

DATA INTEGRATION OPTIONS 2009

1) IMPROVED LINKAGE ANALYSIS FOR PCBs AND DIOXINS - \$30,000

In spite of the substantial work performed to date on PCBs, a clear and documented understanding of where and when PCBs enter the food web to impact sport fish species. Less work has been done on dioxins, but the same statement applies to them as well. One key question is whether sport fish accumulate these pollutants mainly from contaminated areas on the Bay margin, or whether regional contamination in the Bay is sufficient to cause the observed impairment. Similar to the Mercury Strategy, a precise understanding of how uptake occurs would allow managers to focus on the pathways that have the greatest influence on uptake, and perhaps reduce concentrations in a shorter time-frame. This task would be the first step in implementing a PCB Strategy for the RMP (the full PCB Strategy writeup is not prepared yet, but will be coming soon).

Information to be reviewed and summarized includes the natural history of sport fish and their prey, a conceptual or quantitative understanding of the dynamics of uptake, and the spatial and temporal patterns of contamination of water and sediment. Existing information is probably not sufficient to answer this question. Consequently, as in the Mercury Strategy, obtaining field data on finer-scale patterns of food web uptake of organics will likely be needed.

Deliverable:

- 1) Technical report reviewing summarizing refined linkage analysis.

2) DEVELOPMENT OF A BAY MARGIN MODEL: PHASE I - \$40,000

In discussions of a Modeling Strategy for the RMP, the Water Board identified improved understanding of pollutant dynamics on the Bay margin as a high priority. The purpose of this task is to initiate a longer-term effort to work toward this goal.

Specifically, this study aims to answer the following questions:

1. How do local watersheds contribute to Bay impairment?
 - a. What are the spatial and temporal scales of influence of local watersheds on Bay impairment?
 - b. Can local watersheds be *ranked* by their relative impact on Bay impairment?
2. How do the Bay margins (i.e., the estuary interface) influence Bay impairment?
 - a. What is the relative impact of hot spots on Bay impairment?

Two tasks would be initiated to address these questions:

- 1) Analyze existing data regarding spatial and temporal patterns of contaminant concentrations in water and sediment. Integrate these data with ancillary information (such as coastline shape which is a potential indicator of residence time) and watershed characteristics (such as land-use, streamflow, known contaminant sources, etc) to develop an indicator of the watershed-Bay relationship.
- 2) Conduct preliminary modeling and scope out a longer-term plan for development of a generally applicable Bay margin model. One possible approach is to utilize the particle

tracking capabilities of a 3D hydrodynamic model of the Bay to simulate freshwater plumes originating from local tributaries. Simulations could be run for a series of representative climatological conditions (e.g., 10yr flood, 50yr, flood, etc.). Model results (in map form) would indicate the spatial extent of freshwater plumes from local tributaries during flood events and for a defined period of time after the events. Integration of these maps with watershed characteristics (such as land-use, known contaminants, etc.) would help quantify the relative influence a given local tributary has on Bay water quality.

Deliverable:

1. Technical report reviewing existing data and providing a technical rationale and initial development of a Bay margin model.

3) CONCEPTUAL MODEL FOR SEDIMENT TRANSPORT IN THE BAY - \$25,000

The goal of this task is to develop a conceptual model of sediment transport in San Francisco Bay. The conceptual model is to be developed with existing data (i.e., no field component associated with this task). The conceptual model would integrate and interpret existing information on sediment transport in natural and urbanized estuaries and attempt to extend that information to the Bay. The conceptual model would build on previous sediment transport studies on the Bay by attempting to elucidate the influence of nearshore regions (i.e., Bay margins) on the overall sediment budget. Findings would help local stakeholders manage sediment, and contaminants, more effectively.

Deliverable:

1. Technical report summarizing present understanding of sediment transport in the Bay.

4) IMPROVING SEDIMENT ASSESSMENT TOOLS - \$20,000

The Sediment Quality Objectives (SQOs), promulgated in 2008, establish a new approach for assessing sediment condition, using sediment chemistry, toxicity, and benthic community assessments. The initial application of the approach to the Estuary produced results that need further examination and interpretation. For example, toxicity in the San Francisco Estuary occurs at lower contaminant concentrations than in southern California, leading to the conclusion that most of the sediment in the polyhaline and mesohaline regions of the Estuary are “possibly” to “likely” impacted. In addition, different benthic indices that have been developed for the Estuary appear to yield somewhat different results. Investigating and resolving these questions and others is important in allowing environmental managers to make management decisions based on a full understanding and confidence in the SQO assessment results.

In 2009, two workshops will be held to refine and develop consensus on benthic indices. At the workshops the details of SQO calculations and interpretations will be presented and discussed with RMP participants and scientists from the region, and ideas will be developed about how to refine the methods to more accurately reflect sediment condition in the different regions of the

Estuary. At a second workshop, findings of the recommended refinement studies will be presented to the group.

Specifically these workshops will focus on the development and validation of benthic assessment tools for the mesohaline portions of the San Francisco Estuary. These tools are necessary for application of the SQOs in the northern and southern reaches of the Estuary. A workshop will be held early in 2009 that will review data analysis of benthic assemblage distribution in space and time in the region, and recommend next steps for revision of mesohaline benthic indices.

Task for 2009 include:

1. Best Professional Judgment (BPJ) of Mesohaline Benthic Condition

It is likely that the first workshop will recommend BPJ validation of benthic disturbance gradients. RMP staff will identify appropriate experts and data sets to review.

To be completed by May 1, 2009.

2. Mesohaline Index Revision and Testing

Revision of existing of mesohaline indices will include evaluation and testing of component benthic indicator metrics. The BPJ gradient will be used as the benchmark for inclusion in a mesohaline index.

To be completed by August 1, 2009.

3. Second Benthic Workshop

The benthic work group will meet to review the results of the BPJ exercise and draft mesohaline benthic indices.

To be completed by October 1, 2009.

4. Reporting and Publication

This project will be completed by production of a RMP Technical Report and two manuscript for publication (e.g., benthic assemblages in SF Estuary; mesohaline benthic index)

To be completed by December 1, 2009

- 5) UPDATE OF THE PCB MULTIBOX MODEL - \$10,000**

The current version of the multibox PCB model uses PCB 118 to represent PCBs as a whole. This approach was appropriate for model development and to improve understanding of general long-term and large-scale PCB fate in the Bay. However, it is thought that the model has reached the limits of its performance due in large part to the use of PCB 118 as a surrogate. The

CFWG has strongly recommended that the multibox PCB model be extended into a homologue model. In doing so, it is believed that model performance will be improved and understanding of finer-scale transport processes will be advanced.

Additionally, model predictions would be improved by incorporating results of the RMP sediment coring project. The multibox model was shown to be highly sensitive to the subsurface mass of PCBs in sediment. However, to date only one sediment core has been incorporated into the model. It has been recommended by CFWG participants and other stakeholders that the multibox model be updated by incorporating (e.g., calibrating to) results of the RMP sediment coring project.

Deliverable would be:

- 1) Manuscript on homologue version of the model, Powerpoint to the TRC on output with new core data