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November 28, 2007

Jeanine Townsend, Acting Clerk to the Board
Executive Office
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

Subject: Draft Staff Report Water Quality Control Plan for
Enclosed Bays and Estuaries Part 1. Sediment Quality
State Water Resources Control Board
California Environmental Protection Agency
September 21, 2007

Dear Ms Townsend:

The Sierra Club, San Diego Chapter has been an active participant in the development of the Proposed Water Quality Plan having served as a member of the Advisory Committee. We wish to thank the Board Staff and its Program Manager, Chris Beegan, the Technical Team, and the Scientific Steering Committee for their outstanding effort to develop the Plan that is based on sound scientific principles.

Summary: The Plan sets a regulatory precedent to protect the enclosed bays and estuaries using multiple lines of evidence that integrates chemistry, toxicity, and the assessment of the benthic community to determine sediment quality. Accordingly, we strongly support this approach to establish sediment quality. Implementation of the Plan is critical in order to assure the sustained protection of the beneficial uses of these waters that are dependent on a healthy benthic community. However, the implementation of the plan has not been adequately addressed in these areas:

- Providing clear guidance on preparing NPDES permits that protect the water and sediment quality of the receiving waters
- Justifying the use of the binomial distribution criteria to determine the exceedence of the receiving water limit
- Providing documentation to design a robust sediment sampling plan and data analysis methods for use to augment the existing data base upon which the thresholds for the multiple lines of evidence were developed

We respectfully submit the following comments on the Draft Staff Report Water Quality Control Plan for Enclosed Bays and Estuaries Part I with recommendations to improve its clarity and to ask for improvements in the implementation of the Plan. These comments are listed according to the respective numerical sections of the Draft Report.

1.9 Statement of Goals: The Draft Staff Report, page 9 has 6 goals. They are:

- *Establish narrative receptor-specific SQOs*
- *Establish a condition that is considered protective for each targeted receptor.*
- *Identify appropriate lines of evidence for each receptor that when integrated can support a confident interpretation of the narrative objective.*
- *Develop and or refine and validate specific indicators for each line of evidence so that the condition of each station can be measured relative to the protected condition*
- *Build a program of implementation based upon these tools and the current level of scientific understanding to promote the protection of sediment quality related beneficial uses.*
- *Define a process that will result in better management and more effective restoration of polluted sediments*

We believe that the first four goals as they apply to the only to the primary receptor, the benthic community has been met for the following reasons:

The Plan is scientifically defensible and transparent. The plan uses multiple lines of evidence comprised of sediment toxicity, chemistry, and benthic indicators to assess the sediment quality for a given monitoring station. While this triad method is in common use today, it lacks transparency because it requires expert best professional judgment to interpret the information and determine the sediment quality. The proposed plan minimizes the need for best professional judgment as explained below.

Each line of evidence was carefully refined drawing on California sediment data base. Toxicity test species were chosen for their sensitivity to pollutants and availability of sources that provide reliable test species.[1] Sediment quality guidelines were selected on how well they predict toxicity in California sediments. Statistical methods are applied to improve the predictability of the adverse effects of toxicity and chemistry on the benthic community or direct effects. In the past the triad method generally used only one benthic indicator. The proposed plan has four benthic indicators to obtain better assessment of the benthic community. Threshold levels for each of these lines of evidence were determined using the data base. Finally, the proposed plan presents a transparent logical process to integrate all three lines of evidence to obtain the sediment quality, thereby reducing if not eliminating the need for best professional judgment.

The proposed plan outlined above applies specifically to Southern California's enclosed bays and marine lagoons and the Polyhaline central San Francisco Bay. Other bays listed in the Report have not met these goals because lack of data. Instead, the Plan, Part 1 Appendix A, Staff Proposal Section V.J describes the same multiple lines of evidence approach using available indicators/tools. Part 2 if adopted would replace this with superior indicators and tools comparable for those developed for the Southern California and central San Francisco Bay.

The goal to establish narrative receptor-specific SQOs besides the benthic community have not been fully met. Part I addresses only the bioaccumulation of contaminants of concern in fish tissue (indirect effects) to protect human health in accordance with the California Environmental Protection Agency policy human health risk assessment policies for fish consumption. The proposed plan states that a more detailed approach to support human health based sediment quality objectives will be completed in the next phase (Part 2). This is not sufficient, in our view, to protect all the

[1] Bay, Steve, Darrin Greenstein, and Diana Young, Evaluation of Methods for Measuring Sediment Toxicity in California Bays and Estuaries, *Southern California Coastal Research Program, Technical Report 503, March 2007*

beneficial uses including all aquatic life in trophic level above the benthic community. The San Diego Region 9 Water Quality Control Board Basin Plan beneficial uses lists Estuarine Habitat, Marine Habitat, Wildlife Habitat and Preservation of Biological Habitats of Special Significance. Aquatic life in these habitats would be adversely affected if the indirect effects of the sediment quality objectives to protect only human health are adopted.

Goals five and six have not been adequately addressed. We will discuss these two items, implementation program and sediment management, in our comments on the Staff Draft Water Quality Plan Proposal Plan in Appendix A.

2. Conceptual Model For Sediment Quality. We commend the inclusion and discussion on the conceptual model. Figure 2.1 is a generic model which serves a basis for developing a detailed site specific conceptual model. In Figure 2.1 we recommend adding a pathway connecting the Wildlife to Humans to account for waterfowl (ducks and geese) that are hunted for human consumption. Mercury levels in duck muscle tissue and liver are known to be very high. The State of Utah has posted duck consumption advisories.[2] We recognize that for Part 1, this pathway is not being addressed but for completeness we believe it should be included.

A detailed site specific conceptual model is a critical tool in assessing and managing contaminated sediments.[3] It is a three dimensional model that describes natural physical characteristics of the region; its geomorphology, hydrogeology, and surface water bodies. Many of the bays and estuaries are located in highly urbanized and industrialized regions of the State. As such their associated activities that can modify these physical features should be included in the conceptual model.

4.8. Nonpoint Source Policy. On page 47 under San Diego Region last bullet, revise to state that the Board adopted conditional waiver on October 10, 2007. (R9-2007-0104)

The following are comments on **Appendix A; Staff Proposal Draft Water Quality Control Plan for Enclosed Bays and Estuaries of California, Part I Sediment Quality**

I. Intent and Summary

Section A. We support the SWRCB commitment to refine the benthic community protection indicators for estuarine waters and the development of an approach to address sediment quality related to human health risks associated with consumption of fish tissue (bioaccumulation). However, limiting the bioaccumulation of contaminants of concern in the sediments to human consumption of fish tissue would not provide the maximum protection for existing and future beneficial uses of bay and estuarine waters (§13390 of Porter-Cologne). The beneficial uses for San Diego Bay (San Diego Region Basin Plan) includes habitat for waterfowl, estuarine mammals, shellfish, reptiles; all of which would not be fully protected if the sediment quality is based only on human consumption of fish tissue. Fish whole body toxic load is higher than fish tissue (muscle). Consequently, the health risks to waterfowl and marine mammals would be much higher than for humans because they consume the entire fish and their intake rate per body weight is much higher than humans. Part II should address the sediment quality bioaccumulation health risks to the aquatic life dependent in the upper trophic (food chain) levels.

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[2] Utah Department of Environmental Health *Utah Waterfowl Advisories* http://www.waterfowladvisories.utah.gov/

[3] Sabine, Apitz, et al. Assessing and Managing Contaminated Sediments: Part I, Developing an Effective and Investigation and Risk Assessment Strategy, *Integrated Environmental Assessment and Management, Vol.* 1, No 1, 2005

Section H, Sediment Chemistry. Attachment A, the list of analytes to be tested, shows 18 PCB congeners. These are the same congeners given in the sediment quality quotient guideline developed by Fairey, et al [4]. The total PCB is the sum of the 18 congeners concentrations multiplied by 2, the correction factor. However, Section H does not define how to obtain the total PCB. Presumably it uses the aforementioned method. By comparison the draft final report by K.J. Ritter, et al [5] has a similar but different list of PCBs, with 16 congeners. The sum of these congeners is multiplied by 1.72 to obtain the estimate of the total PCB. Given that the Ritter article evaluated the sediment quality guidelines, which of the two methods to compute the total PCB provides the best estimate of the total PCB? Fikslin and Santoro conducted a study [6] to compare the total PCB based on the suite of 18 to 20 congers out of the total 206 congeners with an expanded list of 81 congers from water, sediment and fish tissue collected from the Delaware Estuary. The study indicated that differences exist between the approaches used and the matrix of congeners analyzed. This ambiguity between the two PCB congener lists and the correction factors should be corrected in the final Plan.

Categorical Scoring. The Plan should be consistent for clarity in assigning the category scores for each line of evidence. Table 6 provides a row for the respective scores, 1 through 4. However, these are absent in Tables 4, 5, and 8. Without these one is at a loss in how to average the disparate values in each of the rows.

VII. Program of Implementation

VII. B. NPDES Receiving Water and Effluent Limits

This paragraph does not explain what constitutes the sediment quality to be potentially at risk in the discharge vicinity of a point source. If the Regional Board has monitored the sediment quality at stations within the influence of the point source and has found them to be unimpacted or likely unimpacted, then one would consider that the sediment quality not to be potentially at risk. If the stations monitored have a moderate potential for chemically mediated effects as shown in Table 11, then does this fit in the definition of being potentially at risk? It is not clear what specific conditions are in the sediment quality objectives that could be applied as receiving water limits. The NPDES permit sets water quality limits based on the California Toxic Rule. This does not take into consideration the assimilative capacity of the receiving water of the contaminants of concern, either in the dissolved or solid state. The program implementation should be specific on how to apply the sediment quality objectives in the NPDES permit for these at risk situations.

VII. C. Exceedence of Receiving Water Limits

The program implementation should provide guidelines and or a manual for a robust spatial sediment sampling design that is site specific. The design should take into consideration the highly variable properties of the enclosed bays and estuarine environment[7]. Table 15 tabulates the minimum number of stations per sample size that do not meet the protective conditions needed to

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[4] Fairey, R, E.R. Long, C.A. Roberts, B.S. Anderson, B.M. Phillip, J.W. Hunt, H.R. Puckett and C.J. Wilson.. An Evaluation of methods for calculating mean sediment quality guideline quotients as indicators of contamination and acute toxicity by chemical mixtures. *Environmental Toxicology and Chemistry*, Vol.20: 2276-2286

[5] Ritter, Kerry J., Steven M. Bay, Robert Smith, Doris E. Vidal-Dorsch, and L.J Field, Development and Evaluation of Sediment Quality Guidelines Based on Benthic Macrofauna Responses. *Southern California Coastal Water Research Project,* November 14, 2007

[6] Fikslin, T.J. and E.D. Santoro, PCB Congener Distribution in Estuarine Water, Sediment and Fish Samples: Implications For Monitoring Programs, *Environmental Monitoring and Assessment*, Vol. 87 No. 2, September 2003

[7] Caerio, Sandra, Marco Painlo, Pierre Gooverts, Helena Costa and Sandra Sousa, Spatial sampling design for sediment quality assessment in estuaries, *Environmental Modeling and Software*, 18 (2003) 853-859 http://www.biomedware.com/about/pdfs/spatialsampling.pdf

exceed the direct effects SQO as a receiving water limit. Without a carefully designed sampling design that has sufficient samples to characterize the receiving water and that the samples are normally distributed, applying the binomial distribution to determine if the sediment quality objectives are met in the receiving water complies would be prone to errors and at worst not meaningful. Setting the minimum sample size of 16 is meaningless without reference to the size of the water body and its many-fold properties.

The binomial distribution criteria have been accepted to assess water quality. Because evaluating sediment quality compared to evaluating water quality is much more complex, we believe that applying the binomial distribution criteria deserves further justification. Have tests been conducted to validate the assumption that the samples come from a normally distributed population? Assuming that is true, our concern lies with the fact that the receiving water can comply by meeting the criteria in Table 15 without due consideration of the number, the relative locations and the severity of the stations that fail to comply with the sediment quality objectives. To explain this concern, consider the example case where the receiving water is in compliance; the sample size is 90 and the number of stations exceeding the sediment quality objective is 7. Let the assessment of the failing stations range from clearly impacted to likely impacted and that these stations are spatially clustered. The cluster could be considered as a toxic hot spot worthy of further investigation. Consider another case with the same sample size, 90 and number station of exceedences, 7. The severity of effects of these stations is lower than the first example but still not in compliance and the stations are scattered over the water body. In our view, the receiving water in the first example could be judged as being in exceedence of the water quality limits, while the second could be in compliance. One option is to set conditional requirements based on the number, clustering and severity of the stations that exceed the sediment quality objectives. Another would be to tighten the null hypothesis. We ask that this issue be addressed.

This section states that the stations included in the analysis are located in the vicinity and identified in the [NPDES] permit. In order to be enforceable, there has to be evidence that the fate and transport of the contaminants of concern from the permitted discharge covers the stations of concern. This is not an easy task to determine the reach of the plume from the discharge point because the volume/velocity of the discharge is dependent on the type of discharge. There are discharges that are from sources with flow rates that are relatively uniform over time. There are other discharges from sources such as storm drains and creeks/rivers with flow rates that are seasonally dependent; high during the rainy season and low or non-existent during the dry season.

The discussion in this section should address the cumulative pollutant sediment loading from multiple NPDES permitted discharges into the receiving water. Data and/or modeling studies are needed to provide an acceptable estimate of the fate and transport of the contaminants of concern that account for single and multiple point sources. Stressor identification is required to determine the cause for the exceedence of the receiving water limit. In the case where there are multiple sources can contribute to the exceedence, the source or sources need to be identified.

The Plan should also address the case if there is an exceedence and the stressor identification does not implicate the permitted discharge but is due to other causes. In this case remedial action is still necessary to bring the stations into compliance.

V.II. E. Sediment Monitoring. See prior comments on design of the sediment sampling plan in VII, C above. Sediment monitoring guidance documents should be prepared to cover analysis methods and to means to augment the sediment data base and if necessary, used to refine the thresholds the multiple lines of evidence.

V.II. G. Development of Site-Specific Management Guidelines

We support the development site-specific management guidelines. These guidelines are necessary not only to serve as a basis for clean-up goals but also to serve as the basis of proactive site specific management tools to improve and protect the of the beneficial uses of the enclosed bays and estuaries. Footnote 3 cited part I of two part paper. Part II [8] provides additional information on assessing and managing contaminated sediments.

It is our understanding that implementation manuals are being prepared. We recommend that the Staff Final Report Water Quality Control Plan for Enclosed Bays and Estuaries Part 1, Sediment Quality include a list of these manuals.

Typographical errors

1. Page 8 and 9 correct figure numbering in the text to agree with the figures on page 11.
2. In Section 3, Environmental Setting, the text refers to figures that are not present. Page 17, correct spelling to Carpenteria Marsh. Page 23 and 25; correct table numbering in text to agree with the Tables.
3. Page 40 Bite should be Bight.
4. Page 54, correct Section 1.3 to 1.2 under the paragraph for Alternative 1.
5. Pages 70, 71 correct the term Plate to Figure.
6. Appendix A, page 22 Section D.1, second line: correct then to than
7. Attachment A; correct Fuorene to Fluorene

Thank you for this opportunity to submit these comments.

Sincerely,

Ed Kimura

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Sierra Club
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[8] Apitz, Sabine E, Assessing and Managing Contaminated Sediments: Part II, Evaluating Risk and Monitoring Sediment Remedy Effectiveness. *Integrated Environmental Assessment and Management*, Vol. 1 No. 1 2005