Responses to Comments
Draft Revised Workplan for the Development of Sediment Quality Objectives for Enclosed Bays and Estuaries of California dated March 19, 2003

The State Water Resources Control Board (SWRCB) circulated the Draft Revised Workplan for the Development of Sediment Quality Objectives for Enclosed Bays and Estuaries of California on March 20, 2003 for public comment. Comments were requested by April 22, 2003. Only those comments received on or before that date are included below. Comments are presented with authors name followed by SWRCB staff response.

Comment No. 1. G. Fred Lee
On page 4, first paragraph, beginning on the first line, it is stated, with regard to the development of Sediment Quality Objectives in the BPTCP, that, "Insufficient funding resulted in significant delay of the program." This statement is highly misleading and not accurate with respect to the problems with why the previous efforts by the SWRCB did not result in SQOs. The problem was inappropriate leadership of the program, where the SWRCB staff responsible for the program made up their mind early on the use of co-occurrence-based Sediment Quality Objectives. I was involved throughout this process, commenting on the inappropriateness of that approach. Copies of my comments are available from my website, www.gfredlee.com, in the Contaminated Sediment section. Any of the sets of comments listed can be obtained upon request from gfredlee@aol.com.

Response
Comment noted. SWRCB staff has not identified any single specific approach at this time. Rather we will attempt to evaluate relationships between chemical loading and various biological effects, some of which have been used to develop existing sediment quality guidelines and some which have not been attempted with such a robust data set before.

Comment No. 2. G. Fred Lee
As discussed in comments provided by myself and others, the SWRCB's earlier attempt at Sediment Quality Objective development was doomed from the start because of the approach taken. Large amounts of funds were used in this effort to support an ill-conceived project, which at the time was predicted to produce nothing in the way of useful information. These predictions have proven to be correct.

Response
Comment noted.

Comment No. 3. G. Fred Lee
I am concerned that the draft Workplan appears, at least in part, to be an attempt to develop chemically-based Sediment Quality Objectives. It will be very important that the SWRCB not make the same mistakes that it did in the past in trying to develop Sediment Quality Objectives, by focusing on chemical concentration-based objectives, as opposed to chemical impact objectives.

Response
Staff agrees that any chemical-specific or quotient-based objective must be able to protect aquatic life with some degree of certainty otherwise the values would be of no use.

Comment No. 4. G. Fred Lee
Page 6, under 2.0 Program Approach, 2.1 Priorities and Additional Research, paragraph 2 states, "These SQOs will not directly address the exposure of fish, wildlife, or humans to sediment contaminants. The protection of beneficial uses related to wildlife health and seafood consumption is extremely important,

but the funds and time schedule for this project are not sufficient to complete this endeavor." This is a serious mistake on the part of those who developed this proposed plan. The food web uptake of contaminants from sediments that occurs to a sufficient extent to be a threat to human health is one of the – if not the – most important issues that should be addressed by sediment quality guidelines. While, as discussed in Lee and Jones-Lee (2002b), it is not possible to provide numeric chemical-specific concentrations in sediments that would prevent excessive bioaccumulation, it is possible, and it should be a principle component of this SQO development activity, to develop specific guidance on how the evaluation should be made to determine if potentially bioaccumulatable chemicals in sediments (such as the organochlorine pesticides, PCBs, dioxins) could bioaccumulate to excessive levels in edible organisms. These issues are discussed in detail in Lee and Jones-Lee (2002b). As an example of work of this type, in cooperation with the DeltaKeeper, Dr. Scott Ogle and I conducted studies on city of Stockton Smith Canal sediments to determine whether they were likely the source of excessive bioaccumulation of PCBs in edible fish taken from Smith Canal. This 319(h) report (Lee, et al., 2002) was published as "Preliminary Assessment of the Bioaccumulation of PCBs and Organochlorine Pesticides in Lumbriculus variegatus from City of Stockton Smith Canal Sediments, and Toxicity of City of Stockton Smith Canal Sediments to Hyalella azteca" (available upon request from gfredlee@aol.com).

Response
Staff agrees that this is a very important issue. SWRCB staff don't believe that the SWRCB could develop any meaningful numeric objectives at this time that would be protective of human health, based upon bioaccumulation, due to the overwhelming data needs and the complexity of foodweb transport. Instead the SWRCB will perform a case study to evaluate how well various models predict bioaccumulation for a water body where an existing data set is available. This case study will not only evaluate model performance but also identify data needs for future applications. SWRCB staff believe this task will benefit Regional Board staff when bioaccumulation is addressed on a site specific basis.

Comment No. 5. G. Fred Lee
Page 11, section 3.4.3 Assess Existing Sediment Quality Guidelines for Predicting Biological Impacts, should be deleted. The existing guidelines are obviously technically invalid. They have no predictive capability and should not be used for any purpose.

Response
A Pellston workshop sponsored by the international Society for Environmental Toxicology and Chemistry in 2002 and attended by leading scientists from many disciplines concluded that existing SQGs are not intrinsically flawed and have predictive ability with a known degree of uncertainty. This workshop and numerous recent peer reviewed scientific publications have demonstrated that SQGs are able to predict the incidence of toxicity and conclude that such guidelines have an appropriate, but limited role in sediment quality management decision making.

Comment No. 6. G. Fred Lee
On page 8, an item 10 should be added to the list of objectives – namely, an assessment of the water quality impacts of contaminated sediments should be developed as part of this effort. As discussed in my comments on this issue, there are many naturally toxic sediments which have excellent fisheries in the waterbody overlying the sediments. Part of the effort of this Sediment Quality Objective development must be the appropriate use of the SQOs in the water pollution control program. Without this, simply developing numeric criteria or testing procedures, without the guidance on how they should be used, will be seriously deficient in meeting the needs for Sediment Quality Objectives.

Response
The items listed on pages 7-8 list elements of the 1991 workplan. It is not appropriate to add other topics to this list, as it would misrepresent the original focus of the 1991 workplan. Many regions with impaired

sediment quality may harbor productive fisheries because some fish populations may not be directly exposed to contaminated sediments and therefore may not be as sensitive as benthic macrofauna to pollution impacts. The emphasis of this project will be to establish objectives that protect the most sensitive aquatic sensitive species, which are often sediment-dwelling animals.

Comment No. 7. G. Fred Lee
Page 9 states, in 3.0 Scope of Work, 3.1 Program Guidance and Scientific Technical Review, that "Annual public meetings and workshops will be held…." It is important that the public be an integral part of this effort, and not just receive annual reports. This was one of the problems with the previous studies, in that the State Board staff was able to go for years without having to make reports. By that time, it was too late to correct the errors that were made by the State Board staff in developing the previous program.

Response
A stakeholder group will be formed to provide input and voice concerns about prospective policy issues.

Comment No. 8. G. Fred Lee
Page 9, paragraph 2 states that, "A Scientific Steering Committee (SSC) will be established to assist in the design of studies, data analysis and interpretation, …." It is important that that Scientific Steering Committee not be selected to be a "rubber stamp" for the State Board staff efforts, as occurred previously. Individuals knowledgeable in the topic areas should be members of this Steering Committee.

Response
The scientists that participated in the technical workshop for the 1991 Workplan were highly respected throughout the nation for their work on sediment quality. Many of these scientists and researchers had very differing opinions on the method the SWRCB should use to develop sediment quality objectives and some of the specific issues were so contentious that no agreement was reached. The Scientific Steering Committee will be composed of scientist from outside the State that are highly respected and have expertise in sediment science and/or policy development. Staff doubt that the selected members would risk their reputations by rubber stamping a faulty plan or one with severe deficiencies as the commenter suggests.

Comment No. 9. G. Fred Lee
Page 9, section 3.2 Sediment Quality Database Development, states in the first paragraph that, The data collected in previous studies "…will be used to determine the relationships between contamination and biological effects …." The previously conducted studies, in many areas, were not adequately done to properly make this assessment. A prime example of this is the Upper Newport Bay studies, where only a few selected parameters were measured. Key parameters were not measured. As a result, the database that was generated is largely unusable to establish any relationship between degree of the contamination and effects. This same situation occurs in San Diego Bay and elsewhere. It is clear that a much more comprehensive, reliable approach needs to be conducted to establish the degree of contamination of the sediments and any potential relationship to adverse effects on aquatic life and excessive bioaccumulation.

Response
Compilation of statewide sediment quality data will be done in coordination with many of the agencies conducting the studies, (e.g., BPTCP staff, SFEI, Regional Water Quality Control Boards, Ports). In addition, criteria for data screening and analysis will be used to select studies having adequate quality and coverage for the purpose. While any one study may have deficiencies in design since it was not designed for this purpose, the collective analysis of thousands of data values from throughout the state will moderate this issue. When compiled and screened for quality and completeness, this dataset will be more extensive than most regional datasets used to develop SQGs.

Comment No. 10. G. Fred Lee
Page 10, first paragraph, before I can comment on the adequacy of the existing database developed by the Los Angeles Contaminated Sediments Task Force, I will need to examine this database. Is it available online, and has it been discussed, in terms of its technical quality and appropriateness?

Response
The Los Angeles CSTF sediment quality database can be downloaded from www.sccwrp.org. The database includes metadata for each study and reference manuals that fully describe its structure.

Comment No. 11. G. Fred Lee
With respect to page 10, section 3.3 Benthic Community Assessment Index Development, at this location and elsewhere mention is made that, "The emphasis of SQO development project is to develop objectives that will protect the most sensitive aquatic species…." Care should be taken in focusing just on ultra-sensitive species. The proper approach to take to evaluate the significance of sediment toxicity is to test the sediments on a variety of sensitive species and then, through a best professional judgment weight of evidence approach, determine the water quality/beneficial use significance of the toxicity that is found.
This is the approach that is discussed and advocated in the previously discussed paper (Lee and Jones-Lee, 2002a) that was presented at the SQA5 conference in Chicago last fall.

Response
Staff agrees that a variety of biological indicators should be used to determine sediment quality. This workplan emphasizes such a broad approach by utilizing toxicity data from all relevant studies and incorporating the results of benthic community analyses (the combined response of multiple species) into the SQO development process.

Comment No. 12. G. Fred Lee
Page 11, section 3.4 Effects Assessment and Guideline Performance Analysis, states (in this section and elsewhere) that, "Analyses of the statewide sediment quality database will be conducted to identify important aspects of the relationship between sediment contamination and effects in California." As discussed above, the database that is needed to do this reliably does not exist. Because of the misdirection and mishandling of the previous studies, the database that should exist now was not developed.

Response
Staff agrees that a suitable database for the planned analyses does not currently exist. Such a database will be developed as part of this project, as described in section 3.2 of the workplan.

Comment No. 13. G. Fred Lee
With respect to page 12, section 3.4.4 Evaluate Fish Bioaccumulation Models, it is clear that those who developed this are not familiar with the literature on this topic. There are no reliable models that can be used to predict bioaccumulation based on chemical concentrations in the sediments. This issue is discussed in detail in the Lee and Jones-Lee (2002b) report to the SWRCB/CVRWQCB.

Response
Effective models do exist for the purpose of predicting fish tissue concentrations from sediment exposure. They have been applied throughout the nation, including the Hudson River, Palos Verdes Shelf, and San Francisco Bay. As stated in the workplan, this project will examine the performance of these models so that their attributes and limitations regarding applications for contaminated sediment management can be better understood. The inclusion of section 3.4.4 in this workplan is an acknowledgement that existing bioaccumulation models may not be sufficiently reliable for use in establishing sediment quality objectives. The objective of section 3.4.4 is to obtain the information needed to clarify this issue.

Comment No. 14. G. Fred Lee
Page 12, section 3.5.1 Develop Proposed Numeric SQOs, states, "Numeric values representing chemical-specific threshold concentrations will be developed and evaluated." This approach is doomed to failure. This is an issue that has been addressed since the 1970s. Each time it has been tried, it has failed. The SWRCB should not waste any more time on this effort. Rather than trying to get chemical concentrations which predict impacts, they must work toward developing a regulatory approach based on chemical impacts – i.e., toxicity, bioaccumulation, etc. – which are related to toxic-available forms in the sediments. The statement in this paragraph about using ERMs, AETs, etc., reflects a lack of understanding on the part of those who developed this statement, of the relationship between the chemistry of constituents in sediments and their impacts on water quality. This approach is a waste of time, and should not be used. These are not just my views. There are numerous people who understand these issues who strongly condemn any attempts to use chemical concentrations as a means of predicting chemical impacts.

Response
The ability of numeric SQGs to predict biological impacts has been demonstrated in numerous studies, as summarized in the August 2002 Pellston conference on the use of SQGs. The workplan recognizes that numeric objectives may not be appropriate for some situations and applications and identifies in section 3.5.2 the need to utilize alternative approaches, such as narrative objectives that incorporate measurements of impact as recommended by the commenter, in situations where numeric objectives are inappropriate. Guidance for the application of SQOs, which will be developed as part of section 3.6.2, will likely include recommendations to obtain multiple lines of evidence and to confirm indications of biological impact derived from numeric objectives for some applications.

Comment No. 15. G. Fred Lee
With respect to page 13, section 3.5.3 Perform Bioaccumulation-based Objectives Case Study, the write-up in this section reflects a lack of understanding of the literature on the topic. There is no way to reliably relate chemical concentrations of constituents in sediments and bioaccumulation. Bioaccumulation must be assessed based on benthic organism uptake of the chemicals in sediments. As discussed by Lee and Jones-Lee (2002b), the US EPA (2000) has developed this approach, involving the development of a site-specific Biota-Sediment Accumulation Factor (BSAF), since the chemical concentration approach has been found to be unreliable.

Response
Staff agrees that bioaccumulation is influenced by many site-specific factors. The purpose of the case study approach is to show how site-specific BSAF data and other parameters are used to understand bioaccumulation processes and to promote the collection of relevant site-specific data before bioaccumulation assessments are made in other areas.

Comment No. 16. G. Fred Lee
Page 14, section 3.6.2 Applications and Enforcement, should be expanded to include an assessment of what it means to have "toxic sediments" to the beneficial uses of a waterbody. This is a key issue that must be addressed if this effort is to develop meaningful results.

Response
The intent is to develop SQOs that are protective of beneficial uses, with an emphasis on aquatic life.

Comment No. 17. G. Fred Lee
Overall, the proposed Workplan is an improvement over previous workplans; however, it is still largely misdirected toward trying to develop chemical-concentration-based objectives. This approach is

obviously flawed and should not be used. The effects-based approach should be used. It can provide reliable information, if properly implemented.

Response
There is a need for both chemical concentration-based and effects-based objectives, and the workplan anticipates the development of both types of objectives, as stated in section 3.5, paragraph 1. Concentration-based objectives are needed for screening and the initial phases of assessment and cleanup programs. Effects-based objectives provide greater certainty at intermediate contamination levels and where complex site-specific factors are present, but these objectives may be more difficult to apply and interpret during clean-up activities and assessment activities.

Comment No. 18 Port of Oakland
The Port's overarching comment on the draft workplan is that it appears to be grossly under-funded. As a major dredger and member of the regulated community, the Port has considerable experience in funding chemical and biological testing and other special studies. As one example, the Port recently spent some $2M in characterizing sediments for potential reuse and disposal for a major construction project. Given the present level of uncertainty in equilibrium partitioning models and effects-based guidelines, it is inconceivable that the necessary elements for scientifically defensible, state-wide SQOs can be achieved with the $2.5M budget stated on page 5 of the workplan

Response
The project will utilize the millions of dollars spent by other agencies in monitoring and research to describe sediment contamination and effects. Compilation of these data and the subsequent analysis will provide the most timely and cost-effective way to meeting the legal mandates to develop the objectives.

Comment No. 19 Port of Oakland
Page 10, Benthic Community Assessment Index Development: Little detail is given on the recently developed statistical indices for the Southern California bight. How will this index take into account the wide range in changes to estuarine benthic community structure due to predation, storm effects, dredging, etc., and be able to separate out these effects from those caused by chemical contamination?

Response
Two broad types of factors complicate the interpretation of benthic community responses to contamination: natural changes in composition due to habitat differences (e.g., depth and grain size) and other stressors not related to contamination, such as physical disturbance. The Benthic Response Index developed for southern California bays minimizes the influence of habitat differences by incorporating data from a majority of the species present (many indices rely on a subset of "indicator species"), and by using different (yet comparable) versions of the index for different natural assemblage groups. The nature of benthic community responses to disturbance from contamination is similar to that caused by other factors such as dredging and the southern California index may not be able to reliably distinguish among these factors. The workplan contains tasks to refine the southern California index and to develop comparable assessment tools for other regions of the state; these tasks will emphasize improving the ability of these indices to discriminate between contaminant-related and noncontaminant-related impacts. The use of benthic community data for site assessment and SQO development will require a careful analysis of the physical and chemical information associated with the sample so that stations can be stratified or qualified in order to minimize false interpretation of the results.

Comment No. 20 Port of Oakland
Page 10, Section 3.3.3 – Compare field methods for benthic community assessment – again, given the range in changes that normally occur in benthic community structure, it appears it would be extremely

difficult to do a comparison of this sort unless synoptic studies were done in a range of identical sediment/community types using the variety of samplers/processing methods to be evaluated.

Response
Staff agrees that synoptic studies where multiple methods are used concurrently is the best approach. Such studies are planned as part of Section 3.3.3.

Comment No. 21 Port of Oakland
Page 11, 12 – Sections 3.4, 3.4.2, 3.5, 3.5.1 – frequent reference is made to "statistical approaches" and "statistical analyses" with no details or specifics on what kinds/types of statistical approaches or analyses will be used, so it is difficult to comment on the appropriateness of the intended approach. The Port believes the workplan should give more detail, and also name the proposed members of the Scientific Steering Commmittee.

Response
A project of this complexity will require an iterative approach that is based upon good scientific judgment and experience. The intent of this workplan is to describe the scope of the project and provide an understanding of the conceptual approach. An attempt to describe specific statistical methods at this point would be necessarily incomplete, as some of these methods will be determined by the nature of the data and the preliminary results. The Scientific Steering Committee (SSC) is still being formed and will be comprised of representatives from federal and state agencies with extensive experience in the development or application of SQGs, as well as independent scientists. A partial list of SSC members is: Dr. Peter Landrum, NOAA; Dr. Todd Bridges, U.S. Army Corps of Engineers, Dr. Scott Ireland, U.S. EPA, Ed Long, ERL Environmental, OR (formerly NOAA), and Don MacDonald, MacDonald Environmental Services, Ltd, Canada. It is anticipated that scientists representing USGS, Washington, and Florida will be added to the SSC.

Comment No. 22 Port of Oakland
Page 12, 3.4.4 – Evaluate fish bioaccumulation models – more detail is needed about how the "several different modeling approaches" will be evaluated in order to comment on the validity of this approach.

Response
Additional detail regarding the modeling approaches will be provided in year two of this project, when this task is expected to be conducted.

Comment No. 23 Port of Oakland
Page 12 – Section 3.5.1 – Develop proposed numeric SQO's – AETs are mentioned right after ERMs as an empirical approach – is the plan to develop region-specific AETs using the database or to evaluate the established Puget Sound AETs? If it is the latter, this would be very questionable given the specificity of these results to the Puget Sound region. The Port further wishes to state its opposition to the use of ERMs in developing guidelines. The ERM approach uses questionable logic, its chief flaw being that it ignores sediment chemistry data from bioassays that do not indicate toxicity. The only apparent virtue of the ERM is that it gives a conservative number.

Response
The value of the database is that many different types of analyses will be performed rapidly using a variety of different techniques used to develop sediment quality guidelines. The results will then be assessed as to the predictive ability of each method. AETs can be developed based upon a portion of the data collected from California's Enclosed Bays and Estuaries and then validated using a different data set. Existing AETs from Washington States Puget Sound may also be evaluated.

Comment No. 24 Port of Oakland
Page 12 – Section 3.5.2 – "narrative" SQO's are going to be developed "when the numeric objectives are determined to be inappropriate." How is this "inappropriateness" going to be determined? What criteria will determine if any developed guideline is appropriate or not?

Response
The workplan stated that narrative objectives will "*complement the numeric objectives by encompassing a wider range of beneficial uses, addressing contaminants for which numeric objectives are not available, and providing a site specific alternative for use when the numeric objectives are determined to be inappropriate for a particular application*". The policy describing under what conditions site specific sediment quality objectives can be used has not been developed. Site specific objectives are typically developed for remedial actions where cleanup to background is not economically feasible.

Comment No. 25 Port of Oakland
Page 13 – Section 3.5.3 – Perform Bioaccumulation-based Objectives Case Study – for the purposes of this framework, will this case study assume that the sediment is the only exposure source of contaminants for the fish?

Response
Not necessarily. The objective of the case study will be to use all relevant site-specific information regarding contamination sources, pathways, and receptors to describe the linkage between sediment contamination and fish bioaccumulation. The case study will illustrate a framework that addresses sediments in the context of other factors, such as water column transport and discharges.

Comment No. 26 Port of Oakland
Page 3.5.4 – Section 3.5.4 – Data will be "used to document the sensitivity and reliability" of the draft SQOs – what are the target values for acceptable sensitivity and reliability?

Response
The target values for SQO performance will be those characteristic of the ERM when applied to a national database of sediment quality information. An objective of the analyses conducted in Section 3.5 is to improve upon these target values by using regional data to develop candidate SQOs.

Comment No. 27 Port of Oakland
Page 13 – Section 3.6.1 –Toxicity Assessment – porewater toxicity testing is mentioned as a potential test to be specified; given the inherent problems with porewater toxicity testing (Chapman et al, 2002; Marine Pollution Bulletin 44: 359-366), these should not be included as an "appropriate methodology".

Response
Sediment toxicity methods described in the guidance document will emphasize tests that include bulk sediment in the test chamber.

Comment No. 28 Port of Oakland
Page 14 – Section 3.7 – Summary of sediment quality in CA Bays & Estuaries – will this be done using the numerical or narrative SQO's developed (or both?)

Response
The form (narrative or numeric) type of objective and how it will be used is not known at this point. This will be dependent on the outcome of several tasks that have not been initiated,

Comment No. 29 Port of Oakland

In summary, it is not possible to conclude that the court order to develop SQOs as part of a comprehensive program to protect beneficial water uses can be adequately addressed by the activities outlined in the draft workplan. The Port appreciates the opportunity to comment.

Response
Staff believes that the proposed plan if followed will result in the development of sediment quality objectives that are scientifically defensible and that meet the intent of the court order.

Comment No. 30 Sanitation Districts of Los Angeles County, Tri-TAC
The proposed work plan is an improvement over the 1991 version. The tasks in the plan are presented in a coherent and rational manner. The plan includes review at important points by a Scientific Steering Committee (SSC), which we believe is essential, due to the fact that the science is still emerging in this field.

Response
Comment noted.

Comment No. 31 Sanitation Districts of Los Angeles County, Tri-TAC
The emphasis of the workplan is to use available sediment chemistry, toxicity and benthic macroinvertebrate information collected in California and elsewhere over the past ten years as the basis for derivation of sediment quality objectives (SQOs), using a weight-of-evidence approach.

Response
Staff agrees with the comment.

Comment No. 32 Sanitation Districts of Los Angeles County, Tri-TAC
Statistical approaches will be used to examine relationships between contaminant levels in sediments and observed laboratory and field effects. This information will presumably form the basis for development and evaluation of proposed objectives. This appears to be a sound approach.

Response
Comment noted.

Comment No. 33 Sanitation Districts of Los Angeles County, Tri-TAC, SCAP
We believe it is essential that the SWRCB embrace a weight-of-evidence approach to both develop and implement sediment quality objectives, given the lack of conclusive evidence about the correlative relationships between chemical-specific threshold concentrations, toxicity test responses, and benthic community conditions. Therefore, it is important that all of these endpoints be taken into account when developing regulatory tools such as sediment quality objectives

Response
Staff agrees with the comment.

Comment No. 34 Sanitation Districts of Los Angeles County, Tri-TAC, SCAP
The work plan indicates that a Program of Implementation will be developed. However, more detail should be provided regarding section 3.6.2 "Applications and Enforcement." We are unable to provide detailed comments at this time due to the lack of specificity about what this will entail or how it will be developed, and we request that the SWRCB provide a more detailed description of the tasks necessary to carry out this portion of the workplan for public review and comment.

Response

SWRCB staff and RWQCB staff have not initiated development of the applications and enforcement portion of the policy. When that effort is initiated, a stakeholder group will be formed to provide input and voice concerns of prospective policy issues.

Comment No. 35 Sanitation Districts of Los Angeles County, Tri-TAC, SCAP
The workplan states that SWRCB will hold annual workshops to present the status of activities to develop objectives. We request that the SWRCB also provide a written status report to the public in advance of the annual workshop, and that opportunities for public comment be provided during the workshops. Additionally, technical reports and analyses produced pursuant to this workplan, such as items under Workplan Tasks 3.3 and 3.4, should be made available to the public as they are produced, in order that interested parties may track the progress of this program and make informed comments at the workshops

Response
Staff agrees.

Comment No. 36 Sanitation Districts of Los Angeles County, SCAP
The workplan also states that a Scientific Steering Committee will be formed to assist in the design of studies, data analysis and interpretation, and development of a strategy for SQO implementation. The workplan should provide a description of the process to select Steering Committee members. Furthermore, we strongly recommend that the SWRCB convene a separate committee to provide advice on the strategy for SQO implementation, since that is an area requiring regulatory expertise, and not just scientific expertise. This group would likely not have to be convened until after the SQO development tasks are completed

Response
The three primary criteria used to select members of the Scientific Steering Committee are: 1) a high level of technical experience either developing guidelines, assessing effects or developing and implementing sediment quality policy, 2) member of key agency involved in sediment quality assessment such as USEPA, USACE, NOAA, or USGS, 3) No direct involvement in California's water quality or sediment quality issues. As discussed in response to Comment No. 34 SWRCB staff plan to form a stakeholder advisory group after the Workplan is approved. Developing draft implementation provisions and proposing them through a public process are key components of the implementation and policy phase.

Comment No. 37 Sanitation Districts of Los Angeles County
Lastly, we request that meetings of the SSC be open for observation by interested members of the public desiring a greater level of information than may be made available through the annual public workshops. We believe that this is important to ensure that the process is open and transparent. SSC meeting minutes can be made available to stakeholders upon request.

Response
Comment noted SSC meetings will be open to the public.

Comment No. 38 Sanitation Districts of Los Angeles County, Tri-TAC
The criteria to be used in the selection of candidate pollutants for numeric sediment quality objectives should be stated. Also, a step of identifying, and soliciting public comment on, those candidate pollutants should be added to the workplan. For selected pollutants, it is recommended that some level of conceptual model be produced and provided for scientific and public review.

Response
Two principal criteria will be used to select chemicals for SQO development. First, priority will be given to chemicals identified as a suspected cause of sediment impairment in TMDLs. Second, chemical-

specific SQOs will be developed only for constituents that show a statistically significant association between sediment concentration and effects in California.

Comment No. 39 Sanitation Districts of Los Angeles County, Tri-TAC, SCAP
Finally, the data quality objectives for information to be used in the development of numeric SQOs should be clearly stated.

Response
Two rounds of data quality screening will be conducted. The first round will determine suitability for inclusion into the database and will require documentation of acceptable methods, station location, and lab quality assurance procedures. A second round of data review will be conducted to determine if the data are suitable for specific statistical analyses; this review will require acceptable lab QA results, minimum detection limits and analyte completeness, as well as other parameters that will be specific to particular analyses.

Comment No. 40 Sanitation Districts of Los Angeles County
We have significant ongoing concerns regarding the use of narrative standards in setting regulatory requirements (e.g. numeric effluent limits). The very idea of adopting sediment quality objectives is to obviate the need for broadly-stated narrative objectives. As such narrative objectives may be able to be dropped in favor of the new numeric objectives. However, if narrative objectives are used, the implementation procedures for candidate narratives should be clearly stated if narrative standards are adopted. The existing Basin Plan narrative objectives listed in the workplan should be re-evaluated prior to consideration for adoption as a new SQO. The workplan should specify a public process to participate in the evaluation of candidate narrative objectives.

Response
Regardless of how many constituents numeric objectives are developed for, there will always be a need for narrative objectives to protect against those constituents for which there are no numeric objectives, for newly identified pollutants, or for those compounds that are acting synergistically. Narrative objectives will only be proposed if a clear policy of implementation has been developed that describes how the narrative objective would be used. All proposed objectives and associated policy must go through a public process in accordance with the Federal Clean Water Act and state law including the California Environmental Quality Act and Water Code.

Comment No. 41 ERL Environmental
Page ii, Abbreviations: The ERM values were published as the Effects Range Medians (Long and Morgan, 1990; Long et al., 1995). If you elect to refer to them in your workplan as Effects Range Mediums, you must explain that they, therefore, are not to be confused with the previously published abbreviation for Effects Range Medians. For reasons unknown to me, the Army Corps of Engineers has elected to refer to them as Effects Range Medium values which is incorrect, but this mistake has been passed along among other agencies.

Response
A corrected definition of the ERM will be provided in the revised workplan.

Comment No. 42 ERL Environmental
Page 4: U. S. EPA has adopted criteria for divalent metals, by using the SEM:AVS approach. This approach allows users to identify toxic samples in which these metals were not bioavailable, and therefore, assumed to not be the cause of observed toxicity. Therefore, they were not adopted to be predictive of toxicity.

Response
Staff appreciates the clarification.

Comment No. 43 ERL Environmental
Page 4: In my experience it has become increasingly apparent that it is important to clarify whether the SQOs are intended to be predictive of toxic effects or to protect against such effects. In most cases, a single numerical value cannot be expected to perform both functions. The legislative language does not clearly specify what the objectives are to be used for, but implies that they should be protective of living benthic resources. In any case, the SWRCB must decide and clarify which function the SQOs will be developed for. A low-range chemical concentration (ERL) can be expected to protect against losses of living resources and other such effects, but will not correctly predict the occurrence of toxic effects with high efficiency. A mid-range (e.g., ERM) or upper-range value (e.g., AET), on the other hand, can be highly predictive of adverse effects, but will not be very protective of losses of resources. A strong approach, then, would be to adopt two sets of guidelines, one set to be protective and the other to be predictive. On page 6 (2 nd paragraph) the work plan states that the guidelines will be calculated to protect sensitive aquatic life, notably benthic community organisms. But, on page 13 it states that the ability of the SQOs to predict effects and protect benthic resources will be evaluated, suggesting that the intent is to have them perform both functions. In my opinion, this is the right thing to do. But, the work plan must clearly state the narrative or conceptual intent of the SQOs in language more succinct than in the three bullets listed in section 3.5.2.

Response
The Water Code requires that the SWRCB adopt SQOs that provide adequate protection for the most sensitive aquatic organisms. Hence, objectives must protect against toxic effects Staff agrees with the comment that a strong approach would be to adopt two sets of numerical values, one to be protective and the other to be predictive. We anticipate that multiple sets of values will likely be developed, to address their multiple uses in sediment management.

Comment No. 44 ERL Environmental
Page 6: The list of factors that contribute to the uncertainty in equating sediment contamination levels to bioaccumulative effects in fish, wildlife, and humans and the list of assumptions that must be made to derive such guidelines is overwhelming. There are no sediment quality criteria or guidelines currently available with which to predict bioaccumulative effects. The scientific basis for making such guidelines has rot been developed I strongly urge you to avoid attempts to develop such guidelines until the time when the scientific information necessary to do so has been developed. Currently available guidelines for protection of or prediction of acute effects in benthic resources are available and have been held validated; thus, they are infinitely more refined than anything that can be assembled to address bioaccumulative effects. The work plan is correct in avoiding attempts to derive SQOs that would be protective of wildlife or human health.

Response
Staff agrees with the comment. The tasks that address bioaccumulation in this workplan are limited to efforts to understand the important factors and to identify the additional science needed to support development of SQOs for bioaccumulation.

Comment No. 45 ERL Environmental
Page 9: Inclusion of steps to keep stakeholders informed is important in this process. Such workshops and other meetings were conducted periodically by the state of Florida as they developed their guidelines for sediments and the adoption of those guidelines was made much easier as a result.

Response

A stakeholder group will be formed.

Comment No. 46 ERL Environmental
Page 9: 1 hereby volunteer to serve on the SSC.

Response
Comment noted

Comment No. 47 ERL Environmental
Page 9: The list of possible sources of data is not offered as exhaustive, but, nevertheless, it should include sediment quality data from the NOAA National Status and Trends Program surveys of southern California and San Francisco Bay. It is very important to include data quality screening steps in the development of a database to ensure that only highest quality data are included. By adopting and applying quality screening steps, the SWRCB will be able to deflect criticism from detractors regarding the quality and comparability of data from different sources that will be compiled and merged in one database. The data from both laboratory toxicity tests and benthic infauna analyses should be included along with the matching chemistry information.

Response
Data from the referenced NOAA studies will be included. The data screening steps to be used in this project will be adapted from those used to establish the NOAA national sediment effects database, as well as from other large-scale data compilation efforts.

Comment No. 48 ERL Environmental
Page 10: It will be considerably more difficult to calculate the guidelines using benthic community data than with laboratory toxicity data. Because the composition of these communities naturally varies from place to place in California bays and estuaries and with a host of natural factors, identifying what constitutes an adverse effect in these communities attributable to the chemicals of concern will be challenging at the least A better approach would be to use data from laboratory toxicity tests performed with local benthic species, wherein the results from multiple areas would be readily comparable and are more immune to the effects of natural sedimentological factors. The data from multiple surveys in which the same toxicity tests were performed can be readily merged and treated as equal and comparable. The ecological relevance of toxicity tests with marine amphipods has been documented independently in recent studies (Long et al., 2000; Ferraro et al., 2002). Therefore, the data from these tests can be used with the understanding that they are predictive of resident benthic impacts, especially to sensitive taxa such as infaunal amphipods. By using toxicity test data, the SWRCB would avoid the contentious step of evaluating the role of natural factors in causing adverse impacts. Nevertheless, information currently available from southeastern US estuaries, Puget Sound, Tampa Bay, and San Francisco Bay strongly suggest that benthic impacts occur at lower sediment contamination levels than those associated with acute toxicity to amphipods. Whether these impacts are attributable only to anthropogenic chemicals or some combination of natural and chemical factors is open for debate. If, however, the SWRCB elects to use benthic data to satisfy the requirements expressed on page 6, it should proceed with development of a multi-parameter benthic response index to standardize how these data are reported statewide. It is important to recognize, however, that the database now being compiled by the SCCWRP for the LA CSTF does not include benthic data.

Response
Staff agrees with the comment and intends to develop a multi-parameter benthic response index that has been validated to reflect impacts due to anthropogenic stress. Different, yet comparable, indexes may need to be developed for different regions of the state to address differences in habitat type or community composition. Incorporation of benthic community response is more complex than analysis of sediment

toxicity data, but there is a large body of data and expertise in California that increase the likelihood that such an effort will be productive. A substantial amount of effort in Sections 3.2 and 3.3 will be directed towards resolving the issues of complexity and comparability identified in the comment.

Comment No. 49 ERL Environmental
Page 11, section 3.4.1: It is important to include a set of data quality screening steps before beginning to assemble the database. These steps should include procedures to ensure that the biological and chemical data came from the same samples, that the same analytical methods were used across studies, that the same criteria are used to declare the sample as "toxic" or having impaired benthic attributes, etc. This section could refer the reader to the material in section 3.6. 1.

Response
Data screening steps will be incorporated into both the data compilation and analysis tasks in this project.

Comment No. 50 ERL Environmental
Page 11, section 3.4.3: Washington state is the only state with enforceable sediment quality criteria. Many others (e.g., Florida, New York, New Jersey, South Carolina, Texas, Hawaii, Alaska) either have adopted guidelines derived by others for informal uses or use them routinely without having formally adopted them. While it is important to assess existing guidelines, it is equally important to develop a decision framework with which to apply them. This section should include a step to evaluate application frameworks that are currently available.

Response
Staff agrees and has planned to include an evaluation of regulatory policy developed for applications in other states.

Comment No. 51 ERL Environmental
Page 12, section 3.5. 1: It will be important for the SWRCB to establish the level of certainty that they want to attain in being able to declare that the benthic resources are "safe" when chemical concentrations fall below the guidelines. For example, analyses of matching chemistry and bioassay data compiled in a nationwide database (n=1 513) has demonstrated that less than 10% of samples failed the amphipod survival tests when no concentrations exceeded the ERL or TEL values. Most people I have spoken with feel comfortable with a probability of mis-classifying samples of less than 10%. The chemical concentrations that result in an incidence of toxicity of about 25%, about 50%, and about 75% or more were determined and published in the same study (Long et al., 2000). The logistic regression model approach can be used to empirically determine the percent incidence of toxicity in amphipod survival tests over ranges in chemical concentrations. However, in both cases the users of the guidelines must decide what level of certainty or protection they want to attain before calculating the applicable guidelines.

Response
Staff agrees that the desired levels of protection and certainty need to be established in order to guide numeric SQO development. Such levels will be established and documented as part of the development process for the objectives and application policy.

Comment No. 52 ERL Environmental
Page 13, section 3.5.4: The evaluation of the performance of the SQOs here seems redundant with the evaluation described in section 3.4.3. In any case, if existing guidelines are determined empirically to be sufficiently protective and predictive of effects to Californian benthic resources, it is not clear why it would be useful to proceed with the derivation of new values. This step would seem unnecessary if existing guidelines do the job adequately. In any case, whether new California guidelines are calculated

and adopted as the SQOs or if existing guidelines are adopted, it is of paramount importance to test and quantify their predictive ability and protectiveness using data from California bays and estuaries. If necessary, following those evaluations, the SQOs may need to be revised to improve their performance.

Response
Staff agrees with the comment. Section 3.5.4 refers to the validation of new SQOs developed using the statewide data, which will not be needed if the existing SQGs are determined to be sufficient for the SWRCB's needs.

Comment No. 53 ERL Environmental
Page 14: While it is important to consult with state agencies in Washington and Florida on their uses of sediment quality guidelines, it is important to understand that they were developed and are applied very differently in these two states. The AET values used in Puget Sound were formally adopted by the Washington Legislature as enforceable standards. They were calculated with data only from Puget Sound and are, therefore, applicable only in that region. In contrast, the guidelines developed in Florida were calculated with data from throughout North America and have been adopted only as informal, nonregulatory benchmarks.

Response
Staff understands the different legal ramifications associated with the sediment quality guidelines used in Florida and objectives or criteria used in Washington State

Comment No. 54 Western States Petroleum Association
The State Board should focus its limited resources on properly developing SQOs for high priority constituents of concern ("COCs") rather than improperly developing SQOs for all COCs**.**

Response
Staff agrees. A priority COC list will be developed, based upon ongoing TMDL efforts, input from stakeholders, and the characteristics of the data.

Comment No. 55 Western States Petroleum Association
The Workplan provides that, due to funding and time constraints, "[o]nly those efforts that could reasonably be completed within two or three years and that would be crucial to the development of objectives or implementation policy were given high priority and allotted resources." See *Workplan*, § 2.1. WSPA believes that two years is woefully inadequate to collect the necessary information and develop scientifically sound and legally defensible SQOs given the limited resources available. While WSPA is sympathetic to the limitations imposed on the State Board, time and budget constraints do not diminish the State Board's responsibility to develop and adopt appropriate SQOs.

Response
The SWRCB is under Court Order to develop Sediment Quality Objectives within the time period described in the Workplan. Staff believe that the workplan is sound and if carried out to completion will result in the development of defensible objectives and a logical stepwise implementation policy.

Comment No. 56 Western States Petroleum Association
Any attempt to adopt SQOs for all COCs given existing constraints is certain to result in inappropriate or unnecessarily stringent requirements in violation of Water Code Section 13000.[1] Therefore, WSPA

[1] Section 13000 establishes an overriding statewide policy that water quality be regulated to the maximum extent that is **reasonable** in light of existing demands being made on those waters. The adoption of inappropriate and unnecessarily stringent requirements due to time and budget constraints is unreasonable.

strongly recommends that the State Board prioritize COCs and concentrate on using the limited resources to properly develop SQOs for the highest priority constituents. When additional resources become available, SQOs for the lower priority constituents can be developed.

Response
Staff agrees with the comment. Analyses of the database will be used to identify priority COC for which there is evidence of a significant and substantial association between effects and contamination.

Comment No. 57 Western States Petroleum Association
Additionally, Water Code Section 13392.6 provides that the Workplan shall include a list of priorities, identification of additional resource needs, and identification of staff or funding needs. Although Section 1.3 of the Workplan references some available resources, it does not identify these issues with enough specificity to allow an analysis of their adequacy. Given that important studies and data collection efforts are not being conducted due to the lack of resources, there are clearly additional resource needs for the development of appropriate and defensible SQOs that have not been identified. Therefore, in compliance with Section 13392.6, WSPA requests that the Workplan be amended to identify all of the COCs requiring the development of an SQO, the priority COCs that should be addressed first, and the additional resource, staffing and funding needs required to properly complete the SQOs.

Response
The workplan will be amended to identify the process for selecting and prioritizing COCs. Information will also be included that clarifies that the current workplan is limited in scope and identifies that additional resources, staffing, and funding are needed to complete all aspects of the program. Due to the complexity and iterative nature of the SQO development effort, an attempt to quantify such additional needs in the workplan is premature and would consume already limited resources and time to produce an inaccurate estimate. It is more useful to quantify specific needs near the end of this project, when the results and success in accomplishing the tasks can be used to determine specific needs with greater accuracy.

Comment No. 58 Western States Petroleum Association
Regardless of time and budget constraints, SQOs must be based on sound science.
The California Water Code provides that the sediment objectives "shall" be based on scientific information. Cal. Wat. Code § 13393(b). However, the Workplan provides that certain studies and data collection efforts, previously considered critical to developing appropriate SQOs in the 1991 Workplan, will not be conducted due to time and budget constraints. As indicated above, WSPA is sensitive to these constraints. However, we believe that sound and complete science is not only necessary for the development of defensible SQOs, but is legally required pursuant to the Section 13393 mandate that SQOs be based on scientific information.

Response
All proposed objectives will be scientifically defensible and ecologically relevant.

Comment No. 59 Western States Petroleum Association
The Workplan provides that the State Board will employ the equilibrium partitioning approach, but will not be conducting field or laboratories studies to measure pore water chemistry, contaminant desorption, and the effects of sediment resuspension. WSPA has several problems with this approach. First, WSPA has concerns regarding use of the equilibrium partitioning approach because it has several limitations including very high levels of uncertainty, inaccurate consideration of high background metals levels, it fails to account for high variability, and has not had its accuracy and applicability demonstrated across a wide range of sediments. We believe that the equilibrium partitioning approach has potential technical problems that can lead to greatly overestimated actual risk. Therefore, as a preliminary matter, the

appropriateness of this approach should be reviewed, and this review process should be incorporated into the Workplan.

Response
All candidate approaches for developing SQOs have significant limitations, as well as advantages. Numerous field and laboratory studies have been conducted to investigate aspects of equilibrium partitioning, yet there is still uncertainty and controversy regarding the usefulness of this approach for some applications. This workplan acknowledges such limitations and intends to evaluate the predictive ability of the equilibrium partitioning approach, as well as other approaches, when applied to field sediments in California. Such a direct evaluation of performance will address concerns regarding reliability and accuracy without having to rely upon theoretical assumptions.

Comment No. 60 Western States Petroleum Association
Even if the equilibrium partitioning approach is used, the data necessary for proper implementation, including field validation, is not being collected due to budget constraints. Failure to collect this information will result in a less accurate equilibrium partitioning value, as well as a larger safety factor, making the resulting value unnecessarily conservative and overly protective. WSPA believes this information is needed to properly develop SQOs, and we request that the Workplan be revised to include collection of this data.

Response
Concerns regarding the degree of protection and reliability of any of the candidate SQOs cannot be addressed at this time, because no evaluations or decisions have been made. These issues can be more effectively addressed once information is available on how well the candidate SQOs predict biological impacts and draft implementation policy is produced.

Comment No. 61 Western States Petroleum Association
Additionally, the Workplan proposes basing SQO development on data that may not be accurate or complete for enclosed bays and estuaries. Rather than obtaining data specific to enclosed bays and estuaries, existing data from other sources will be used, with a heavy emphasis on the use of data from oceanic water. In addition, the Workplan proposes using data from the Los Angeles Contaminated Sediment Task Force (the "Task Force"). However, the data collected by the Task Force was intended to advance its primary objective -- the development of a long-range management plan for dredging and disposal of contaminated sediments. Therefore, this data may not be appropriate as a basis for development of statewide SQOs.

Response
Data collected from the Ocean will not be used to develop sediment quality objectives for enclosed bays and estuaries.

Comment No. 62 Western States Petroleum Association
As discussed further in the technical comments provided below, we do not believe that these sources provide sufficient data as to conditions in enclosed bays and estuaries given their emphasis on ocean environments. It is inappropriate to rely primarily on data from other aquatic environments which are significantly different and fail to account for the variability in sediment conditions across the state. WSPA strongly believes that obtaining additional data specific to enclosed bays and estuaries is critical to the development of appropriate objectives. Therefore, we urge the State Board to amend the Workplan to include additional data collection efforts specific to enclosed bays and estuaries. Finally, the heavy reliance on oceanic data or data from one a particular location may not adequately account for ambient background concentrations in certain watersheds or the potential natural variability in the benthic community due to seasonal or storm related variations in salinity.

Response
See the response to Comment No. 61. Ocean data will not be used to develop these objectives.

Comment No. 63 Western States Petroleum Association
WSPA believes that failing to conduct adequate studies necessary for the proper development of SQOs, and relying on oceanic data that does not accurately represent conditions in enclosed bays and estuaries violates Section 13393's mandate that SQOs be scientifically based. Therefore, we urge the State Board to amend the Workplan to (1) include field and laboratory studies to measure pore water chemistry, contaminant desorption, and the effects of resuspension; (2) obtain additional data specific to enclosed bays and estuaries; and (3) assess the appropriateness of equilibrium partitioning as well as other (e.g. empirical) approaches proposed in the Workplan.

Response
The candidate approaches that will be evaluated in this project (e.g. equilibrium partitioning, empirical approaches) are scientifically based, as evidenced by numerous peer-reviewed scientific publications that describe the methodologies and their applications. Specifically, the equilibrium partitioning approach is based on well-established scientific principles governing the solubility of chemicals, sorption kinetics, bioavailability, and mechanisms of toxic action. Field and laboratory studies to investigate various aspects of pore water chemistry and contaminant desorption would be useful in understanding the processes behind contaminant bioavailability, but these studies will not be definitive in regards to determining the suitability of any SQO approach because there are other sources of uncertainty that may affect the ability of these approaches to predict biological effects. The workplan will directly assess the appropriateness of each candidate SQO by documenting its ability to predict biological impacts (e.g., toxicity or benthic community alteration). By focusing upon the end result (ability to predict impacts), this analyses conducted in this project will take into consideration many of the factors (e.g., porewater chemistry, contaminant desorption, chronic exposure) likely to influence the performance of the various approaches. An effort will be made to obtain and analyze all of the relevant existing sediment quality data for enclosed bays and estuaries for this project and use these data for SQO development and validation. Though oceanic data will be included in the database in an effort to provide a more comprehensive product for future applications, SQO development will not dependent upon these data.

Comment No. 64 Western States Petroleum Association
The Workplan fails to provide for the evaluation and consideration of economics. Water Code Section 13393 requires the State Board to adopt SQOs using the same procedures established to adopt or amend requirements in Water Quality Control Plans. Cal. Wat. Code § 13393(b). In adopting water quality objectives, the State and Regional Boards are required to take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, and the provisions of Water Code Section 13241. Cal. Wat. Code § 13263(a). Section 13241 requires the consideration of, among other things, economic considerations. Cal. Wat. Code § 13241(d).

Response
The Workplan will be revised to more specifically reference the process for adopting water quality objectives. Staff agrees that, under Water Code section 13241, the State Board must consider economics, as well as other factors, in adopting SQOs.

Comment No. 65 Western States Petroleum Association
The Workplan does not include a specific task for consideration of these issues. Instead, a report describing the existing sediment quality for the proposed SQOs and implementation program will be prepared, along with a Functional Equivalency Document ("FED"), to fulfill the requirements of the

California Environmental Quality Act ("CEQA"), Water Code Section 13241, and the Administrative Procedures Act ("APA"). See *Workplan*, § 3.7. It appears that the Section 13241 factors, including economics, will be considered separately after the SQOs have been developed. However, Section 13241 specifies that these factors must be considered as part of establishing the objectives, and not merely as an after-the-fact analysis.[2] WSPA views economics as an integral and legally required part of developing appropriate SQOs. Therefore, we request a task be added to the Workplan regarding the analysis of economic issues as part of developing the SQOs.

Response
As stated above, the Workplan will be revised to more specifically reference the process for adopting water quality objectives. Under Water Code section 13241, the State Board is legally required to consider economics, as well as other factors, prior to adopting SQOs. The analysis of economic considerations will likely be incorporated into or appended to the FED.

Comment No. 66 Western States Petroleum Association
The Workplan is not clear with regard to developing bioaccumulation-based objectives or how the SQOs will be linked to beneficial uses. The Workplan states that a "framework" for the calculation of sediment objectives based on fish bioaccumulation and consumption by humans or wildlife will be developed based on a case study, and that this framework will serve to illustrate the methods and data needed to develop bioaccumulation-based sediment objectives by regulatory agencies. See *Workplan*, Section 3.5.3. It is not clear how the State Board intends for this framework to be used by Regional Boards and other regulatory agencies.

Response: There currently is no accepted method for evaluating bioaccumulation in California. The intent of the task described in the workplan was to compare different model results to evaluate the performance of the models within a water body where a significant amount of fish tissue data has been collected.

Comment No. 67 Western States Petroleum Association
WSPA opposes the use of a "framework" by the Regional Boards for calculating numeric bioaccumulative-based SQOs based on best professional judgment, or on a case-by-case or permit-by-permit basis. Such an approach would violate 13393's mandate that SQOs be adopted in accordance with the procedures required for adoption or amendment of Water Quality Control Plans, including the failure to comply with CEQA, the APA, and Water Code Section 13241. A more appropriate use would be to use the framework as a guide for future development of appropriate and scientifically sound bioaccumulation-based SQOs that are formally adopted in compliance with applicable requirements. Further, we believe that any such "framework" for the development and adoption of bioaccumulative-based SQOs must provide comprehensive guidance so that similar facilities and conditions are regulated consistently throughout the state. Therefore, we urge the State Board to clarify in the Workplan how it intends this "framework" to be used.

Response
The RWQCB currently has the authority to develop regional and site specific water quality objectives. This authority could apply to sediment quality objectives. The framework in question could be used by the RWQC to develop such objectives on a regional or site specific basis

Comment No. 68 Western States Petroleum Association

[2] Section 13241 requires that the specified factors be considered "**in establishing**" water quality objectives. (Emphasis added.) Because Section 13393 mandates the same process for establishing SQOs, economics must be considered as part of SQO development.

In addition, the Water Code Section 13391.5 defines the term "sediment quality objective" as the "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. Wat.Code § 13391.5(d). However, the Workplan does not explain how the SQOs will be linked to beneficial use protection. To the contrary, the Workplan indicates that field studies will not be conducted. WSPA believes that the appropriate way to correlate SQOs with beneficial use protection is through field studies. Therefore, we request that the Workplan be clarified as to how the SQOs will be linked to the protection of beneficial uses.

Response
By focusing on benthic communities, many aquatic life related beneficial uses will be protected to some degree but those directly linked to benthic communities include; Estuarine Habitat and Spawning Reproduction and/or Early Development

Comment No. 69 Western States Petroleum Association
The Workplan should provide for stakeholder involvement. With the exception of annual workshops intended to merely "inform" interested parties, there is no provision in the Workplan for stakeholder involvement in the development of the objectives. WSPA believes that consultation and involvement of interested parties during the SQO development process would provide significant benefits for both the State Board and interested parties. The value of stakeholder involvement has been demonstrated through various stakeholder groups working on the development of Total Maximum Daily Loads ("TMDLs"). Therefore, we urge the State Board to form a stakeholder advisory group that would allow representatives from industry, municipalities and environmental groups to participate and provide regular input in the development of the SQOs.

Response
A Stakeholder group will be formed.

Comment No. 70 Western States Petroleum Association
While WSPA supports including flexibility to avoid the rigid application of inappropriate SQOs for a particular application, translators for narrative criteria must also be developed. WSPA supports a flexible approach that avoids the imposition of numeric SQOs when those objectives are determined to be inappropriate for a particular application. We believe that such an approach is consistent with Section 13000's reasonableness requirement. However, it appears that the State Board intends to provide this flexibility through the use of narrative SQOs. If so, then the State Board must also develop appropriate translator mechanisms so that regulated entities can demonstrate compliance. Therefore, the Workplan should be amended to provide for the development of appropriate translators for narrative criteria.

Response
Staff intends to develop appropriate implementation methods for any narrative SQOs that are proposed.

Comment No. 71 Western States Petroleum Association
Implementation Issues Although we recognize that the Workplan constitutes the first step in the development process, it is currently unclear how many of these issues will be implemented. It is important to recognize that, in implementation of SQOs, there is a significant amount of uncertainty associated with the use of numeric values intended to predict adverse effects on biological communities, wildlife or human health. Sediments, in particular, are complex in that numerous factors can influence the bioavailability and toxicity of chemicals and the condition of communities in the sediment matrix. A single set of statewide values may not be able to capture this complexity. Any implementation policy must consider these issues.

Response
Staff appreciates the comment and is sensitive to these issues.

Comment No. 72 Western States Petroleum Association
In addition, it is WSPA's understanding that many of the sediment hotspots are the result of legacy pollutants. However, it is unclear how SQOs will be applied to legacy issues. Therefore, it would be helpful for the Workplan to have a discussion, to the extent possible at this early stage, of how these issues will be implemented.

Response
Staff has not prepared any draft sediment quality policy at this stage, however legacy pollutants will be considered when development begins.

Comment No. 73 Western States Petroleum Association
TECHNICAL COMMENTS Regulatory Background (Section 1.2, Page 3): Applicability.
The California Water Code (Section 13393) as well as the Workplan specify that SQOs be developed for enclosed bays and estuaries, and the methods in the Workplan focus on data for these types of water bodies. Thus, the SQOs developed will not be directly applicable to freshwater systems. Toxicity of chemicals can vary widely between freshwater and marine/estuarine systems and the factors responsible for toxicity as well as the methods used to evaluate sediments can be vastly different. The Workplan should be amended to state that the SQOs and any methods and implementation processes developed will not be applicable to freshwater systems. It would be useful to indicate a salinity limit that would bound the use of SQOs as well.

Response
The SQOs developed will not be directly applicable to freshwater systems.

Comment No. 74 Western States Petroleum Association
Relationship to 1991 Workplan (Section 2.2, Page 7), Identification of key species. Although human and wildlife receptors will not be specifically addressed, key species should be identified in the SQO effort. The benthic community has been identified as a key receptor, and a definition of this receptor group should be developed for the SQO document.

Response
The benthic macrofauna community referred to in this workplan represents those animals inhabiting the surface layer of soft-bottom sediments, which constitutes a key component of the ecosystem and an important food source for many species of fish. This group typically includes many species of worms, crustaceans, and molluscs, as well as other phyla. This community is operationally defined by the methods used to collect and analyze samples and therefore usually does not include fish, highly mobile or deep-burrowing species, or very small species (e.g. less than 0.5 mm in length).

Comment No. 75 Western States Petroleum Association
Additionally, an assessment endpoint for each key receptor group should be developed to define the level of protection addressed by the SQO. The endpoints and level of protection will assist in developing an appropriate SQO. The population and community levels of organization should be targeted as the level of protection for most receptor groups. Threatened and endangered species, however, may require a different level of protection, which should be defined in the SQO document.

Response
The developed SQOs will be intended to provide protection at the population and community level (e.g. preservation of normal diversity) for the benthic macrofauna.

Comment No. 76 Western States Petroleum Association
Field Validation of Equilibrium-Partitioning. Studies related to equilibrium partitioning are not included, although an assessment of the predictive ability of this approach is included as a scope element. As indicated above, WSPA has significant concerns regarding use of the equilibrium-partitioning approach because of its significant limitations. For example, sediments may not be near equilibrium as assumed in the partitioning model, and additional partitioning phases may decrease bioavailability, thus greatly overstating the risk with respect to site-specific conditions. Therefore, an assessment of the appropriateness of this approach should be conducted by the State Board.

Response
Staff agrees with concerns regarding the applicability of equilibrium partitioning models to predict impacts in the field. For this reason, evaluation of suitability of this approach will be based on the demonstrated performance of candidate SQOs using field data, not assumptions or focused lab/field studies.

Comment No. 77 Western States Petroleum Association
Spiked Bioassays. WSPA agrees with the SWRCB's decision to eliminate spiked bioassay studies from the scope. We agree that data from spiked bioassays do not necessarily reflect field conditions and bioavailability.

Response
Comment noted.

Comment No. 78 Western States Petroleum Association
Information Needed to Implement SQOs. WSPA does not agree that all of the information required to develop an implementation plan for SQOs will be obtained from other programs. The implementation plan and policy are key elements that are directly related to the development of SQOs. In fact, it is recommended that key management questions and implementation components be developed up front to help guide the SQO development effort. The SWRCB should develop data quality objectives that outline the decisions that the SQOs will be used to support. Although the TMDL effort is gathering some information on implementation, that information is water body and pollutant specific and may not cover all of the COCs and geographic regions addressed by the SQOs. Similarly, hot spot cleanup plans are very site-specific. The implementation information relevant to the SQOs should be more broad and encompassing. In addition to the components of implementation listed on Page 9 of the Workplan, methods for site-specific adaptation of SQOs and information on ambient levels should be evaluated. Site-specific adaptation of the SQOs will be needed to ensure that appropriate actions are taken, given the variability in sediment conditions across the state. The establishment of ambient levels is also essential to ensure that the SQOs are can be successfully applied.

Response
Comment noted. Section 3.6.1 of the Workplan addresses data quality needs in the program of implementation. Staff intends to consult with the coastal RWQCBs, appropriate federal agencies and other states with experience in sediment quality management, at a minimum, in developing recommended implementation strategies.

Comment No. 79 Western States Petroleum Association
Sediment Quality Database Development (Section 3.2, Page 9). In addition to the sources of data listed in Section 3.2, data from the U.S. Geological Survey as well as from State and Federal Superfund actions across the state should be incorporated. The Workplan should indicate what types of data will be compiled (e.g., chemistry, bioassays, bioaccumulation, benthic community assessment).

Response
Staff agrees that relevant and available data from across the state should be used. A request for collaboration in the identification of such data will be sent to the suggested agencies and others. Resources have been allocated to compile the data into a standardized format to facilitate analysis.

Comment No. 80 Western States Petroleum Association
Evaluate Feasibility of Statewide BRI (Section 3.3.2, Page 10). WSPA cautions the SWRCB that a single statewide Benthic Response Index (BRI) may not be sufficient for evaluating all enclosed bays and estuaries. There are numerous site-specific conditions that affect the benthic community that may not be able to be addressed by the single index. These site-specific conditions can significantly influence the ability of the index to provide a clear cause and effect relationship between a COC and an observed effect. In addition to the habitat characteristics listed in Section 3.3.2, other factors to include are temperature, hydrodynamics, and confounding factors related to ammonia and sulfides, among others. The other limitation on this approach, as mentioned previously, is that it relies heavily on oceanic data that does not represent conditions in enclosed bays and estuaries.

Response
Staff agrees that multiple indexes will be needed to incorporate data from different habitats and regions. Index development and harmonization is an important part of the workplan; these analyses will utilize data from the habitats of concern, not oceanic waters.

Comment No. 81 Western States Petroleum Association
Effects Assessment and Guideline Performance Analysis (Section 3.4, Page 11). The Workplan states (on Page 6) that there will be an *"...emphasis on protecting benthic organisms from long-term exposure impacts."* However, most of the data available is for short-term chronic tests. The Workplan needs to either indicate how this will be addressed (will literature information be used to extrapolate from short-term chronic to longer term tests or will additional long-term tests be conducted?) or indicate that this is an inherent uncertainty in the approach (and provide bounds for this uncertainty in the SQO document).

Response
The intent of the workplan is to provide protection from long-term impacts through the incorporation of benthic community response data in the SQO development process. Benthic community composition reflects the impacts from long-term exposure to contaminants.

Comment No. 82 Western States Petroleum Association
Assess Data Quality (Section 3.4.1, Page 11). Data quality objectives should be developed for the evaluation of data for inclusion in the database. In addition to the factors listed in Section 3.4.1, , acceptability criteria for both chemical and biological data should be developed. Completeness should include the evaluation of datasets for the inclusion of data such as organic carbon content and grain size as well as measurement of parameters such as ammonia and sulfides, which can confound results.

Response
Staff agrees with the comment.

Comment No. 83 Western States Petroleum Association
Evaluate Natural Factors Affecting Sediment Contamination-Biological Response Relationships (Section 3.4.2, Page 11). As stated previously, factors such as grain size, ammonia, and sulfide should be evaluated. Other factors than influence bioavailability should be included (e.g., organic carbon content).

Response

These factors are potentially important and will be addressed in the analyses (e.g., Section 3.4.2).

Comment No. 84 Western States Petroleum Association
Assess Existing Sediment Quality Guidelines for Predicting Biological Effects (Section 3.4.3, Page 11). It is assumed that by "performance," the SWRCB will be examining the predictability of various guidelines. The predictability of some of the available SQGs is very low (e.g., DDT). Empirical approaches in general do not provide a reliable means to derive criteria or screening levels that reflect contaminant specific response thresholds (due to un-addressed co-contaminant and chemical mixture issues), and they do not incorporate site-specific factors that influence bio-availability. SQGs are recommended for use only as screening values and require the use of additional analyses before a management decision can be made. As mentioned previously, WSPA believes that the use of the equilibrium-partitioning approach should be assessed for appropriateness before use and, if found to be appropriate, data should be collected to support its use.

Response
Staff agrees that the reliability of each numeric SQO should be documented and that the implementation policy should specify appropriate uses. Different SQO applications (e.g, screening or decision-making) may be appropriate for different management activities.

Comment No. 85 Western States Petroleum Association
Evaluate Fish Bioaccumulation Models (Section 3.4.4, Page 12). In addition to bioaccumulation into fish, bioaccumulation into invertebrates (e.g., bivalves, crustacean) and subsequent transport through the food web needs to be evaluated. Additionally, more bioaccumulation information is likely to be available for these organisms.

Response
The evaluation of bioaccumulation processes in this project is limited due to funding and time constraints. Data will be collected on invertebrates and it is likely that these data will be used in some of the case study analyses.

Comment No. 86 Western States Petroleum Association
SQOs Development (Section 3.5, Page 12). WSPA supports the use of multiple lines of evidence (such as a triad analysis: chemistry, toxicity, and benthic community condition) in making management decisions regarding sediments. Multiple lines of evidence should be required before taking any actions at a site, because any one line of evidence may have significant uncertainty associated with it.

Response
Staff anticipate proposing the use of multiple lines of evidence to make decisions regarding sediment quality.

Comment No. 87 Western States Petroleum Association
Develop Proposed Numeric SQOs (Section 3.5.1, Page 12). WSPA recommends that numeric SQOs for organic chemicals be expressed as organic carbon-normalized values, similar to those developed by the Washington State Department of Ecology. Organic carbon-normalized values inherently incorporate some site-specific bioavailability information, as the toxicity and bioavailability of organic chemicals in sediments are directly proportional to their organic carbon content.

Response
Staff agrees with the rationale supporting this comment. Decisions regarding how the chemistry data will be expressed will be based on many factors, however, including partitioning theory, geology of the sediment, recommendations of the SSC, and demonstrated utility in predicting impacts.

Comment No. 88 Western States Petroleum Association
Develop Proposed Narrative SQOs (Section 3.5.2, Page 12). As discussed previously, to the extent that narrative objectives are developed, appropriate translator mechanisms must also be developed.

Response
See the response to Comment No. 70.

Comment No. 89 Western States Petroleum Association
Perform Bioaccumulation-based Objectives Case Study (Section 3.5.2, Page 13). The use of more than one case study would benefit the process by allowing the comparison of two potentially different sites and with different conditions and management questions. The SWRCB should consider using at least two case studies. Additionally, as mentioned previously, the use of fish-based bioaccumulation data only will result in a data gap. Bioaccumulation into invertebrates should be included as well.

Response
More than one case study will be presented, if sufficient funds are available. This component of the workplan is limited and will not address all needs related to bioaccumulation issues.

Comment No. 90 Western States Petroleum Association
Methodology (Section 3.6.1, Page 13). Under "Bioaccumulation potential of sediment contaminants," transfer of COCs from benthic organisms up through the food chain should be described in the methodology as well.

Response
This methodology document will incorporate the results of the bioaccumulation model evaluation study, where applicable.

Comment No. 91 Tri-TAC, SCAP
The draft revised work plan is intended to entirely replace the 1991 work plan for development of Sediment Quality Objectives for enclosed bays and estuaries in California, which was developed by SWRCB staff. Tri-TAC supports this approach.

Response
Comment noted.

Comment No. 92 Tri-TAC, SCAP
Page 3, item 1.1, paragraph 1 - Several specific sources of pollutants are listed. The list should be separated into two categories: (1) active sources and (2) legacy sources. The list of sources should be expanded to include urban runoff, mining, natural and atmospheric deposition.

Response
Comment noted. SQOs will apply regardless of source. Management options, on the other hand, can take into account whether the pollutants are due to active sources or legacy sources. The list of sources provided in the workplan was not all-inclusive.

Comment No. 93 Tri-TAC
Page 7, item 2.2., No. 7, – It is stated that recent data collected by SCCWRP suggest that Apparent Effects Thresholds (AETs) and equilibrium partitioning guidelines may have the predictive capacity to protect beneficial uses in California. Please provide the reference(s) that contain this recent data and support this statement. It is also suggested that the statement be revised to state that these guidelines warrant continued evaluation instead of saying that they protect beneficial uses, which implies significant policy interpretation. This is clearly beyond the level of detail of the work plan.

Response
This statement is misleading in that it implies that AETs and equilibrium partitioning have been shown to have predictive ability in southern California, this is not correct. This item will be revised as suggested.

Comment No. 94 Tri-TAC, SCAP
Page 9, item 3.1, paragraph 2 – The work plan should provide a description of the process to select Steering Committee members. A goal should be stated to assemble a Steering Committee with expert technical qualifications. It is recommended that one position on the Scientific Steering Committee be from the San Francisco Estuary Institute, given the importance of San Francisco Bay as an estuarine system in California.

Response
The workplan will be revised to clarify that technical expertise and SQG development/application expertise are the primary factors guiding Steering Committee member selection. SFEI will be an active participant in conducting most phases of the workplan, their membership in the SSC is therefore inappropriate.

Comment No. 95 Tri-TAC
Page 10, item 3.2, top of page – Add San Francisco Bay TMDL studies to the list of studies to be examined.

Response
Staff agrees with the comment.

Comment No. 96 Tri-TAC, SCAP
Page 12, item 3.4.4, paragraph 1 – In addition to the calculation of accumulation factors from empirical data, the significance of correlations between sediment concentrations and levels in biota must be examined. In the absence of significant and meaningful correlations and meaningful relationships, accumulation factors have no predictive relevance or validity.

Response
Staff agrees with the comment.

Comment No. 97 Tri-TAC, SCAP
Page 12, item 3.5 – Priority should be given to 303(d) listed pollutants

Response

Staff agrees that those pollutants that are responsible for impairing sediments within bays and estuaries of California should be given the highest priority.

Comment No. 98 Tri-TAC
Page 12, item 3.5.2 – we believe that the process outlined in the proposed work plan to derive numeric sediment quality objectives leads to numeric objectives where adequate scientific information exists. We therefore question the idea of setting narrative objectives, which would apparently not be supported by adequate science.

Response
Staff disagree. Any narrative objective that is adopted will be accompanied by appropriate implementation methodology. These may include scientifically defensible endpoints or threshold value that will be used to determine if the narrative objective is met.

Comment No. 99 Tri-TAC
The work plan should specify a public participation process for the evaluation of candidate narrative objectives, including an alternative to not adopt narrative objectives.

Response
All proposed objectives whether narrative or numeric, and associated policy must go through a public process in accordance with the Federal Clean Water Act and state law including the California Environmental Quality Act. The alternatives that the SWRCB must consider in adopting the objectives include the "no action" alternative, i.e. an option to not adopt the proposed objective.

Comment No. 100 Tri-TAC, SCAP
Page 13, item 3.5.3 – The process or the criteria to be used to select the pollutant and region for the bioaccumulation-based case study should be provided.

Response
This process will be based upon the data available and existence of relevant prior analyses.

Comment No. 101 Tri-TAC
Page 13, item 3.5.4, fifth sentence – The qualifier "If appropriate" should be added to the sentence that begins "Proposed objectives will be adopted …".

Response
Comment noted.

Comment No. 102 California Department of Transportation
More project details and a schedule for deliverables would provide for better management of the project.

Response
Staff disagree. The proposed plan allows for flexibililty.

Comment No. 103 California Department of Transportation
Second sentence of Section 3.3.1: replace "conducted" with "collected."

Response
Staff agrees.

Comment No. 104 California Department of Transportation

Comparison and recommendation of field and sampling methods (Section 3.3.3) should be completed before the sampling activities discussed in Section 3.3.1. If not, it's conceivable that non-recommended methods would be used.

Response
These activities will be coordinated to ensure that comparable methods are used.

Comment No. 105 California Department of Transportation
Regional beach nourishment contributes to recreational uses and should be a factor considered in the proposed SQOs. The SWRCB should consider development of the SQOs in coordination with the development of the Resources Agency *Draft Review of California Coastal Erosion Planning and Response: A Strategy for Action* that discusses beach nourishment and erosion control. With coordination between these two endeavors, appropriate Department waste materials from landslides and culvert cleanings might be better used as beach nourishment materials rather than disposed in a landfill.

Response
The need for coordination among these efforts will be investigated.

Comment No. 106 California Department of Transportation
In addition, the California Department of Transportation (Department) recently prepared a sediment analysis protocol and by June 2003 will complete a literature review to relate pollutants and particle size. In another study due for completion in 2004, the Department will analyze both dissolved and total concentrations of all of the CTR listed constituents, including the concentration of these constituents in the suspended solids in Caltrans runoff. This information may be useful to the State Water Resources Control Board in accomplishing their SQO goals.

Response
Staff agrees that this information may be useful.

Comment No. 107 Partnership for Sound Science in Environmental Policy
In developing sediment quality objectives (SQOs), the State Board plans to rely heavily on data, analyses, and expertise based on oceanic waters, rather than enclosed bays and estuaries. PSSEP is concerned the tasks proposed to assess the applicability of models and standards towards enclosed bays and estuaries north of Point Conception may not adequately address both the diversity between Northern and Southern California waters and the applicability of oceanic data to enclosed bays and estuaries. PSSEP recommends that a specific task be added to assess the appropriateness of using ocean data and analysis for enclosed bays and estuaries or that the scope of existing tasks be expanded to provide this assessment.

Response: All of the data used for the development and validation of numeric SQOs will be from enclosed bays and estuaries of California. Data from nearshore coastal waters will also be included in the database in order to provide a complete record for some studies, but staff do not intend to use data from coastal ocean waters in the SQO analyses**.**

Comment No. 108 Partnership for Sound Science in Environmental Policy
PSSEP also recommends that the State Board rely on its Bay Protection and Toxic Cleanup program (BPTCP) and/or Bays and Estuaries Section staff in developing the SQOs and implementation plan. In addition to relying on staff of the Southern California Coastal Water Research Project (SCCWRP) on an as-needed basis, PSSEP recommends that the State Board also rely on Bay Area expertise, such as the San Francisco Estuary Institute (SFEI).

Response
Comment noted. SCCWRP will contract and consult with SFEI and other scientific organizations such as the Marine Pollution Studies Laboratory at Granite Canyon and Moss Landing Marine Laboratory both of which were used extensively under the BPTCP.

Comment No. 109 Partnership for Sound Science in Environmental Policy
The Workplan does not include specific tasks to prepare the FED and evaluate the economic impact of the proposed SQOs. PSSEP is concerned that, by separating the FED and the economic analysis from the process of developing SQOs, many of the decisions that could impact the numeric SQOs - such as choosing an appropriate safety factor and selecting the statistical approaches - may not adequately be considered when adopting the final SQOs and implementation plan. PSSEP believes the FED and economic analysis should be an integral part of the proposed Workplan. The economic analysis and FED should evaluate the "cost" of key decisions that are made in developing SQOs and their alternatives.

Response
The Workplan will be revised to more specifically address the process for adoption of SQOs. The State Board will comply with all applicable federal and state legal requirements, including the California Environmental Quality Act, and Water Code section 13241, prior to adopting any SQOs.

Comment No. 110 Partnership for Sound Science in Environmental Policy
The proposed Workplan does not contain an investigation of options for prevention, minimization, and remediation of impaired sediments that were included in the 1991 Workplan. The reasoning is that these activities are included in the development of Total Maximum Daily Loads (TMDLs) and hot spots cleanup plans. PSSEP believes that, by eliminating this step, meaningful information required for the economic analysis and FED will be missing. PSSEP encourages the State Board to include this step in the Workplan.

Response
Staff intended the draft workplan to describe how the objectives would be developed. Policy will be developed with input from regulators the regulated community, environmental groups and the general public.

Comment No. 111 Partnership for Sound Science in Environmental Policy
Although the Workplan provides for annual workshops where the status of the efforts and activities either proposed or underway to develop the objectives is presented, PSSEP would like to see the State Board continue to consult with persons associated with municipal discharges, industrial discharges, other public agencies, research scientists, commercial and sport fishing interests, marine interests, organizations for the protection of natural resources and the environment, and the general public as required by Water Code §13392.6(b) in preparing the Workplan. Although the State Board is not required by law to continue consulting with such interested parties once the Workplan is developed, PSSEP nonetheless recommends that a stakeholder advisory group be formed to provide input on the development of the SQOs, the implementation policy, and accompanying documents. The makeup of such a stakeholders advisory group could be similar to that described in Water Code §13394.6(a) for toxic hot spots, which represent: (1) trade associations whose members are businesses that use the bay, estuaries, and coastal waters of the state as a resource in their business activities; (2) dischargers required to pay fees pursuant to Section 13396.5; and (3) environmental, public interest, public health, and wildlife conservation organizations.

Response: Staff agrees with the comment and intend to form a stakeholder group.

Comment No. 112 Partnership for Sound Science in Environmental Policy

Section 3.5.4 of the Workplan identifies a process where draft SQOs will be presented to the SSC and the State Board. It is unclear from the Workplan how public comments will integrate with the draft SQOs presented to SSC and State Board. PSSEP recommends the proposed Workplan be modified to include public comment in its process for review and modifications.

Response: Under the Federal Clean Water Act, and state law including California Environmental Policy Act and the Water Code, the SWRCB must provide the public with opportunities to review and comment on draft objectives and associated policies prior to consideration for adoption by the SWRCB.

Comment No. 113 Partnership for Sound Science in Environmental Policy
According to the Workplan, the State Board plans to establish a Scientific Steering Committee (SSC) to assist in the design of studies, data analysis and interpretation, and development of a strategy for SQO implementation. Because the SSC will have significant policy input into developing the SQOs, PSSEP believes that the Workplan should identify whom the State Board is planning to appoint. PSSEP supports Tri-TAC's recommendation that one position on the Scientific Steering Committee be from the San Francisco Estuary Institute, given the importance of San Francisco Bay as an estuarine system in California.

Response: Scientists from the San Francisco Estuary Institute will not be members of the Scientific Steering committee as they will be working on tasks directly related to the project.

Comment No. 114 Partnership for Sound Science in Environmental Policy
In lieu of adopting numeric SQOs based on bioaccumulative impacts to humans or other wildlife, the proposed Workplan notes that a framework for calculating sediment objectives based on fish bioaccumulation and consumption by humans or wildlife will be developed and its application will be illustrated in a case study. The proposed Workplan states that the framework and case study will serve to illustrate the methods and data needed to develop bioaccumulation-based sediment objectives by regulatory agencies. PSSEP is unclear how the framework and case study will to be used once the SQOs and implementation plan are adopted. PSSEP is concerned that the framework and case study will be used by permit writers to determine SQOs based on "best professional judgment" (BPJ). In doing so, numeric objectives may be adopted into permits without the review require by Water Code §13393(b). This section of the Water Code requires the State Board to adopt the sediment quality objectives pursuant to the procedures for adopting or amending water quality control plans, including fulfilling the requirements of the California Environmental Quality Act (CEQA), Water Code §13241, and the Administrative Procedures Act (APA). PSSEP believes that the proposed Workplan and subsequent implementation plan should be very clear as to the purpose of the framework and case study.

Response
Comment noted. It is premature to speculate about the outcome of the framework and case study on bioaccumulation-based sediment objectives.

Comment No. 115 Partnership for Sound Science in Environmental Policy
PSSEP shares the concerns raised in comment letter from Tri-TAC and the Western States Petroleum Association regarding the use of "narrative standards" in setting numeric effluent limits, and agrees that the narrative Basin Plan objectives listed in the workplan should be reevaluated and the Workplan should contain an alternative not to adopt narrative objectives.

Response
An alternative which the SWRCB may consider during the adoption process is to adopt all, some or none of the objectives proposed by staff, whether they consist of narrative or numeric objectives. This alternative will be presented along with other alternatives in the Functional Equivalent Document.

Comment No. 116 Partnership for Sound Science in Environmental Policy
The State Board is proposing to use ranking criteria developed and applied as part of the Bay Protection and Toxic Cleanup Program (BPTCP). The ranking criteria developed and applied as part of the BPTCP contains numeric concentration guidelines for over 25 constituents. It is unclear if the Workplan intends to use or adopt these numeric guidelines along with the Ranking Criteria. The Workplan should be used to develop appropriate SQOs based on the sound science, rather than incorporating numeric guidelines automatically in the Workplan. PSSEP recommends that the Workplan be modified to include only the narrative portions of the Ranking Criteria.

Response
The SWRCB is not proposing the use of ranking criteria and did not intend to incorporate the previous numeric guidelines. As the commenter stated the Workplan will be used to develop appropriate SQOs based on the sound science.

Comment No. 117 Partnership for Sound Science in Environmental Policy
The 2003 Workplan does not include field and laboratory studies to measure pore water chemistry, contaminant desorption, and the effects of sediment resuspension on equilibrium partitioning that were included in the 1991 workplan. Although the equilibrium partitioning may not be the ultimate approach chosen to develop SQOs, PSSEP is concerned that, with the Workplan's heavy reliance on oceanic data, models and expertise, the conditions within enclosed bays and estuaries will not be adequately reflected without robust field validation. PSSEP agrees with Tri-TAC in that in addition to calculating the accumulation factors from empirical data, the State Board must also examine the significance of correlations between sediment concentrations and levels in biota. PSSEP recommends that robust field validation work needed to verify whatever approach is taken, including measuring pore water chemistry, contaminate desorption and the effects of sediment resuspension in the San Francisco Bay be included in the proposed Workplan.

Response
The workplan contains a robust field validation component, which is represented by determining the performance of candidate SQOs against data from California bays and estuaries. This approach is more definitive than conducting detailed studies of specific components of the system (e.g, pore water chemistry). The data compilation effort described in the workplan reflects the SWRCB's intention to base the SQOs primarily on data from bays and estuaries. Data from oceanic waters is often included in some of the datasets and will be retained in the database to enhance its usefulness for future studies by state and federal agencies.

Comment No. 118 Partnership for Sound Science in Environmental Policy
In the 1991 Workplan, SWRCB staff proposed adopting SQOs from existing sediment quality guidelines such as Apparent Effects Thresholds (AETs) and equilibrium partitioning guidelines. The proposed Workplan states that recent data collected by the SCCWRP suggest that these guidelines may have the predictive capacity to protect beneficial uses in California and is only proposing activities to provide guidance and supporting information needed for the adoption of SQOs. PSSEP is concerned that data collected from the SCCWRP is focused on oceanic waters, not enclosed bays and estuaries. PSSEP recommends that the Workplan contain all steps necessary to ensure that the data and models used to develop SQOs are applicable and appropriate for enclosed bays and estuaries, and that these data are validated through robust field validation.

Response
Only data from enclosed bays and estuaries will be used to develop and assess proposed sediment quality objectives.

Comment No. 119 Partnership for Sound Science in Environmental Policy
Water Code §13392.6(a) requires the State Board to adopt the workplan for SQO for toxic pollutants that have been identified by the state board or a regional board as a pollutant of concern. The Workplan does not identify these pollutants or include a task to identify the pollutants of concern. PSSEP recommends that the proposed Workplan be modified to include a list of the pollutants of concern for which numeric or narrative SQO will be developed, or, as an alternative, include a step which describes a process and/or the criteria that will be used for developing the list and ultimately, Stakeholders should be allowed to comment on the list.

Response
The Workplan will be revised to address the process for selecting the candidate pollutants.

Comment No. 120 Partnership for Sound Science in Environmental Policy
Considering the State Board's limited budgetary and staff resources, as well as the restricted timeframe within which to develop such SQOs, PSSEP recommends that the initial list of those pollutants of concern be limited to those more crucial to the environment and a process for adopting additional numeric limits be identified in the Workplan and eventual implementation plan.

Response
Commented noted.

Comment No. 121 Partnership for Sound Science in Environmental Policy
Lastly, the PSSEP strongly urges the State Board to include in the Workplan an assessment between the SQO being developed and the beneficial use it is protecting. Field validation should be an integral part of the process in linking the SQO to the beneficial use.

Response
The beneficial use the SWRCB is proposing to protect by focusing on benthic communities is aquatic life. In addition a task is also proposed to help evaluate bioaccumulation models that may at some point be used to assess risk to human health from contaminated sediments. Both efforts will use existing data and data collected under ongoing monitoring programs to assess whether the proposed values/metrics or thresholds actually protective the use they were intended to protect.

Comment No. 122 Latham & Watkins LLP
The State Board's Proposed Development of Numeric SQOs Is Not Required By Law and May Not Be Technically Feasible or Scientifically Defensible. The Draft Workplan proposes to require numeric SQOs on a chemical-specific basis. The Draft Workplan at page 12 states as follows:"Statistical analysis of the statewide sediment quality database will be used to develop proposed numeric SQOs in the form of chemical concentrations, toxicity test responses, or benthic community condition." Also on page 12: "Numeric values representing chemical-specific threshold concentrations will be developed and evaluated." The State Board should not commit to the development of numeric SQOs at this early stage. The Water Code does not require numeric SQOs. As we are sure the State Board is well aware, there are very significant technical and scientific difficulties the State Board must overcome before valid numeric SQOs could be promulgated. Due to such difficulties, the United States Environmental Protection Agency ("U.S. EPA") has been unable, despite over a decade of effort, to finalize any numeric SQOs. In fact, in 1989 when Water Code Section 13393 was adopted, the California Legislature contemplated that federal activity in this area might serve as a precedent for the State Board to follow. In the absence of that precedent, it is even more important that the State Board not tie its hands. Rather, the State Board should follow the course on this issue reflected in its original Workplan from 1991, where the State Board stated that: "Sediment quality objectives can be *either* numerical based values based on scientifically defensible

methods *or* narrative descriptions implemented through toxicity testing." (Emphasis added.) The State Board should leave its options open by not pre-ordaining that it will develop numeric SQOs on a chemical-specific basis before it has proven that it is feasible to do so.

Response
The SWRCB intends to evaluate both narrative and numeric objectives. The SWRCB has not pre-ordained the type or format of the objective nor the policy describing how the objectives would be used to assess sediment quality.

Comment No. 123 Latham & Watkins LLP
The Draft Workplan Does Not Explain How the State Board Plans to Satisfy Water Code Sections 13240 through 13247; The Workplan Must Be Revised to Address the Applicable Provisions. The Draft Workplan does not once mention sections of the Water Code that clearly apply to the development of SQOs. These provisions relate to water quality control plans (Water Code Sections 13240-13247) which are cross-referenced in the SQOs statute, Water Code Section 13393. The 1991 Workplan acknowledged that these provisions, specifically Sections 13241 and 13242, applied to SQOs. The Draft Workplan should be revised to address these relevant statutory requirements and to indicate how they will be satisfied. Until the State Board does so, it is not possible to complete our comments on the Draft Workplan. As the State Board is aware, Water Code Section 13241 requires *water quality objectives* to satisfy certain statutorily enumerated factors: "Each regional board shall establish such water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance; however, it is recognized that it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses. Factors to be considered by a regional board in establishing water quality objectives shall include, but not necessarily be limited to, all of the following: (a) Past, present, and probable future beneficial uses of water. (b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto. (c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area. (d) Economic considerations. (e) The need for developing housing within the region. (f) The need to develop and use recycled water." The valid development of SQOs requires the State Board to interpret these statutory factors with respect to sediment, and the water associated with it. Water Code Section 13242 requires the State Board to specify a program of implementation with respect to water quality objectives. To satisfy Water Code Section 13393, the State Board likewise must specify implementation measures for SQOs. The "program of implementation" is essential to inform the regulated community as to whether the SQOs are reasonably achievable, as required under Water Code Section 13241.

Response
The Workplan did not address these factors; rather, the intent of the workplan was to focus on the scientific approach. As stated previously, the Workplan will be revised to more specifically address the legal requirements for adopting SQOs. The Water Code section 13241 factors will be considered as required and the analysis will be presented in the Functional Equivalent Document.

Comment No. 124 Latham & Watkins LLP
The Protectiveness of the SQOs Must Be Consistent with the Policies of Division 7. Water Code Section 13393(b) requires the State Board to provide "adequate" protection for the most sensitive aquatic organisms. "Adequate" protection must be determined in a manner consistent with Water Code Sections 13000 and 13001 of Chapter 1 of Division 7. Water Code Section 13000 requires that activities and factors that may affect the quality of water be regulated to the highest water quality which is reasonable by considering all demands being made and to be made on the water and the total values involved, beneficial and detrimental, economic and social, tangible and intangible. Water Code Section 13000, and the Porter-Cologne Act's legislative history, require a substantive balancing of these factors. Water Code

Section 13001 states that the State Board must conform to and implement the policies of Chapter One when exercising any power in Division 7. Since SQOs are required under Division 7, the Section 13001 policies apply. Therefore, in the Draft Workplan, the State Board must address the balancing test under Water Code Section 13000 and explain how it is to be met. This balancing test should focus on, among other relevant considerations, sediment quality, benthic community protection, socio-economics, the feasibility of such protection, etc.

Response
The State Board will comply with all applicable legal requirements in adopting SQOs. The State Board recognizes that their actions must be consistent with Water Code sections 13000 and 13001. Those statutes do not require a substantive balancing of the factors cited above, but rather regulation that considers these factors.

Comment No. 125 Latham & Watkins LLP
SQOs for Benthic Species Should Focus on the Overall Health of the Benthic Community
The State Board proposes to base SQOs solely on the benthic macroinvertebrate community. The relationship between contaminants in sediments and the condition/health of the benthic community is complex and inherently uncertain and is driven by a number of site-specific and species-specific factors (e.g., the depth and physical character of the biologically active zone, species composition, sediment dynamics, etc.). In order to adequately address these complexities and uncertainties, the State Board should consider using a benthic index as the principal measure of benthic community health. A benthic index would be based on overall species composition, numbers, and diversity of species. If the benthic index value corresponds to a healthy benthic community, adequate protection of the "most sensitive" species would be indicated. Empirical evidence expressed through a benthic index is more reliable than numerical chemical concentration data or laboratory toxicity testing using test species. Relying in the first instance on empirical evidence is consistent with the reasonableness requirements of the Porter-Cologne Act.

Reponse: The SWRCB will most likely utilize a weight of evidence approach that considers benthic community (population, structure and diversity), toxicity tests results, physical properties and sediment chemistry. Additional data may also be used such as bioaccumulation data and biomarker studies.

Comment No. 126 Latham & Watkins LLP
The State Board Should Make Explicit Its Implicit Finding That Sediments Are Not Exposing People to Pollutants Through the Food Chain. Water Code Section 13393(b) states: ". . . The state board shall base the sediment quality objectives on a health risk assessment if there is a potential for exposure of humans to pollutants through the food chain to edible fish, shellfish or wildlife." However, the State Board in the Draft Workplan has indicated that it will not do a human-health based risk assessment. The State Board states on page 6 of the Draft Workplan that numeric SQOs will be based on protecting the sensitive aquatic life represented by sediment-dwelling organisms and that narrative objectives developed will address the protection of beneficial uses influenced by contaminant bioaccumulation. Under Section 13393(b), the State Board can forego a human-health based risk assessment only if there is not a potential for exposure of humans to pollutants through the food chain to edible fish, shellfish, or wildlife. Therefore, it appears that the State Board has found there is not such a potential for exposure of humans to such pollutants through the food chain. If so, the State Board should explicitly express this finding. In the alternative that the agency proceeds with risk assessment, interested parties should be permitted to bring to bear site-specific human health risk information and characterization as part of a process to develop regional or location-specific SQOs. The SQOs should describe a process, leave options open, and allow for real exposure and real risk to be considered at the appropriate time. Generic risk assessments have proven to produce unrealistic risk numbers that bear no reasonable relationship to actual risk. To satisfy the Porter-Cologne Act, risk assessment methods employed must produce a

reasonable and realistic characterization of risk. Thus, to the extent the State Board takes into account human health risk in the development of SQOs, it should accommodate site-specific human-health based risk assessment, using site-specific information such as who is eating the fish, shellfish, or wildlife, the frequency of consumption, in what quantities, etc.

Response
The workplan states: "*These SQOs will not directly address the exposure of fish, wildlife, or humans to sediment contaminants. The protection of beneficial uses related to wildlife health and seafood consumption is extremely important, but the funds and time schedule for this project are not sufficient to complete this endeavor. The relationship between contaminated sediments and the bioaccumulation of toxics is influenced by many species-specific and site-specific factors, such as sediment organic content, complexity of the food web, species-specific feeding habits, and fish movement. In addition, the estimation of risk to humans or wildlife requires accurate estimates of prey consumption rates, which are also regionally-specific and species-specific. Insufficient data are available for most regions of the State to enable the modeling of contaminant bioaccumulation and seafood consumption. A framework for the development of SQOs based on bioaccumulation, however, will be developed and illustrated with a case study. This framework will identify the process and data needs for deriving bioaccumulation-based SQOs on a regional basis".*

Comment No. 127 Latham & Watkins LLP
In closing, we look forward to working with the State Board constructively, as it proceeds over the next several years to develop SQOs for the State of California. We recognize the importance of this initiative, and trust that our comments on the Draft Workplan will be of assistance to the State Board as it proceeds to finalize the Workplan.

Response
Comment noted.

Comment No. 128 Quantitative Environmental Analysis LLC on behalf of Latham & Watkins LLP
Section 1.2 Regulatory Background. The workplan quotes Section 13393 (b) of the California Water Code (CWC), which states that the sediment quality objectives "shall provide adequate protection for the most sensitive aquatic organism." This statement can be construed to mean that the SQOs will be developed to protect the most sensitive species, which would set an unprecedented level of protection more stringent than that provided in any aquatic life criteria or standards set to date. The 1986 Quality Criteria for Water document (the "Gold Book") states that water quality criteria for aquatic life are developed to provide, "on the average, a reasonable amount of protection." The criteria were not intended to provide 100 percent protection of all species and all uses of aquatic life all of the time, but rather "to protect most species in a balanced, healthy aquatic community" (EPA, 1986).

Response
The statute requires adequate protection for the most sensitive species Staff

Comment No. 129 Quantitative Environmental Analysis LLC on behalf of Latham & Watkins LLP
Section 3.2 Sediment Quality Database Development. The workplan describes the construction of a Sediment Quality Database for use in the development of SQOs. The database will incorporate data from multiple monitoring and assessment programs into one Sediment Quality Database. The workplan describes an approach for assessing data quality. Beyond this, it is important that site-specific bioavailable sediment depths be established and the appropriate data from each program is used for evaluating SQO performance (Section 3.4) as well as for SQO application and enforcement (Section 3.6.2).

Response
Comment noted. SCCWRP staff will use only data that contains matching chemistry and biological effects results. An example of a matched data set would include a benthic community analysis coupled with surface sediment chemistry data from the same location and time.

Comment No. 130 Quantitative Environmental Analysis LLC on behalf of Latham & Watkins LLP
Section 3.4 Effects Assessment and Guideline Performance Analysis. The workplan describes approaches to evaluating the relationship between sediment contamination and effects. A potential issue involves the evaluation of fish bioaccumulation models (Section 3.4.4). It sounds like the approach is to model uptake solely from local sediments. One needs to consider the contribution of water sources of contamination to the food web. Ignoring water column exposures may lead to incorrect decisions: for example, if fish take up contaminant from the water, and PCBs in the water come from upstream, remediation of local sediments will have very little effect. Yet, a model based solely on uptake from sediments will lead to a direct relationship between reductions in surface sediment concentrations and fish levels.

Response
Staff agrees with the comment.

Comment No. 131 Quantitative Environmental Analysis LLC on behalf of Latham & Watkins LLP
Section 3.5 SQO Development. The workplan states that the results of the sediment quality data analyses, benthic community index development (Section 3.3), and the effects assessment and guideline performance analyses (Section 3.4) will be used to derive SQOs, using empirical and causal approaches. This integration of the results of the effects analyses with the sediment quality data is probably the most important issue as the determination of chemical-specific criteria, using any of the proposed approaches, is confounded by the presence of other chemicals and natural factors such as salinity, redox conditions, dissolved oxygen levels, and organic carbon content. Natural forms of stress can affect toxicity and other measures of benthic community health and thus care must be taken in the interpretation of test results and extrapolation of indices to differing environments. Beyond these complications, the difficulty in quantifying the level of a single contaminant that exerts stress on the benthic community in sediments that contain multiple contaminants has been well documented. Indeed, the PCB effects-based low (ERL) and effects-based median (ERM) sediment quality guidelines (SQGs) developed by NOAA for the National Status and Trends Program and adopted by EPA as screening level values for the National Sediment Quality Survey are based on a study in which the incidence of effects was poorly correlated with total PCB concentrations (Long et al. 1995).

Response
Comment noted.