

Comments on Delta Contaminated Sediment Issues

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Dear Chris:

Following up on the last PWT meeting where a preliminary draft proposal for work on Delta contaminated sediment issues was made available prior to the meeting, but not discussed at the meeting, I have reviewed that proposal and wish to provide the following comments. The issue of contaminated sediments and their impacts on water quality is an area that has been a focal point of my 30-year university graduate-level teaching and research career where I conducted over several million dollars in research specifically directed toward evaluating the significance of chemical constituents in aquatic sediments as they may impact the beneficial uses of the associated waters.

The proposal made available prior to the PWT meeting focuses on obtaining funding for several specific Delta sediment-related research projects. For example, the first proposed research area - source of sediment contamination is one that I would give a low priority to until it has been found that there are significant Delta and Upper San Francisco Bay water quality use impairments due to chemical constituents in sediments. At this time, there is such a poor understanding of water quality issues in the Delta, much less the role of contaminated sediments in impacting water quality that it is my recommendation that CALFED should initially fund an effort to define whether contaminated sediments within the Delta are likely having an adverse impact on the beneficial uses of the Delta and its resources. Where potential use impairments are found, the cause of the use impairments and their significance to the aquatic ecosystems/water quality should be determined.

For example, it should not be assumed, as is often done, that any aquatic life toxicity is significantly adverse to the fisheries and other aquatic life-related beneficial uses of aquatic systems. Those familiar with the characteristics of waterbody sediments know that high levels of aquatic life toxicity exist naturally in eutrophic lakes which are some of the most productive waterbodies in the world. Several years ago I published an invited paper, "Evaluation of the Water Quality Significance of the Chemical Constituents in Aquatic Sediments: Coupling Sediment Quality Evaluation Results to Significant Water Quality Impacts," at a Water Environment Federation conference where I discussed the importance of natural toxicity in

aquatic sediments as a cause of toxicity as well as gaining an understanding of what sediment toxicity means to the beneficial uses of a waterbody. This paper is available from our web site (<http://members.aol.com/gfredlee/gfl.htm>).

I agree that contaminants in sediments within the Delta could play an important role in impacting the beneficial uses of the Delta and its resources. However, at this time, there is such limited information on these issues that there is need to start from scratch with a highly directed program focusing on searching for potentially significant water quality use impairments caused by sediment-associated constituents.

My recommendations to CALFED would be to make sufficient funds available to appoint an expert panel who would develop guidance on the specific research effort that should be undertaken to begin to define the water quality significance of chemical constituents and pathogenic indicator organisms in Delta aquatic sediments. I would not include Suisun Bay as a high-priority area for initial attention, but instead would focus on the overall Delta system in order to define through appropriately conducted toxicity tests, where the sediments in the Delta are toxic to aquatic life. It is important that several individuals who have high degrees of expertise in sediment chemistry and toxicology be part of this panel. The failure to incorporate modern-day aquatic chemistry/toxicology into sediment quality evaluation has resulted in highly inappropriate approaches being used for incorporation of chemical information into regulatory programs for sediments, such as the BPTCP. The State Board staff, as part of the BPTCP, are using approaches based on total concentrations of chemical constituents that were known to be technically invalid in the 1960s for evaluating the significance of chemicals in sediments.

Where significant sediment toxicity is found to several types of sensitive organisms using appropriate reference sites, then studies need to be conducted to determine the cause of the toxicity. Under no circumstances should the approaches being advocated by the State Board staff and the BPTCP based on co-occurrence values of Long and Morgan be used to estimate cause and effect or even imply that there is any relationship between elevated concentrations of a chemical constituent in sediments and toxicity or other adverse impacts. The determination of the cause of toxicity must be based on properly conducted sediment TIEs.

In those areas where high levels of toxicity are found, an intensive benthic organism assemblage sampling program should be conducted to determine whether the toxicity is apparently influencing the numbers and types of aquatic organisms present in or associated with the sediments. Based on this information, again operating through the expert advisory panel, a specific assessment should be made of the potential water quality significance of the sediment-associated constituents and their impacts on the beneficial uses of the Delta and its aquatic resources. In those situations where it appears that one or more constituents present in sediments is having a potentially significant adverse impact on the beneficial uses of the Delta or significant part thereof, then studies should be conducted on the sources of the constituents responsible for the use impairments. Through appropriate transport fate forensic studies using sediment toxicity and sediment TIEs, it would be possible to trace back to the principal sources the origin of the constituents that are causing the water quality problems in the Delta due to sediment accumulation.

These problem definition type studies of focusing on sediment aquatic life toxicity would likely lead to a variety of specific research projects somewhat along the line of those proposed in the PWT Delta sediment research write-up. However, these projects would be focused then on the most significant water quality problems that evolve from the problem definition studies. It is my recommendation that before any of the specific sediment quality studies are undertaken, however, it is necessary to determine whether there is a significant water quality problem associated with contaminants in the Delta sediments.

I separate the mercury bioaccumulation issues which is a sediment phenomenon from the sediment toxicity issues. I have previously provided detailed comments to you and others on the work that needs to be done to determine the role of mercury in Delta sediments as a source of excessive mercury bioaccumulation in edible fish. The first step that needs to be done in that program is determine what the current levels of excessive mercury are in edible fish within the Delta. If as suspected, excessive levels are found which represent a human health threat compared to US EPA Region IX guidance for one meal per week or even two to three meals per week, I recommend that benthic invertebrate sampling be done using the Slotten procedures to determine those areas of the sediments within the Delta where there are high rates of methylmercury formation. Next there is need to conduct the incubation studies I have described earlier of where high-flow Cache Creek mercury is added to the sediments and studies conducted under laboratory conditions to see if the addition of Cache Creek high-flow particulate mercury changes the rate of methylmercury production. Through studies of this type, it should be possible to gain considerable insight into the potential benefits of spending CALFED funds in controlling Cache Creek and Sacramento River mercury inputs to the Delta. It is important to note, however, that there may be such a mercury reservoir there now that the current additions are having little or no impact in maintaining any excessive bioaccumulation that occurs.

One of the issues that needs to be considered in providing guidance on future Delta sediment water quality-related work is the potential relationship between the proposed work discussed herein and that of the CALFED-sponsored work that is being conducted under the guidance of the California Resources Agency Delta Levee and Habitat Advisory Committee. The background to that Committee's activities arises from a long-standing problem that exists where those who wish to dredge and use dredged sediments in the Delta for levee enhancement and now shallow water habitat development find that the regulatory requirements implemented through the Central Valley Regional Water Quality Control Board for obtaining dredging permits are significant impediments to dredging and beneficial uses of dredged sediments within the Delta. This situation is being seen by CALFED as a potentially significant problem in development of the alternatives for improved conveyance of Sacramento River water to central and southern California, especially through in-Delta channel improvements. It is also a potentially significant impediment to the development of shallow water habitat within the Delta since one of the primary sources of fill material is Delta channel sediments.

In 1996, through discussions between Chris Foe, Bill Croyle, Jerry Bruns and myself, I became aware of the problem and the interest of the Resources Agency Delta Levee and Habitat Advisory Committee members in addressing the problem. In 1997, I began to attend the monthly meetings of this Committee. Also in July 1997 I submitted a CALFED Category III proposal to assist CALFED in helping to formulate an approach that would bring together a panel of experts

who could advise CALFED, the regulatory agencies and others on appropriate management of contaminants in dredged sediments associated with their use in levee enhancement and shallow water habitat development. I was involved with the Corps of Engineers in the 1970s in conducting over \$1 million in research as part of the Dredged Material Research Program that was specifically directed to develop dredged sediment disposal criteria for open water disposal of contaminated sediments. Many of the approaches which were addressed in this research have become standard practice and are currently being used today by the US EPA and the Corps of Engineers in regulating contaminated dredged sediment. Through the work that was done by my graduate students and myself as well as others in the 1970s, we demonstrated that the mechanical application of worst-case water quality criteria to dredged sediment management situations readily resulted in gross over-regulation of many of the chemical constituents in dredged sediments and therefore significantly impeded the beneficial uses of dredged sediments. The situation with respect to dredging in the Delta has evolved to one of where the Central Valley Regional Water Quality Control Board has a severe resources limitation in being able to develop and apply more appropriate dredged sediment management approaches to Delta dredging projects.

It was my proposal that a panel of experts could work with CALFED, the CVRWQCB and State Water Resources Control Board, the Resources Agency, Fish and Game, Fish and Wildlife Service, National Marine Fisheries, Department of Water Resources, etc. in developing guidance on Delta dredging, levee enhancement and shallow water habitat development projects that would be protective but yet not be sufficiently overly-protective of Delta water quality and aquatic resources so as to impede appropriate use of contaminated sediments in Delta shallow water habitat and levee enhancement projects.

In November 1997, I made a presentation to the Resources Agency's Delta Levee and Habitat Advisory Committee on the potential impacts of the California Toxics Rule on Delta dredging projects. A copy of the slides used during my presentation is available as , "Review of the Potential Impacts of the California Toxics Rule on Dredging of the Sacramento River, the Sacramento River Deep Water Ship Channel, and the Port of Stockton Deep Water Channel and Beneficial Uses of Dredged Sediment for Delta Levee Enhancement and Shallow Water Habitat Development," from Dr. Jones-Lee's and my web site. It summarizes the key issues that need to be considered in developing a more appropriate regulatory approach to protect Delta resources from chemical constituents in dredged sediments in Delta dredging projects as well as the use of dredged sediments obtained from within the Delta and from outside of the Delta for shallow water habitat development and Delta levee enhancement projects. The primary recommendation from my presentation was that there was need for CALFED to support the development of an expert panel who would guide CALFED and others in the studies needed to specifically address the under- and over-regulation of contaminants in Delta dredged sediments as they are used for levee enhancement and shallow water habitat development.

My Category III proposal submitted in July 1997 was not funded; in fact, it was ranked sufficiently low as to not even make the first cut, evidently because it was not directed to work on specific fish species. Last winter CALFED made available to the Resources Agency \$500,000 of funding to implement a program designed to address the problems of the use of contaminated sediments for Delta shallow water habitat development and levee enhancement. The Resources

Agency Delta Levee and Habitat Advisory Committee has recommended to CALFED that these funds be used to appoint an expert panel who would provide guidance along the lines that I originally suggested which would include a critical review of existing regulatory requirements, discussion of potential modification of these requirements to enhance protection where under-regulation occurs and to reduce the over-regulation that is occurring in managing contaminated sediments in Delta projects. This effort would include one or more demonstration projects where through intensive monitoring of the actual impacts of contaminants associated with dredged sediments that are used for levee enhancement and/or shallow water habitat development, it would be possible to fine tune the regulatory requirements to be protective without being overly-protective. As planned by the Resources Agency now, the \$500,000 would not be used to actually conduct studies, but would be designed to provide for expert panel activities and the consultant to assist the panel in formulating and implementing guidance on these issues. It is my understanding that at this time that the Resources Agency Delta Levee and Habitat Advisory Committee is awaiting CALFED funding to initiate this activity.

While the proposed program that I have outlined addresses contaminated sediments in the Delta issues, it is distinctly different from the CALFED-supported Delta Levee and Habitat Advisory Committee activities concerned with facilitating Delta dredging and beneficial use of dredged sediments for levee enhancement and shallow water habitat development. The two programs will strongly complement each other; they are both needed. The Resources Agency Committee activities will, if properly implemented, be highly directed to a narrow range of issues associated with dredging and dredged sediment management. It will not address the issues of the overall significance of contaminants in Delta sediments. That is a much larger issue that must be addressed separately. The two activities, however, should be closely coordinated.

My role in this effort can be that of a interested party who provides assistance as time and resources permit to one of providing active leadership where if funds are available, I would be willing to devote substantial time helping to develop, coordinate and implement this program through the expert panel. My work would be that of a technical leader where I would be willing to work on this effort at substantial reduction in my normal consulting fees.

If you or other members of the PWT have questions or comments or wish further information on any aspect of these issues, please contact me.

Fred