reflect the empirical data.

Using the white croaker and shiner surfperch to measure attainment of the water quality objectives also results in a TMDL that may be unattainable. The PCBs levels in these species must be reduced 20-fold to meet the 10 ppb target. The 4- to 5-fold reduction in sediment PCBs concentration used as the metric for success will not achieve a 20-fold reduction in croaker and shiner surfperch PCB levels. So the revised TMDL may still be impossible or infeasible to meet—and the burden is on RWQCB to show that it can be met. See, e.g., Cal. Water Code § 13241; Consolidated Gas Co. of New York v. Prendergast (S.D.N.Y. 1925) 6 F.2d 243, 277, modified and affirmed, 272 U.S. 576 (1926).

We recognize that it may be that recreational anglers eating fish caught from San Francisco Bay consume a variety of species of fish, not exclusively shiner surfperch or white croaker. Through

adaptive implementation and the collection of additional information, we will evaluate whether fish species other than shiner surfperch or white croaker should be considered to evaluate attainment of the fish tissue target. The target is not excessively conservative. The staff report and administrative record include substantial data to support the assumptions and analysis that were used to derive the TMDL and the TMDL targets. The U.S. EPA has argued in its comments that an even more stringent risk level should be used in the development of the fish tissue target. While this could have been our approach, our analysis shows that meeting the fish tissue target will lead to attainment of standards.

Water Board staff followed EPA guidance in developing the fish tissue targets and used locally available consumption data. The approach used to develop the target does not go against EPA guidance.

The TMDL is not impossible to meet. We believe that our linkage analysis clearly demonstrates it is, in fact, possible to attain our target. The TMDL implementation plan adopts an adaptive implementation approach that provides sufficient time and latitude for dischargers to evaluate and implement methods of complying with the TMDL and meeting their allocations.

In a recent case the Court of Appeal held that the opponents of a TMDL have the burden "to establish impossibility". City of Arcadia v. State Water Resources Control Board (2006) 135 Cal. App. 4th 1398, 1428.

The commenter has not met that burden. Furthermore, the Consolidated Gas case cited by the commenter does not support its argument that the Board must show that it is feasible to meet the TMDL. The case involved a challenge to an order of a New York state agency in which natural gas rates were set. It did not decide the issue of whether a water board has the burden of showing that it is feasible to meet a TMDL, an issue that has been clearly decided by the Arcadia court.

Cal. Chamber/GE Comment 8.2: Recognize, consistent with the available empirical data, that PCBs are declining in the Bay with a half life of approximately 10 years. The half-life of 56 years used in the TMDL is based on an estimate of the rate of chemical degradation of PCBs, and ignores other processes that are demonstrably diminishing PCBs in the Bay.

We disagree that we are ignoring other process. Natural attenuation is explicitly considered in the TMDL and mass budget model for PCBs already in the Bay and PCBs loadings to the Bay. We have collected and will continue to collect empirical data and continue to evaluate how PCBs in the system change over time. The empirical relationships identified by the commenter need to be further evaluated and validated before they can be incorporated into TMDL. The ongoing monitoring being conducted through the Regional Monitoring Program will allow us to do just that, to improve our understanding of the rate of natural attenuation and recovery, as well as our understanding of patterns of PCBs concentrations in fish tissue and sediment.

Cal. Chamber/GE Comment no. 8.3: Acknowledge that PCBs loads into the Bay will not drop instantaneously when the TMDL is adopted. As drafted, the TMDL assumes that the day the TMDL is adopted, PCBs loads into the Bay immediately will drop to 10 kg/yr. This

assumption is unrealistic for a phased TMDL involving many non-point sources, and causes the TMDL documentation to misstate and overestimate the benefits of the TMDL.

We acknowledge that PCBs loads into the Bay will not drop instantaneously. We expect it will take about 20 years to achieve the TMDL of 10 kg/yr. Thus the time frame for achievement of the long-term mass of PCBs in the active sediment layer is predicted to be 60 years rather than 40 years. The difference between taking no actions versus working towards attainment of the TMDL is still significant.

Cal. Chamber/GE Comment no. 8.4: Although portions of the TMDL may be quasi-legislative, the TMDL is aimed at a small group of known individuals—and as such, it quasi-judicial. For example, that the TMDL is targeting GE and San Leandro Bay was confirmed at the September 12, 2007 hearing on the draft basin plan amendment when RWQCB staff, among other things, specifically addressed the quantities of PCBs allegedly handled by GE.

Portions of the TMDL are focused on determining the rights and obligations of specific entities. This is the essence of a quasi-judicial proceeding. Department of Alcoholic Beverage Control v. Alcoholic Beverage Control Appeals Bd. (1987) 195 Cal. App. 3d 812, 817 ("the determination of specific rights in regard to a specific fact situation" is quasi-judicial conduct); Graves Advice Letter, 1998 WL 473136 at *7 ("The issuance of regulatory letters by the regional board (and subsequent compliance by responsible parties) for the purpose of investigating and remediating UST contamination are properly characterized as quasi-judicial proceedings since the regulatory actions involve specific parties.").

Since RWQCB is mixing quasi-legislative and quasi-judicial determinations in the TMDL proceedings, it must bifurcate the proceedings or adopt the procedural protections of a quasi-judicial proceeding for the entire action. See, e.g., L & M Professional Consultants, Inc. v. Ferreira (1983) 146 Cal. App. 3d 1038.

The commenter does not mention which parts of the proposed TMDL it contends are inconsistent with quasi-legislative action. The proposed TMDL is intended to establish policies and does not determine the rights or obligations of any specific entities including GE. A search of the entire TMDL reveals that the name "General Electric" never appears so it is unclear what the commenter is referring to in complaining that the rights and obligations of entities (presumably the commenter's client, General Electric) are somehow determined under the TMDL. In the event that the Board issues a cleanup order against any party for PCBs discharges, that action will be quasi-judicial and will be conducted in accordance with the requirements applicable to such proceedings.

Even if the TMDL referred to specific entities as suggested by the commenter, the legal precedent cited by the commenter is inapplicable to the commenter's assertion that the TMDL includes "quasi-judicial determinations". The Alcoholic Beverage Control case involved the question of whether one state agency had the jurisdiction to review the decision of another state agency concerning the applicable fee for the transfer of a grocery store's liquor licenses. The decision does not address the issue argued by the commenter. Graves is an advice letter that was issued by the California Fair Political Practices Commission to a former Board employee on

the subject of the conflict of interest requirements that apply to former Board employees. It contains no discussion or analysis of quasi-legislative proceedings and whether they can become quasi-judicial as argued by the commenter. The only case cited by the commenter that is even arguably relevant is the L&M case but the court in that case did not reach the conclusion asserted by the commenter. The court concluded that the action of the public agency "may have been adjudicative" rather than legislative when the agency considered an action concerning a 10 foot wide easement over a single parcel of land. (supra, at 1054.) It noted that the factors that led to that possibility were the "small size and number of parcels involved and relatively few property owners affected". (id.) Those facts are completely distinguishable from the TMDL. The TMDL affects much of the Bay Area rather than a limited number of small properties.

Comment Letter no. 9: Quantitative Environmental Analysis (QEA) January 22, 2008

QEA Comment No. 9.1: "The use of white croaker and shiner surfperch for impairment assessment violates project objectives and the USEPA guidance upon which the water quality objective is based

- **By not using the fish species commonly consumed by Bay anglers as the metric for assessing impairment, the Board is violating United States Environmental Protection Agency (USEPA) guidance and some of the project objectives identified in the Staff Report**
- **The use of white croaker and shiner surfperch to evaluate attainment of the TMDL undermines evaluation of achievement of the BPA water quality objective**
- **Arguing that the use of white croaker and shiner surfperch introduces a margin of safety into the TMDL is not defensible, given acceptable approaches to the margin of safety in other USEPA-approved TMDLs. "**

We disagree that the use of white croaker and shiner surfperch violates USEPA guidance. In any event, guidance cannot be violated as it is not a regulation or requirement. We also disagree that we are violating the project's objectives. We based the recreational angler consumption rates on readily available data, the seafood consumption survey conducted locally in San Francisco Bay.

The use of croaker and surfperch do not undermine evaluation of achievement of water quality standards. See response to Latham and Watkins comment 8.1. The use of these two species to show attainment of beneficial uses may be reviewed as part of the Adaptive Implementation strategy for the TMDL.

We disagree that the margin of safety is not acceptable. USEPA did not comment that our margin of safety in the TMDL is not acceptable or defensible, therefore the history of other USEPA-approved TMDLs is irrelevant. States can decide how much of a margin of safety is appropriate.

QEA Comment no. 9.2: The Staff Report overstates the benefit of the TMDL because it misrepresents the loading time trends that would occur without and with implementation of the TMDL.

- **TMDL implementation will take considerable time**
- **PCB loadings are naturally attenuating more quickly than accounted for**
- **The difference in time to reach the TMDL target between the current loading rate and the proposed TMDL may not be significant**

See response to Latham and Watkins comment no. 8.3.

Comment Letter 10: Dr. David Sunding, Berkeley Economic Consulting, Inc. (Sunding) January 22, 2008

Sunding Comment No. 10.1: "The Basin Plan Amendment is based on the notion that the TMDL should be protective of the shiner surfperch and white croaker fisheries in the San Francisco Bay. ….Basing the TMDL on shiner surfperch and white croaker, as opposed to a more representative mix of species, is likely to significantly reduce the wasteload allocations and increase the costs of complying with the TMDL.

"It is inefficient to protect the white croaker and shiner surfperch fisheries by imposing a TMDL. Anglers could be dissuaded from consuming these two species through outreach and educational programs, including signage and other measures. Even removal of the skin from white croaker prior to preparation has been shown to reduce PCBs by over one-third. These measures are almost certain to be much less expensive than the proposed TMDL."

The Basin Plan amendment is not based on the notion that the TMDL should be protective of the shiner surfperch and white croaker fisheries. The TMDL fish tissue target of 10 ug/kg is based on protecting recreational anglers who eat fish caught from the Bay, regardless of species type.

The wasteload allocations were calculated based on the TMDL and a protective fish tissue target; there is no relationship to specific fish species.

We are required to develop a TMDL to achieve water quality standards. The Clean Water Act does not allow us to simply tell recreational anglers not to fish in order to achieve water quality objectives. In addition, some fish species with lower PCBs concentrations, e.g., leopard shark and striped bass, have higher mercury levels. Thus, discouraging consumption of white croaker and surfperch is not necessarily an easy solution. See also response to Latham and Watkins comment 8.1.

Comment Letter no. 11: Latham and Watkins October 31, 2007

Cal Chamber/GE Comment 11.1: "The legislative history of Porter-Cologne demonstrates that the legislature seriously considered the relationship between environmental and economic needs when it required the regional boards to balance environmental costs of water quality regulations they propose to adopt with the economic and non-economic costs of those regulations."

The Legislature addressed its concern about economics with respect to the Water Boards when it adopted section 13241. That statute requires that Regional Boards consider (but not balance) economics when they adopt water quality objectives. If the Board adopts the proposed TMDL it will not adopt water quality objectives as part of that action so the statute is not applicable in this case.

Cal Chamber/GE Comment 11.2: "The California Environmental Quality Act (CEQA) requires an analysis of the costs of implementing a TMDL. Section 21159 requires that the Board take into account a reasonable range of economic factors."

We agree that Public Resources Code section 21159 requires that the Board take into account a reasonable range of economic factors. Section 12.10 of the Staff Report includes a consideration of economic factors.

Cal Chamber/GE Comment 11.3: "The California Administrative Procedures (sic) Act requires a consideration of economics. Section 11346.3(a) requires that the Board must identify businesses that could be affected by a TMDL, determine what costs they would be required to bear under the TMDL, and to weigh whether those costs are reasonable."

Under Government Code section 11353 the Water Boards are subject to some but not all of the provisions of the Administrative Procedure Act. The commenter has referenced a section to which the Board is not subject. Nevertheless, Section 12.10 of the Staff Report includes a consideration of economic factors as required by CEQA.

Cal Chamber/GE Comment 11.4: Multiple laws (including the Clean Water Act, Porter Cologne, CEQA and the Administrative Procedures (sic) Act) require that the Regional Water Boards to "balance economics" when adopting a TMDL. Balancing requires the Boards to determine whether a TMDL is reasonable when its economic costs are weighted against environmental and other factors.

The Board is not subject to any laws (including those cited by the commenter) that require it to "balance" economics against environmental protection when it adopts a TMDL.

Comment Letter no. 12: Dr. David Sunding, Berkeley Economic Consulting, Inc. dated October 30, 2007

Sunding Comment 12.1: The TMDL, as proposed, is not supported by a meaningful economic analysis, and does not satisfy either the economic balancing requirements of the Porter-Cologne Act or economic analysis methodologies generally employed by federal authorities such as U.S. EPA or the federal Office of Management and Budget.

We have satisfied the requirements to consider economics under the Porter-Cologne Water Quality Act. Not only are potential costs discussed in Section 12 of the Staff Report, but we have identified a variety of implementation measures from which the regulated community may choose that meet their needs and budgets. We are not bound by economic analysis methodologies employed by federal authorities.

Sunding Comment 12.2: "The problems with the TMDL relate to both the potential costs of attempting to achieve its PCB targets and goals, and the benefits that might accrue from such compliance efforts. It likely will be very expensive to reduce PCBs in fish tissue from current levels to 10 ppb, the fish tissue target proposed in the TMDL." The commenter presents the details of a cost analysis to treat stormwater prepared by ARCADIS and submitted in a comment letter to the TMDL and a discussion of the cost of the one ug/kg sediment goal being applied as a cleanup goal.

This comment presents much of the same arguments presented in their previous comment letter. The cost estimate referred to by Dr. Sunding to treat stormwater runoff is flawed. The cost estimate uses a one hour estimate of rainfall of 0.2 inches per hour, presented in the 2003 San Mateo County Stormwater permit, and assumes that stormwater controls would need to be designed to store and treat 24 hours of rainfall at this rate. In addition, the cost estimate assumes that stormwater runoff from the entire bay area would need to be stored and treated to manage PCBs. These are incorrect assumptions and result in a highly overestimated cost analysis. The cost estimate to address contaminated sediments is similarly flawed in that the TMDL does not require cleanup to the sediment goal level.

Sunding Comment 12.3: Taking such detailed information into account reveals that the health benefits of the TMDL are insubstantial. The change in health risk resulting from attainment of the 10 ppb fish tissue target is 0.004 avoided cancer cases per year, or one case of cancer over 250 years. This circumstance is reflective of the low levels of risk from PCBs at present. Even making the conservative assumption that every cancer results in death, applying the standard value of $7 million per life saved results in a value of health risk reduction of $542,000 over 70 years (0.004 * $7 million = $28,000 per year discounted over 70 years at 5 percent). It is unreasonable to require an expenditure of billions of dollars in capital costs alone to achieve a benefit of this magnitude. The cost of implementing just the TMDL's urban runoff element may well exceed billion of dollars per cancer case avoided,

placing the TMDL far outside the mainstream of environmental regulation in the United States.

We disagree that the costs involved in complying with this TMDL amount to billions of dollars as the commenter relies on exaggerated and speculative claims about the requirements stemming from the TMDL to derive astronomical costs of the TMDL and then go further to use these costs to state that the potential health benefits are insubstantial. Additional information regarding the costs of implementing stormwater controls is included in the Regulatory Analyses, Section 12.10 of the Staff Report.

Sunding Comment 12.4: "Recommended Approach. Reasonable Best Management Practices are available to further reduce PCB loads to the Bay. These BMPs could be employed in a Phase I TMDL during which the substantial uncertainty associated with the scientific and technical underpinnings of the current TMDL could be addressed. During Phase I, the Regional Board could address whether PCB loads truly are as high as the TMDL estimates, whether current loads need to be reduced as much as currently proposed, and whether measures other than BMPs should be deployed as part of Phase II.

"A BMP-based TMDL is an appropriate approach in this case where there is no acute toxicity or imminent harm presented by the declining, residual levels of PCBs in the Bay. Further, the primary basis for the TMDL is to help a small, poorly defined subpopulation of subsistence fishermen who, to the extent they do exist, would be most benefited in the short term by such BMPs, including institutional controls.

"The TMDL should be reformed to be a phased TMDL with a Phase I based on reasonable BMPs where the regulated community is not placed at risk of being subjected to massive costs that are not justified by any commensurate water quality benefit."

See response to Sunding Comment 10.1 above. The TMDL does not exclude the use of BMPs as an implementation measure.

V. STAFF RESPONSES TO PEER REVIEW COMMENTS

Peer Review Comment Letter no. 1: Dr. David O. Carpenter, M.D.

Dr. Carpenter Comment 1: "The numeric fish tissue target is reasonable, with some qualifications, when one considers only PCBs. The screening level of 10 ng/g wet weight fish tissue falls within the risk-based consumption limit proposed by USEPA (2000) of 4 meals per month to avoid a risk of cancer beyond 1 in 100,000, or 12 meals per month to avoid excess in non-cancer health endpoints. However if one really wants to protect the public, the level for unlimited consumption given by USEPA (2000) is 1.5 ng/g (ppb) wet weight. There are certainly some sport fisherpersons, and especially some ethnic and immigrant groups who consume much more than 4 meals of fish per month. And it must be noted that the 1 in 100,000 limit is far from the 1 in 1,000,000 that is desirable. The EPA level given for unlimited consumption so as to avoid non-cancer adverse health effects is 5.9 ng/g (ppb), so even for non-cancer effects the screening level of 10 ng/g is somewhat high. Nevertheless setting this level is realistic, even if not ideal, and is consistent with other advisories throughout the country."

The USEPA level for unlimited fish consumption is based on consumption rates for the United State population as a whole. We have based our fish tissue numeric target on Bay-specific fish consumption rates determined by the California Department of Health Services (DHS). However, the DHS study only evaluated the consumption rate of people who catch and eat fish from the Bay, which is a subpopulation of the Bay area population. USEPA guidance clearly states that subpopulations do not need to be protected at a risk level of 1 in a 1,000,000, but rather at a maximum risk level of 1 in 10,000 for subsistence fishers. We derived a fish tissue target at a 1 in 100,000 risk level to protect the subpopulation of Bay area sports fisher who actually consume fish they catch from the Bay so it affords an even higher level of protection for the general Bay area population, most of which does not eat fish caught in the Bay.

Dr. Carpenter Comment 2 : "The bigger problem is that fish contain many other fat-soluble compounds that have carcinogenic and non-carcinogenic actions in addition to PCBs. Thus by setting the standards on the basis on consideration of only PCBs it is possible, indeed it is likely, that these standards are not protective of human health. These considerations strongly suggest that the by consideration of only PCBs one is significantly underestimating the risk of consumption of fish from San Francisco Bay."

TMDLs are driven by water quality standards that are not designed to protect against possible synergistic effects. Therefore, we have proposed a TMDL that will restore the Bay's environmental health only with respect to PCBs and dioxin-like PCBs.

Dr. Carpenter Comment 3: "Yes, the description of the water quality problem is sound and justified. The major problem is the large amounts of PCBs in the sediments. While PCBs are not very water soluble, they are in equilibrium with levels in the water. The report documents significant sediment contamination with PCBs, and even without additional

input it will take generations before these levels decline. Removal of all of the contaminated sediments is not realistic with current technology."

The TMDL does not call for the removal of all contaminated sediment in the Bay. Rather, the TMDL calls for site investigations to determine, on a site-by-site basis, the need for remedial activity to control the release of PCBs to biota.

Dr. Carpenter Comment 4: "I find the calculation that the direct PCB loads to the Bay are estimated at 0.35 kg/yr, but the loss due to atmospheric transport to be 7.4 kg/yr, to be very surprising and almost not believable. I have reviewed the paper by Tsai et al. (2002) and the report by Tsai and Baker (2005), and certainly don't find anything wrong in their analysis. However the input to the Bay is very much lower than that to Lake Michigan, reported to be about 3,200 kg/yr, with 330 kg coming from Chicago (Hornbuckle and Green, 2000). In their review of persistent organic pollutants in the Great Lakes, Hornbuckle et al (2006) state that "the atmosphere is the largest source of PCBs to Lake Michigan…..Atmospheric deposition (gas, dry particle, and wet deposition) is larger than inputs from resuspension of contaminated sediments and larger than inputs from direct discharge and contaminated tributaries". Kelly et al. (1991) estimated total atmospheric input to Lake Erie to be 257 kg/yr. The EPA has estimated input to Lake Ontario to be 64 kg/yr. (USEPA, 2003). Strachan and Eisenreich (1988) estimated that the atmosphere contributes about 90% of the PCBs found in Lake Superior. Hsu et al. (2003) show that between 2 and 70 kg of PCBs enter the Chicago atmosphere each day, and a significant percentage of this is deposited into Lake Michigan. Wethington and Hornbuckle (2005) report 120 kg of PCBs go into Lake Michigan just from the city of Milwaukee. I don't doubt but there is more contamination with PCBs in the Midwest and East than on the West Coast, but it is hard to believe that the input to the Bay is so small. However, the conclusion that there is more loss than input from vapor-phase PCBs is consistent with the results from the Great Lakes, and so does not alter the conclusion that there is a net loss through this route. Certainly the methods for measurement of PCBs in air used by Tsai and Baker (2005) are standard, and reports look fine. But their result is highly questionable, in my judgment. With all of the cities and waste sites around the Bay it is simply not believable that only 0.35 kg/yr enter the Bay by atmospheric transport of gas phase PCBs."

We have relied on the only available study estimating the exchange of PCBs between the atmosphere and San Francisco Bay. This study was performed by a highly regarded USEPA and academic scientist and was published in the peer reviewed scientific literature. There are important differences between the Bay area and the Great Lakes environment that may partially account for why deposition seems to play a lesser role in the Bay area than in the Great Lakes. First, the Great Lakes are surrounded by a land mass that is generally much more contaminated by PCBs due to older and more intense industrial land use than in the Bay area. Second, the prevailing winds in the Bay area are from offshore and are less likely to convey high concentrations of PCBs to the Bay. It is, therefore, more likely that PCBs from the watershed are transported from the Bay area and redeposited in watersheds that may drain to the Bay or other waterbodies.

Dr. Carpenter Comment 5: "They are clearly stated, but as discussed above, I have difficulty believing that the atmospheric deposition is as small as reported here. The other estimates appear reasonable to me."

Please see response to comment 4 above.

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Dr. Carpenter Comment 6: "Yes, the linkages between sources and numeric target are clearly stated, and use of fish PCB concentration as the numeric target is appropriate. While the numeric target may not be optimally protective for those consuming excessive amounts of fish, they are reasonable and justified on the basis of target levels used throughout the country."

See response to comment 1 above.

Dr. Carpenter Comment 7: "The load and wasteload allocations are clearly stated for each source category. The calculation methodologies are less clearly explained, and for most of the source categories the allocation is simply given without any great discussion of how it was derived. The allocations appear reasonable, but it would have been more satisfactory to have a detailed explanation of the methodology for their derivation."

We have clarified the basis of the allocations in Sections 10.2 and 10.3 of the Staff Report.

Dr. Carpenter Comment 8: "Yes, this is well done. The three major implementation categories of a) control of external loadings, b) control of internal source and c) actions to manage risks to Bay fish consumers are clearly stated and discussed. The strategy of regular monitoring is essential in order to determine whether goals are being met, and the proposed monitoring program is excellent. I do have some question as to whether the anticipated natural attenuation within the Central Valley watershed and from urban stormwater runoff is realistic, but having these as goals is appropriate. Our experience in the Great Lakes area indicates that cities are enormous reservoirs of PCBs, and that even old buildings contain significant amounts of PCBs in everything from paint, ceiling tile and caulking. The time frame for reduction from such sources is long. It is extraordinarily difficult to obtain the funds to clean up former and current industrial and especially military facilities. Dredging may only remove PCBs from one site and deposit them in another. Great care should be taken in dealing with dredged sediments."

We are aware of the extent of PCBs in urban areas through studies done by the municipal stormwater agencies throughout the Bay area, and in particular, the City of Oakland in the Ettie Street watershed. We are also aware of the extent of PCBs in building materials such as paints and caulks. As such, we have included pilot studies in the adaptive implementation plan.

We also understand the limitations with dredging contaminated sediments. The TMDL calls for site investigations to determine, on a site-by-site basis, the need for remedial activity to control the release of PCBs to biota.

Dr. Carpenter Comment 9: "I am rather pessimistic that the goals of this proposal will be achieved as easily as anticipated. I believe that this view would be shared by most of my colleagues who work on comparable issues around the Great Lakes. For example, Hornbuckle et al. (2006) in their recent review state 'The atmosphere, especially near urban-industrial areas, is the major source to the open waters of the lakes. Other sources include contaminated tributaries and in-lake recycling of contaminated sediments. Until these remaining sources are controlled or contained, unsafe levels of PCBs will be found in the Great Lakes environment for decades to come.' Part of our concern is that whereas PCB levels in Great Lakes fish declined dramatically for many years, they have now plateaued but at a level which exceeds any health-based standard. This is at least in part due to the failure to anticipate what an enormous source of PCBs urban areas are. But whether or not the goal of having fish from the Bay that are safe to eat is achieved in as rapid a time frame as proposed, the steps are all in the right direction. With load reductions and regular monitoring it will be possible at least to inform the public of the status of fish in the Bay."

We are familiar with the Great Lake studies and understand that fish tissue concentrations have leveled off over time after initial declines following the ban of PCBs. We have seen the same trend in the Bay area through the monitoring of fish tissue PCBs concentrations. As such, we will continue to monitor PCBs in fish while taking initial actions with a high probability of success. We will also pilot test future actions to prevent PCBs in the urban environment from entering the Bay's food web.

Dr. Carpenter Comment 10: "Yes, the proposed rules are based on sound scientific knowledge, methods and practices. They use state-of-the-art approaches to anticipate loadings, and propose an excellent monitoring program to chart progress. While some of the problems may have been underestimated, this is an outstanding and innovative approach to regeneration of a fishery that does not pose health hazards to the public."

Comment acknowledged.

Peer Review Comment Letter no. 2: Dr. Kevin J. Farley

Dr. Farley Comment 1 : "Since the use of the 95th percentile upper bound estimate of fish intake is important in establishing the margin of safety for the TMDL, further information should be given on fish intake. For example, a log probability plot of fish intake rates would be appropriate to show in the Staff Report so that the margin of safety for other segments of the population (e.g., the 50th percentile) can be readily quantified.

"The slope factor used in establishing the TEQ screening level of 0.14 pg/g for dioxin-like PCBs should be cited (e.g., on page 24 of the Staff Report)."

To satisfy the requirements of the TMDL, we must determine a target. In this TMDL, we propose the fish tissue screening level for PCBs as the target. There are no requirements to look at the distribution of risk while setting targets. However, we have looked at various fish consumption rates to calculate the screening level and concluded that our approach was the most conservative based on the available Bay-specific consumption data.

We used a slope factor of 156,000 to calculate the toxic equivalents screening level for dioxin-like PCBs. This is the cancer slope factor recommended by USEPA in "Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 2-Risk Assessment and Fish Consumption Limits, 3rd edition (EPA 823-B-00-008)." We clarified this citation in Section 6.2 of the Staff Report.

Dr. Farley Comment 2: "Direct atmospheric loads: The annual rates for gaseous and particulate exchange rates were taken from SFEI (2001). Details of the estimation method are not given in the Staff Report."

We have relied on the only available study estimating the exchange of PCBs between the atmosphere and San Francisco Bay. This study was performed by highly regarded USEPA and academic scientist and was published in the peer reviewed scientific literature. Thus, while we have not reviewed or validated their estimation method, we reasonably infer that it is sound.

Dr. Farley Comment 3: "Central Valley watershed: The annual PCB discharge rate was taken from SFB-RWQCB (2004) based on ten years of monitoring data for the Sacramento and San Joaquin Rivers. Details of the calculation are not provided in the Staff Report."

We have updated our estimates of Central Valley watershed loads based on newer SFEI data. We have revised the text in Section 7.2 in the Staff Report as follows:

> Based on the concentrations measured by the RMP, we had previously estimated that about 40 kg of PCBs entered the Bay each year from the Central Valley. More recently, PCBs loads entering the Bay from the Central Valley have been estimated for the years 2002 and 2003 (Leatherbarrow et al., 2005). Annual loads of PCBs were estimated at 6.0 ± 2.0 and 23 ± 18 kg for years 2002 and 2003, respectively. The load estimates are based on measured flow-weighted mean PCBs

concentrations ranging from 200 to 6,700 pg/L with a median concentration of 600 pg/L. SFEI calculated annual PCBs mass loadings using Central Valley water discharge data at Mallard Island from the Department of Water Resources (Interagency Ecological Program) using a mass balance approach and the DAYFLOW model (SFEI, 2007). These annual load estimates may be at the lower end of the range of annual loads as these years were drier years with lower sediment inflow from the Central Valley (Leatherbarrow et al., 2005). For the TMDL, we are using the SFEI derived average loads of 11 kg/yr, derived from five years of data, as the loading to the Bay from the Central Valley (SFEI, 2007).

Dr. Farley Comment 4 : "Sediment Dredging: An annual estimate of PCB removal from the Bay by dredging is obtained from dredging records (given as 2.4 million cubic yards per year), and a Bay-wide average PCB concentration sediment concentration of 10 μg/kg. (The bulk density of the dredged material is not stated, but results appear reasonable.) A net removal of PCB by dredging is determined based on the amount of dredged material that is disposed at in-Bay disposal sites and the amount that is disposed at either upland sites or the deep ocean disposal site."

Based on comments from SFEI, we have changed the Bay-wide sediment PCB concentration to 4.6 μg/kg. We assumed that sediments were 50% water by weight, resulting in a bulk density of 0.72 kg per cubic decimeter. We have changed our accounting of sediment disposal loads to reflect out-of bay disposal resulting in a net loss of PCBs from the Bay to upland and deep-ocean disposal (Section 7.3 of the Staff Report).

Dr. Farley Comment 5: "For municipal and industrial wastewater dischargers, justification should be provided for using average concentrations in estimating PCB loading rates. A probability plot, or possibly a log probability plot of measured effluent concentrations would be very helpful."

At this time we have a relatively small data set of effluent PCBs concentration from a small number of the municipal and industrial wastewater dischargers. We have requested additional wastewater PCB concentration data as part of the implementation of the TMDL, and we will be reviewing these data as they are collected.

Dr. Farley Comment 6: "For urban and non-urban stormwater runoff, justification should be provided for using median concentrations in estimating PCB loading rates. Again, a probability plot, or possibly a log probability plot of measured effluent concentrations would be very helpful."

We provided a cumulative distribution plot of the stormwater conveyance system sediment data collected over a two year period (Figure 20). These data are clearly skewed to higher concentrations. As such, a median concentration is a more representative central tendency of the data than an average which would be skewed to higher concentration by the few very high PCB concentrations detected.

Dr. Farley Comment 7: "Part of the discussion on sediment dredging needs clarification. In particular, the sentences on page 46 stating '… we estimate that, each year, about 10 kg/yr of PCBs are being disposed in the Bay at dredged sediment disposal sites. During the same period, placement of dredged sediment at either upland sites or the deep ocean disposal site removes about 13 kg of PCBs per year from the Bay resulting in a net loss of about 3 kg of PCBs each year' do not seem right. Based on the current wording, shouldn't the net loss be the 13, not 3, kg of PCBs? Also, shouldn't sediment dredging only be considered a loss from the active sediment layer if the underlying sediments are less contaminated? Has this issue been appropriately considered in subsequent TMDL mass balance calculations?"

We have amended the Staff Report and Basin Plan Amendment to reflect the net loss of PCBs to upland reuse and ocean disposal. In doing so, we have recalculated the mass of PCBs to reflect the new mean sediment concentrations of 4.6 μg/kg calculated by SFEI. These changes are presented in Section 7.3 of the Staff Report and in the Sources section of the proposed Basin Plan Amendment.

Dr. Farley Comment 8: "Linkage between external PCB sources and PCB concentrations in water and sediment are clearly described in the Staff Report. Details of the simple mass budget model are not provided in sufficient detail. (A general description for the simple mass budget model however is provided in SFEI, 2003. Details of the final model calculation with tidal exchange (Figure 28) are not adequately described in the Staff Report or in the cited reference (Davis et al, 2006).) The use of a Bay-wide box model to describe PCB contamination in the Bay does not appear to be consistent with observed spatial variations in PCB contamination (e.g., see map of PCB contamination in sediments (Figure 23). More detailed modeling for the long-term fate of PCBs in the Bay should therefore be given a high priority."

The current one-box model does not capture the full complexity of the Bay and its ecosystem, especially the spatial variation of sediment and PCBs transport and fate. Current data clearly show a spatial pattern of PCBs with lower concentrations in the well- flushed northern estuary and higher concentrations on the near shores of the central and south bay where sediment deposits and near historical upland industrial sites. However, this is the best, completed model available at this time. We continue to work on a more sophisticated multibox model of PCBs fate in the Bay. Upon its completion and peer review, we will incorporate the multibox model results into the TMDL as appropriate.

Dr. Farley Comment 9: "Although simple mass budget model results can be used in evaluating the "average" response for PCB contamination in the Bay, it may be reasonable to expect that sediment contamination in northern portion of the Bay may response faster due to larger incoming sediment loads from the Sacramento and San Joaquin Rivers, while the southern and more contaminated portions of the Bay may response much more slowly.

Factors such as this should be acknowledged accordingly in discussions of model uncertainty."

See response to Comment 8 above. Preliminary results of the multibox model show a faster response in the North Bay than in the South Bay as expected. However, the multibox model is not complete and therefore is not used to develop the TMDL at this time. No discussions of model uncertainty were included in the TMDL. Uncertainty was considered as part of model development for input parameters, such as depth of the active layer and rate of sediment mixing. As part of the multibox model, we will perform an uncertainty analysis and include these findings in future revisions of the TMDL.

Dr. Farley Comment 10: "A further explanation of PCB degradation, particularly in the active sediment layer, should be provided in the Staff Report. (This issue is not adequately addressed in Davis (2003) or Davis et al. (2006).)"

The one box mass budget (fate) model used a degradation half life of 56 years for PCBs based on modeling work undertaken in the Great Lakes (Gobas et al. 1995. *Time response of the Lake Ontario ecosystem to virtual elimination of PCBs*. Environmental Science and Technology, 29,21 2038-2046.) However, the model is sensitive to degradation rate, and we recognize that estimates of degradation rates span a wide range of values. We therefore recognize the need to study PCB degradation rates in the Bay itself.

Dr. Farley Comment 11: "For future model development, the effects of estuarine circulation, sediment transport, and organic carbon cycling should be considered in evaluating spatial and temporal responses of PCB contamination in the Bay."

See response to comment 8. The multibox model is based on a sediment transport model developed by the United States Geological Survey. As such, it directly considers sediment transport and indirectly accounts for estuarine circulation. The PCB multibox model also takes into account differences in sediment organic carbon concentrations and differences in partitioning of PCBs between water and organic carbon in different segments of the Bay. The multibox model does not explicitly account for organic carbon cycling per se, but it does account for differences in properties and concentrations of organic carbon throughout the Bay.

Dr. Farley Comment 12: "Congener-specific, or at least homolog-specific, fate and bioaccumulation behavior should be considered in future model development and TMDL model evaluations."

Both the one box mass budget (fate) and the food web bioaccumulation model are based on congener specific data and then normalized to total PCBs. This is also the case for the future multibox model.

Dr. Farley Comment 13: "The conservative approach used in deriving the fish tissue numeric target (based on the 95th percentile upper bound estimate of fish intake reported for all Bay

fish-consuming anglers) appears to be reasonable in providing an implicit margin of safety. As stated above, a log probability plot of fish intake rates, or some other information, should be provided so that the margin of safety for other segments of the population (e.g., the 50th percentile) can be readily quantified."

See response to Comment 1.

Dr. Farley Comment 14: "Overall, development of the San Francisco Bay TMDL for PCBs appears to be based on sound scientific knowledge, methods, and practices. Portions of the analysis; e.g., the PCB fate model, should be considered as preliminary evaluations at this time, and should be developed in more detail under the adaptive implementation management strategy."

We agree that adaptive management can address some of the uncertainties in the TMDL, for example, we are working on developing a multibox model of PCB fate in the Bay. See also response to Comment 8.

VI. STAFF INITIATED CHANGES

Changes in Tables A-3 and A-4 of the Basin Plan Amendment were initiated by staff to clearly identify currently NPDES permitted facilities and to correct dischargers' names. Those changes are provided below in double underline for additions and double strikethrough for deletions.

Table A-3-Individual Municipal Wastewater Wasteload Allocations

Permitted Entity	NPDES Permit	Allocations
		kilograms per year
American Canyon, City of	CA0038768	0.002
~~California Department of Parks and Recreation, Angel Island State Park~~	~~CA0037401~~	~~0.00003~~
Benicia, City of	CA0038091	0.009
Burlingame, City of	CA0037788	0.01
Calistoga, City of	CA0037966	0.002
Central Contra Costa Sanitary District	CA0037648	0.1
Central Marin Sanitation Agency	CA0038628	0.04
Delta Diablo Sanitation District	CA0038547	0.04
East Bay Dischargers Authority Dublin-San Ramon Services District (CA0037613) Hayward Shoreline Marsh (CA0037702) Livermore, City of (CA0038008) Union Sanitary District, Wet Weather (CA0038733)	CA0037869	0.3
East Bay Municipal Utilities District	CA0037702	0.3
East Brother Light Station	CA0038806	0.00030
Fairfield-Suisun Sewer District	CA0038024	0.05
Las Gallinas Valley Sanitary District	CA0037851	0.01
Marin County Sanitary District, Paradise Cove	CA0037427	0.00003
Marin County Sanitary District, Tiburon	CA0037753	0.002
Millbrae, City of	CA0037532	0.007
Mt. View Sanitary District	CA0037770	0.007
Napa Sanitation District	CA0037575	0.04
Novato Sanitary District	CA0037958	0.02
Palo Alto, City of	CA0037834	0.09
Petaluma, City of	CA0037810	0.02

Permitted Entity	NPDES Permit	Allocations
		kilograms per year
Pinole, City of	CA0037796	0.009
Contra Costa County, Port Costa Wastewater Treatment Plant	CA0037885	0.0001
Rodeo Sanitary District	CA0037826	0.002
Saint Helena, City of	CA0038016	0.001
San Francisco, City and County of, San Francisco International Airport WQCP	CA0038318	0.002
San Francisco, City and County of, Southeast Plant	CA0037664	0.3
San Jose/Santa Clara WPCP	CA0037842	0.4
San Mateo, City of	CA0037541	0.04
Sausalito-Marin City Sanitary District	CA0038067	0.005
Seafirth Estates	CA0038893	0.00001
Sewerage Agency of Southern Marin	CA0037711	0.01
Sonoma Valley County Sanitary District	CA0037800	0.01
South Bayside System Authority	CA0038369	0.06
South San Francisco/San Bruno WQCP	CA0038130	0.03
Sunnyvale, City of	CA0037621	0.05
US Naval Support Activity, Treasure Island WWTP	CA0110116	0.002
Vallejo Sanitation & Flood Control District	CA0037699	0.05
West County Agency, Combined Outfall	CA0038539	0.05
Yountville, Town of	CA0038121	0.001
Total		***2[a]***

Table A-4 - Individual Industrial Wasteload Allocations to San Francisco Bay

Permitted Entity	NPDES Permit	Allocations [a]
		kilograms per year
C&H Sugar and Crockett Community Services District ~~Co.~~	CA0005240	0.00006
Chevron Products Company	CA0005134	0.003
ConocoPhillips	CA0005053	0.0006
Crockett Cogeneration LP, and Pacific Crockett Energy, Inc	CA0029904	0.0006
General Chemical	CA0004979	0.0009
GWF Power Systems, Site I	CA0029106	0.0001
GWF Power Systems, Site V	CA0029122	0.0001
Hanson Aggregates, Amador Street	CA0030139	0.00003
Hanson Aggregates, Olin Jones Dredge Spoils Disposal	CA0028321	0.00003
Hanson Aggregates, Tidewater Ave., Oakland	CA0030147	0.00003
Morton Salt	CA0005185	0.00008
Pacific Gas and Electric, East Shell Pond	CA0030082	0.00003
~~Pacific Gas and Electric, Hunters Point Power Plant~~	~~CA0005649~~	~~0.002~~
Rhodia, Inc.	CA0006165	0.0003
San Francisco, City and Co., SF International Airport Industrial WTP	CA0028070	0.002
Shell Oil Products US and Equilon Enterprises LLC	CA0005789	0.002
~~Southern Energy California~~ Mirant Delta LLC, Pittsburg Power Plant	CA0004880	0.0008
~~Southern Energy Delta~~ Mirant Potrero LLC, Potrero Power Plant	CA0005657	0.0003
Tesoro Refining and Marketing Company	CA0004961	0.002
The Dow Chemical Company	CA0004910	0.0006
~~United States Navy, Point Molate~~	~~CA0030074~~	~~0.00005~~
USS-Posco	CA0005002	0.02
Valero Refining Company	CA0005550	0.0007
Total		***0.035*** [b]