



**California Regional Water Quality Control Board
Central Valley Region**

Karl E. Longley, ScD, P.E., Chair

11/19/07 Public Hearing
Enclosed Bay/Estuaries-SQO
Deadline: 11/30/07 by 12 p.m.



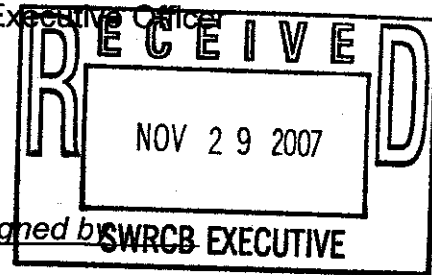
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FROM: Kenneth D. Landau
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DATE: 29 November 2007

SIGNATURE: *original signed by* **SWRCB EXECUTIVE**

SUBJECT: CENTRAL VALLEY WATER BOARD COMMENTS ON THE SEPTEMBER 2007 DRAFT WATER QUALITY CONTROL PLAN FOR ENCLOSED BAYS AND ESTUARIES OF CALIFORNIA, SEDIMENT QUALITY OBJECTIVES

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) staff has reviewed the State Water Resources Control Board (State Water Board) September, 2007 draft Water Quality Control Plan for Enclosed Bays And Estuaries of California, Sediment Quality Objectives (SQO Plan) and the accompanying draft Staff Report. Central Valley Water Board staff appreciates the opportunity to provide comments on the SQO Plan and Staff Report. The Central Valley Water Board has a critical interest in the development of this SQO Plan since protection from impacts of pollutants in benthic sediments in the Sacramento-San Joaquin Delta (Delta) will complement the Water Boards' efforts at addressing the pelagic organism decline (POD) in the Delta and the toxic hot spots caused by mercury and pesticides in the Delta. Although some specific "measurement tools" in the draft Plan would not apply to the Delta under the current proposal, these comments are directed at the entire plan, since future updates are planned to contain similar tools for the Delta.

The complexity, geographic scope, time constraints, and other requirements make development of the SQO Plan extremely challenging. State Water Board staff and the Science Team led by researchers at the Southern California Coastal Water Research Project (SCCWRP) have obviously put considerable effort into, and made considerable progress towards, developing tools to support the implementation of Sediment Quality Objectives. Attached are detailed comments that highlight areas for potential improvements to the SQO Plan and Staff Report. The comments focus on four main themes.

1. The proposed SQOs focus on protecting aquatic communities rather than protecting organisms and sensitive species. Therefore, the proposed objectives appear to be less protective than existing levels of protection specified in the Water Code and the Water Quality Control Plan for the Sacramento and San Joaquin River Basin (Basin Plan)
2. The method for determining if sediments are exceeding the proposed narrative objective requires a great deal of data and lacks flexibility. In many cases, sediment impairments are obvious and waiting for additional data only delays our ability to start

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correcting problems. In some cases, flexibility is needed to respond to information and data which would not be considered within the proposed method. Also, the method allows for significant toxicity to sensitive species to exist without there being an exceedance of the narrative objective.

3. Considering the collapse of aquatic organisms in the Delta, it seems inappropriate to adopt a policy that allows toxicity to sensitive species.
4. The technical analysis supporting the SQO plan could be improved to contain a more thorough analysis of alternatives, applicability and environmental effects.

We look forward to working with the State Water Board on the development and implementation of the SQO Plan and, ultimately, the resolution of the sediment pollution problems that affect the waters of California. If you have any questions about these comments, please feel free to contact Danny McClure at (916) 464-4751 or dmcclure@waterboards.ca.gov or Jerry Bruns at (916) 464-4831 or jbruns@waterboards.ca.gov.

Attachment: Central Valley Water Board Comments on the September 2007 Draft Water Quality Control Plan for Enclosed Bays and Estuaries of California, Sediment Quality Objectives

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Central Valley Water Board Staff Comments on the September 2007 Draft Water Quality Control Plan for Enclosed Bays and Estuaries of California, Sediment Quality Objectives

Comment #1: *Strengths of the proposed SQO Plan.*

The proposed SQO Plan contains narrative Sediment Quality Objectives (SQOs) and a methodology for assessing compliance with the SQOs using information from three lines of evidence - chemical measurements, toxicity testing, and benthic bioassessment. We fully support the consideration and appropriate use of all available lines of evidence in assessing sediment quality. The proposed Plan presents a methodology that appears to work well for determining conditions that correspond with observed sediment quality impacts at the sites and time periods for which it was developed. The approach is based on sites in enclosed bays and time periods for which there are a great deal of sediment chemistry, toxicity and benthic invertebrate data available and where the relationships between pollutant levels, toxicity and benthic conditions are relatively well understood. The proposed methodology is useful in that it provides multiple levels of classification for sites, as opposed to a simple pass/fail ranking.

Comment # 2: *The proposed narrative aquatic life sediment quality objective may not provide adequate protection for sensitive aquatic organisms.*

The proposed sediment quality objective for the protection of aquatic life reads:

"Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities in bays and estuaries of California."

The proposed aquatic life sediment quality objective would only protect benthic organisms against impacts on the community level, and therefore would appear to provide a lower level of protection than required by the Water Code. Section 13303 of the Water Code states that SQOs must provide "adequate protection for the most sensitive aquatic organisms." The proposed objective would also provide a lower level of protection than the existing narrative toxicity objective in the Water Quality Control Plan for the Sacramento and San Joaquin River Basin (Basin Plan), which states:

"All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life."

If the proposed narrative SQO were adopted, the Delta could have a lower level of protection for benthic organisms from toxicity than the rest of the water bodies in the Central Valley Region. A higher level of impact would be allowed if the level of protection were set at the community level as opposed to the organism or population level. Showing "toxicity to benthic communities" would be much more difficult than showing detrimental effects to sediment-associated aquatic life. Toxic effects could occur to organisms and species before such impacts were manifested at the community level.

To be consistent with the Water Code and our existing Basin Plan, we recommend that the proposed aquatic life SQO be amended to replace the term "benthic communities" with "aquatic organisms". The relationship of the proposed narrative SQO to existing narrative objectives in the Central Valley Water Board's Basin Plans should be specified and changes in the level of protection resulting from the SQO Plan should be analyzed.

Comment #3: *The Beneficial Uses and Target Receptors listed in the proposed plan do not represent the full suite of beneficial use protection ultimately needed to address sediment contamination.*

The SQO Plan should provide protection for all beneficial uses affected by contaminants in sediment or it should clarify where additional protections are needed to protect beneficial uses from effects such as bioaccumulation. Our Basin Plan does not include an estuarine use. It includes other aquatic life uses that are applicable in the Delta which should be listed in the SQO Plan.

There needs to be some clarification on the purpose and intent of Table 1. The proposed "target receptors" are not fully representative of the beneficial uses with which they are associated in Table 1. For example, the estuarine habitat beneficial use is defined to include fish, shellfish and wildlife. Fish and wildlife may not be fully protected by protecting the benthic community, due to bioaccumulation of contaminants and other effects.

Comment #4: *The data requirements and level of proof required for determining exceedances of the sediment quality objectives in the proposed methodology could limit the State and Regional Water Boards' sediment quality protection efforts and effectiveness.*

Central Valley Water Board staff fully support the appropriate use of all available lines of evidence to assess sediment quality. However, we are concerned that the specific Multiple Line of Evidence (MLOE) approach mandated in the SQO Plan would not be fully protective of aquatic life. The proposed MLOE approach was developed largely by correlating sediment chemistry toxicity and benthic community condition using existing data from southern California and, to a lesser extent, San Francisco Bay. While correlation analysis provides a useful tool for predicting impacts under similar conditions, such as likely toxicity from widespread legacy pollutants, the measurement tools and threshold limits generated do not directly translate into conditions which are fully protective of aquatic life, since:

- 1) The empirical measurement tools and thresholds generated are in some cases largely a product of the study designs and pollutant distributions providing the data from which they were generated.
- 2) The toxicity and benthic community lines of evidence are fundamentally reactive, in that impacts to aquatic life are already likely occurring before they are observed using these tools.
- 3) The threshold limits are not necessarily biologically based, and are influenced by best professional judgment (BPJ) used to determine impact thresholds for the metrics.

Therefore, caution should be taken in translating conditions which are determined to be predictive of toxic effects in certain situations into standards which should be protective of

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aquatic life, including an appropriate margin of safety. Additionally, while it is somewhat difficult to follow the derivation of the proposed approach from the available references, there are some significant differences between what has been validated through correlation with expert opinions and what is being proposed in the SQO Plan. For example, the binomial method for combining multiple station assessments was not subject to any correlation analysis for this application, and the assessment of the framework for interpreting sediment quality triad data (Bay and Weisberg, 2007) did not use the average of toxicity values for multiple organisms for the toxicity line of evidence, as specified in the SQO Plan's MLOE requirements.

The proposed MLOE methodology would require showing the presence of chemical contamination, and either toxicity due to that chemical contamination or impacts to benthic communities due to the chemical contamination, before sediments at a site could be considered impacted. Since the SQO Plan appears to require a demonstration of impacts on aquatic life prior to action being taken, it may be under-protective, because in some cases environmental harm would have to occur before a determination of impacted sediments could be made. As discussed below, the average score of multiple metrics is used as the overall score for a line of evidence. The approach of using the average of multiple metrics within each of the lines of evidence could effectively "hide" early warning signs of environmental impacts.

The proposed methodology would use the average of multiple species toxicity tests results to determine the overall rank in the toxicity line of evidence. High toxicity to one species could be "averaged out" with low toxicity to other less sensitive species. This does not appear to be consistent with the Water Code mandate that the sediment quality objectives for enclosed bays and estuaries should provide "adequate protection for the most sensitive aquatic organisms."

The median of scores from four benthic invertebrate assessment methods are used to determine the overall score for the benthic community line of evidence. Therefore, indications of high levels of disturbance in one or more benthic response method results could be "averaged out" by less-sensitive benthic assessment methods. This also does not appear to be consistent with the Water Code mandate that the sediment quality objectives for enclosed bays and estuaries should provide "adequate protection for the most sensitive aquatic organisms."

The SQO Plan's MLOE approach would rely on the use of community metrics and indices to assess benthic health. Community metrics are used to reduce the high variability often observed in bioassessment data and provide a simple way of assessing and communicating the data. However, reliance on community level metrics and indices will not protect sensitive taxa and may also significantly hinder an accurate assessment of biological condition because of the reduction of the biological data into less robust metrics and indices.

Benthic assessments also rely on the use of tolerance values which indicate pollution tolerance of a taxon. For the most part, tolerance values represent resistance to organic waste, low dissolved oxygen, and nutrients. Generally, tolerance values do not apply to all classes of chemical pollutants, especially pesticides. Incomplete and inaccurate tolerance

values for chemical contaminants, such as pesticides, could hinder the utility, sensitivity, and accuracy of the benthic assessments in relation to chemical contaminants in sediments.

The proposed SQO Plan MLOE methodology determines the overall score for the chemical exposure line of evidence using two methods. One of the two methods, the Chemical Score Index (CSI), is particularly problematic, as it is more a description of what often correlates with degraded benthic communities in the California dataset than a useful predictor of potential impacts. Due to mathematical reductions used in the CSI method, a high concentration for a given chemical does not necessarily result in a high CSI score. For example, using the CSI method, pure DDT would be incorrectly rated as a minimal sediment chemistry exposure.

The other sediment chemistry method, the California Log Range Mean (CA LRM), determines the highest probability that a single chemical or chemical group is causing toxicity, and uses that probability as the overall score for a sediment sample. This metric is also empirically derived and is to some degree a product of the studies and pollution conditions from which it was developed. The CA LRM also has some limitations, such as not addressing potential additive or synergistic effects between the chemical groups, but overall it is more useful than the CSI method in terms of predicting toxicity. It also has the strength of added flexibility for adding new chemicals. Under the categorization guidelines for the CA LRM, a nearly 49% chance of toxic effects seems to warrant greater than a low exposure categorization. The impact thresholds used to derive the CA LRM regression parameters and categorization values should be more clearly described in order for decision makers to assess the level of protection they would afford.

Under the proposed SQO Plan, the average of the two chemical method's scores is then used to determine the final chemical exposure category. As with the toxicity and benthic community assessments, this has the potential to "average out" potentially toxic concentrations, especially given the shortcomings of the CSI metric. This also does not appear to be consistent with the Water Code mandate that the sediment quality objectives for enclosed bays and estuaries should provide "adequate protection for the most sensitive aquatic organisms." Unfortunately, the SQO Plan only includes 12 and 13 chemicals or chemical groups (such as total PCBs) in these metrics, so any other potential toxicants such as pyrethroid pesticides could not be used in the assessment of potential chemical exposure.

In order to be truly protective from potential impacts, within each of the three lines of evidence, we recommend that the test that predicts the greatest potential effect should represent the score for the entire line of evidence, instead of averaging the scores from the three lines of evidence.

Specifically:

- The toxicity score should be considered high if there are high levels of toxicity to a single species.
- The chemistry score should be considered high if there are potentially toxic concentrations of a particular pollutant or pollutant group.
- The benthic score should be sensitive to indications of benthic invertebrate impacts from any one of the benthic metrics.

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The sediment chemistry line of evidence should be revised to allow the inclusion of other chemicals, such as pyrethroid pesticides. The CSI score should not be used in the sediment chemistry line of evidence.

Although each of the lines of evidence has limitations, independently each can be a useful tool for observing potential sediment quality impacts. Properly designed sediment chemistry and toxicity metrics could be used independently to determine exceedances of sediment quality objectives in cases where chemical concentrations or toxicity tests, absent any conflicting evidence, indicate a significant risk to sensitive aquatic organisms. Chemical threshold values (paired with toxicity testing and benthic community assessments to ensure against effects of unmeasured chemicals, synergistic effects or variations in toxicity) would be more directly applicable for stakeholders who need to plan such activities as cleanup efforts or the design of treatment processes. Some dischargers may find it more cost effective to clean up sediments than to invest in expensive studies of ecological effects. The benthic community line of evidence should also be considered, but would likely not be adequate on its own due to the confounding factors and variability in assessing benthic communities. We agree that benthic bioassessment is an important tool to be incorporated into a weight of evidence approach that includes chemical analysis and toxicity testing. Due to the limitations of the use of benthic bioassessment data described in these comments, benthic bioassessment data should be weighted less than indicators that directly assess chemical contaminant exposure, such as chemical concentrations and toxicity testing.

Revising the MLOE approach as described in these comments and making the SQO Plan applicable to organic enrichment would eliminate potentially long delays in environmental protection which would be caused by "confounding factors" such as ammonia, dredging, etc. under the current MLOE approach.

Comment #5 *The SQO language could be structured to allow flexibility to allow the Water Boards to make determinations using the facts specific to a particular sediment quality assessment and the most current science and information.*

The proposed aquatic life SQO states that it shall be "implemented using the integration of multiple lines of evidence as described in Section V of Part 1." The MLOE approach that the SQO Plan mandates would require a high level of proof of environmental harm, determined using a very specifically dictated (and therefore limited) and very expensive assessment procedure, before sediment at a site could be determined to be impacted by pollutants. The language in the current draft SQO Plan indicates this particular sediment quality assessment procedure is mandatory, and grants no exceptions for situations where other techniques might be more appropriate. While the proposed tools and methodologies may work well in some instances, our understanding of benthic sediment pollution impacts is evolving. In the future, new or previously unidentified pollutants may be detected in benthic sediments, and therefore it would make sense to allow the Water Boards to make the most appropriate, effective and timely responses to new information about sediment pollution.

The developers of the conceptual framework for the MLOE acknowledge that the proposed MLOE framework is only one possible framework and "should be supplemented with BPJ [best

professional judgment] when additional data beyond that included in the framework are available" (Bay and Weisberg, 2007). Ultimately, any process for integrating the lines of evidence will be dependant on some amount of BPJ. The proposed MLOE framework is, at several decision points, the result of the BPJ of the team which developed it. Also, the median expert opinion to which the MLOE approach was compared is the result of the BPJ of experts involved, as apparent in the variability in the individual expert opinions (particularly for marginal sites) and assessment techniques in Bay *et al.* (2007). Allowing individual decisions to be made with clearly documented BPJ may actually provide more transparency and accountability than having one hard-wired, BPJ-based method applied to all bays and estuaries, and would allow decision makers to ensure that the BPJ used in a decision is consistent with legal and regulatory requirements. While allowing BPJ may reduce statewide consistency, adequate protection and transparency of decision making should not be lost to ensure consistency.

The proposed approach, when modified as suggested above, could provide a good default approach in the absence of other information and expertise. However, the Central Valley Water Board staff and other experts in the Region have considerable expertise in addressing complex environmental toxicology problems and considerable knowledge of the specific problems in the Delta. The SQO Plan should retain the flexibility that allows our staff experts and others to effectively respond to new science and new sediment quality problems (as we do in implementing water quality objectives). For this reason, Central Valley Water Board staff suggests the following change to the aquatic life sediment quality objective language:

"This narrative objective shall be implemented using all available lines of evidence. The integration of multiple lines of evidence as described in Section V of Part 1 provides the preferred methodology for combining multiple lines of evidence. Scientific or technical justification must be provided by Regional Water Boards conducting assessments based on modifications to the preferred methodology or for using an alternative methodology."

Comment #6: *The provisions of Section V.J of the SQO Plan could inappropriately reduce the level of protection for the Delta.*

Some bays and the Delta and other estuaries do not have assessment tools developed within the proposed SQO Plan, but the proposed SQO Plan, in section V.J, would mandate that assessments for these waterbodies be performed using the same "conceptual approach" and "key principals of assessment" as those developed for southern California bays and parts of San Francisco Bay. This mandate might impact the Water Boards' ability to use the limited existing data to address sediment pollution in a timely manner, particularly since the prescribed tools may not be ready for use in the Delta for several years, if they can be developed at all. It is not clear from Section V.J who is responsible for developing the assessment tools. Additionally, for the reasons described above, even when fully developed and applied, the MLOE approach in the proposed SQO Plan could provide less protection for aquatic life in the Delta than the current regulatory structure. This is particularly problematic in light of dramatic documented declines in the populations of several Delta aquatic species.

Section V.J states that "The numeric value or statistical comparison (e.g., confidence interval) used to classify a line of evidence as Effected should be comparable to those specified in Sections V.F-H to indicate High Chemical Exposure, High Toxicity or High Disturbance." Section V.J requires the determination of an effect in at least two of the lines of evidence to consider a site impacted. The SQO Plan describes High Chemical Exposure as "highly likely to result in possibly severe biological effects", High Toxicity as "High confidence that a toxic effect is present and the magnitude of response includes the strongest effects observed for the test", and High Disturbance of the benthic community as "The magnitude of stress is high." Using these thresholds to determine effects would preclude any but the most severe impacts from pollutants in sediments from being addressed and thus would likely not provide adequate protection. For example, the proposed threshold for High Disturbance for the Benthic Response Index for bays south of Point Conception corresponds to a 75% decline in the number of benthic species present.

Provisions of the SQO Plan relevant to the Delta should provide a high level of protection which can be implemented in a timely manner and which are consistent with the importance the Water Boards have placed on the protection of the Delta and its beneficial uses.

Comment #7: *Benthic bioassessments have many limitations that restrict their use for assessing contaminated sediments in the Delta.*

Limitations of benthic bioassessments that could affect their utility in assessing contaminated sediments in the Delta include:

- lack of true reference conditions to allow for development of "scientifically valid criteria or thresholds that distinguish healthy from unhealthy benthic communities,"
- many factors (physical, biological) other than contaminant-related factors that can influence or modify benthic communities,
- focus on communities and not the most sensitive taxa,
- reliance on incomplete or inaccurate tolerance values for chemical contaminants,
- synergistic and cumulative interactions of factors that influence biological systems, and
- high unaccounted-for variability typically observed in bioassessment data.

The use of benthic community assessments relies heavily on the availability of reference conditions. Reference conditions for benthic macroinvertebrate communities in the Delta are not available. Lack of historical data prior to intensive agricultural land use, water diversions, and urban development precludes an understanding of benthic macroinvertebrate communities and sensitive taxa that did and should exist in the Delta. Benthic macroinvertebrate communities in the Delta may have been degraded to a baseline condition such that little or no response to further sediment quality degradation can be detected when using benthic community level data. It is likely that the benthic macroinvertebrate community assessment component of the SQO approach will not provide accurate estimates of benthic health, or benthic potential, in the Delta sediment quality assessments because of the lack of true reference conditions.

Comment #8: *Potential inconsistencies in the level of protection from beneficial use impacts of pollutants in benthic sediments and pollutants in the water column could be problematic to Water Boards' efforts to regulate pesticide discharges.*

The Central Valley Water Board has been working for several years on toxic hot spots in the Delta caused by the organophosphorous (OP) pesticides diazinon and chlorpyrifos. Through the efforts of the Central Valley Water Board, the Department of Pesticide Regulation, and the agricultural community and other stakeholders, considerable progress has been made in reducing diazinon and chlorpyrifos toxicity in the Delta (McClure *et al.*, 2006). A valid concern raised during the development of Basin Plan Amendments addressing OP pesticides is that regulation of OP pesticide water column concentrations could cause pesticide use to shift to other pesticides with other potential environmental effects (such as pyrethroid pesticides). Pyrethroid pesticides have emerged as a concern due to their toxicity in benthic sediments. While our Basin Plan contains safeguards against the potential impacts of replacement pesticides, these safeguards could be difficult to implement if, for the reasons described in these comments, the SQO Plan provides less protection from toxic effects of pollutants in benthic sediments than current objectives and programs provide for pollutants in the water column. In order to support the Water Boards' considerable progress in addressing overall toxic impacts of pesticides, Central Valley Water Board staff believe that, whenever technically possible, our standards and programs of implementation should provide a consistent level of protection of beneficial uses regardless of whether the pollutants being regulated are present in the water column or in benthic sediments.

Comment # 9: *The SQO Plan should be revised to provide a clearly defined, achievable path for implementation which enhances State and Regional Water Boards' existing environmental protection efforts and effectiveness.*

Generally, the proposed SQO Plan should be clarified by using terminology more directly applicable to State and federal water pollution control regulations. It is not clear at what point an exceedance of the SQOs would be determined under the proposed SQO Plan. Exceedances are only defined under the discussion of receiving water limits for NPDES Permits. Terms such as "impacted", "unimpacted", and "protected condition" should be clarified as to their relationship with standards and what defines an exceedance of SQOs, or these terms should not be used. Exceedances of the proposed ambient SQOs should be clearly defined.

The SQO Plan should be applicable to controllable organic enrichment, as organic enrichment and associated low dissolved oxygen and ammonia toxicity can adversely impact benthic communities.

The proposed SQOs would be ambient sediment quality objectives and, therefore, should contain provisions for monitoring programs to assess attainment of the SQOs in all waters to which they apply. While many enclosed bays may have dischargers with sufficient resources to support the data requirements of this methodology, many enclosed bays and estuaries do not, in which case monitoring would have to be done by the Water Boards or others. An

analysis of the feasibility of meeting the SQO Plan's data requirements should be included in the Staff Report, and this factor should be considered in the analysis of alternatives. The SQO Plan should be applicable to situations with limited data availability and provide for further data collection through conservative assumptions *in lieu* of missing lines of evidence.

The SQO Plan should describe the program of implementation for nonpoint sources. The SQO Plan should include a schedule for its implementation as required by the Water Code. In order to ensure that the SQO Plan will provide a road map to protecting sediment quality within existing regulatory programs, the SQO Plan or Staff Report should describe how the proposed objectives and program of implementation would work within existing regulatory programs in terms of their processes and timelines.

The SQO Plan describes a series of sequential focused studies that would be implemented to respond to exceedances of the aquatic life narrative SQO. While these focused studies could provide useful information, in some cases they could add unnecessary delay and expense before getting around to cleanup or pollution control actions. The proposed SQO Plan's provisions that SQO-related effluent limits may only be established after a demonstrated impact appears to be inconsistent with the Water Code's requirements for the prevention of new toxic hot spots. Regulatory decisions such as the determination of the nature and sequence of follow-up studies on exceedances and the determination of when effluent limitations can be established should be left to the Regional and State Boards.

Comment #10: *The SQO Plan should not inappropriately use the "binomial distribution" from the 303(d) Listing Policy to establish compliance conditions or exceedance frequencies.*

The proposed use of the "binomial distribution" for determining compliance with receiving water limits and, presumably, for determining an impairment of a waterbody segment is poorly defined, but it has implications for the exceedance frequency of the objectives and allowable mixing zones for NPDES permits. Inherent in the "binomial distribution" is an assumption about acceptable geographic extent of pollution. This inherent assumption would allow for between 3 and 50 % of sites to be impacted before an exceedance of the SQOs is determined. The 303(d) Listing Policy, which established the use of the "binomial distribution", states in its introduction that it shall not be used to "establish, revise, or refine any water quality objective" or "translate narrative objectives for the purposes of regulating point sources". Therefore the "binomial distribution" may not be applicable as existing policy for establishing objectives or translating narrative objectives.

Alternatives for combining site data to make waterbody assessments should be analyzed for their environmental effects and subject to similar rigor as applied to the rest of the objectives, since they imply acceptable exceedance frequency. The SQO Plan may not need to specify regulatory compliance decisions at this level of detail. The SQO Plan should likely leave this decision to the Regional Boards. The SQO Plan should not inappropriately use the "binomial distribution" from the 303(d) Listing Policy.

Comment #11: *The analysis of alternatives should be expanded to explore additional alternatives and additional criteria for analysis of alternatives, and to more clearly state the rationale for the selected alternative.*

Given the importance of the SQO Plan, the alternatives analysis should be thorough and complete. We recommend that, in some cases, more alternatives should be explored, especially those that may be more readily implemented within existing Water Board programs and monitoring budgets. Example alternatives include:

- The possibility of considering all three lines of evidence, but allowing strong signals from one or two lines of evidence to be sufficient for indicating exceedances of the standards.
- At numerous decision points, allowing State and Regional Boards to determine the course of action.
- Considering other possibilities besides the "binomial method" for determining the overall impairment status for a waterbody using the data from individual stations.
- At numerous decision points, providing default methodologies, but allowing flexibility to adjust to particular sediment pollution problems.

The criteria for analyzing alternatives should be clarified. The criteria used to analyze alternatives should include applicable laws, regulations and policies and other mandates relevant to the alternatives being analyzed. Finally, the rationale for the selected alternative should be clearly stated in the Staff Report.

Comment #12: *There are areas where the Staff Report would benefit from clarification and additional analysis.*

The summary of the regulatory baseline should include sediment quality-related 303(d) listings made under the current Listing Policy for waterbodies outside of the Bays and Estuaries, as these listings provide additional description of the current regulatory structure. The pyrethroid 303(d) listings in the Central Valley Region provide an example of how standards exceedances are determined based on the impacts of pyrethroid pesticides.

A number of sections of the Staff Report refer to the support, approval and recommendations of the reviewers in the Science Steering Committee (SSC). The SSC, however, was often reviewing interim work products, partial applications or general information. The SSC has yet to review the entire SQO Plan to see if it technically supports the requirements of the Water Code. The Staff Report should specify what documents and recommendations the SSC has, and has not, reviewed, what the language of their recommendations and approvals were, and what evaluation criteria they were given for their review (i.e., what questions were they asked to answer).

Section 13393 of the California Water Code requires the State Water Board to consider USEPA draft and final sediment criteria and to adopt them if they are final criteria which are scientifically based and provide adequate protection for the most sensitive aquatic organisms

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and/or humans. While USEPA equilibrium partitioning sediment quality guidelines are briefly discussed in the Staff Report, they are dismissed due to low accuracy found in a previous study, but this previous study did not include metals when determining how well these guidelines predicted toxicity (Vidal and Bay, 2005). The Staff Report should contain an analysis of any USEPA sediment criteria relevant to the Water Code's evaluation criteria.

Although the human health sediment quality objective and implementation provisions are brief and reflect current practices, formalizing these in a Water Quality Control Plan is development of regulation. The Staff Report should contain an environmental analysis supporting the sections of the proposed SQO Plan related to the human health related sediment quality objective.

The Staff Report should analyze potential changes to existing regulatory programs and standards resulting from the SQO Plan and potential environmental impacts of those changes. Potential reductions in sediment quality resulting from the proposed SQO Plan, such as those caused by setting a high threshold of evidence prior to a determination of an exceedance and those discussed in the Staff Reports evaluation of economic impacts, are a potential environmental impact which should be discussed in the CEQA analysis. On page 103 the Staff Report states that, for estuaries, "staff is unable to determine whether adoption of the proposed objective could result in potentially significant environmental impacts." The Staff Report should provide this analysis in order to meet CEQA requirements.

Since some level of degradation of sediments (up to the proposed SQOs) would be allowed under the proposed plan, the antidegradation analysis should determine if the allowable degradation is to the maximum benefit of the people of the State. In the case of some sediment quality pollutants and/or locations, better sediment quality than that required by the proposed objectives may be readily achievable.

The baseline for the economic analysis should be the application of current criteria, policies and regulations to the available data set, and it should include potential new 303(d) listings based on assessment of the available data under the State's Listing Policy. The economic analysis should include estimates of the costs to agriculture, costs to dischargers of pollutants to the Delta, and incremental monitoring costs to meet the data requirements of the SQO Plan.

Citations:

Bay, S., W. Berry, P. Chapman, R. Fairey, T. Gries, E.R. Long, D. McDonald and S.B. Weisberg. 2007. Evaluating consistency of best professional judgment in the application of a multiple lines of evidence sediment quality triad. Integrated Environmental Assessment and Management Vol 3. No 4: 491-497

Bay S., S. Weisberg. 2007. A framework for interpreting sediment quality triad data. Southern California Coastal Water Research Project. Costa Mesa, CA.

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Vidal, D. E., and S. M. Bay. 2005. Comparative sediment quality guideline performance for predicting sediment toxicity in southern California, USA. *Environ. Tox. Chem.* 24: 3173-3182