

## **Multibox Pollutant Screening**

The RMP is charged with monitoring known contaminants and identifying emerging contaminants in water, sediment, and wildlife in the Bay and surrounding watersheds. The list of contaminants monitored by the RMP is dictated by stakeholder needs and existing environmental policy. As a result, the current list of contaminants monitored is long. Due to limited resources, environmental fate and risk are studied in depth for only a subset of the monitored contaminants. Contaminants identified for such detailed study are prioritized by management needs (e.g., Total Maximum Daily Loads development) and stakeholder interests (e.g., methylmercury production in restored wetlands). Contaminants that are not of regulatory or stakeholder priority are generally not investigated in detail; their monitoring results are simply reported in the Annual Monitoring Results. As a result, only a fraction of the power of monitoring activities is being used to improve our understanding of the physical, chemical, and biological processes controlling contaminant fate in San Francisco Bay. Analysis within a multi-contaminant framework is lacking.

This subtask would develop a multi-contaminant framework for assessing the environmental fate of contaminants in San Francisco Bay. Results from ongoing monitoring efforts will be incorporated into a numerical model (Multibox Version 2.0) of contaminant fate to estimate the relative importance of physical, chemical, and biological processes in controlling the fate of a range of contaminants (selenium, copper, PCB 118, BDE 47, BDE 209, DDT, dieldrin, and chlordane). These contaminants have a broad range of partitioning characteristics, degradation rates, and external loads (the parameters thought to exert the most control on contaminant fate). The proposed project would integrate, and advance, existing RMP assets, with the objectives of identifying the major uncertainties in estimating the environmental fate of various contaminants (e.g., whether uncertainties in load calculations, understanding of partitioning, or understanding of exchange between Bay regions are more critical) and better constraining model parameters shared in common among contaminants (e.g., watershed sediment loading rates, sediment mixed layer depth, net sedimentation rate). The final product will be a screening tool that can be used by managers to estimate the environmental fate of current and emerging contaminants in San Francisco Bay in a way that will help prioritize management efforts. Results will be especially useful for screening emerging contaminants and will enable managers to assess whether an emerging contaminant poses a long-term threat to ecosystem health.

### Subtask 2.1: Literature review

A thorough literature review will be conducted to identify previous work and to collect/compile information on key model parameters for each contaminant.

### Subtask 2.2: Model coding

The multibox model is currently coded specifically for PCBs. This task will code the model so that it can be used to model a wide range of contaminants. Efforts will focus on

making the model much more flexible in regards to how it handles partitioning, spatial and temporal distributions of external loads, degradation, sediment-water exchange, and water-air exchange.

#### Subtask 2.3: Loads development

Existing data will be analyzed to develop loads estimates.

#### Subtask 2.4: Inventory and trends development

Existing data will be analyzed to determine best estimates of current inventories in Bay water and sediment. Where possible, data will be analyzed for the presence of spatial and temporal trends.

#### Subtask 2.5: Data integration / Modeling and Reporting

Information gathered/developed in previous tasks will be integrated with the newly coded multibox model. The model will be run to steady-state under various loading conditions and results for multiple contaminants will be compared and contrasted. Estimates of such relationships would provide a simple method to assess how the Bay might respond to a given contaminant under various loading scenarios. Sensitivities of model response to other contaminant characteristics such as degradation rates and the spatial distribution of external loads will also be tested through such exploration.

### **SCHEDULE AND DELIVERABLES 2008**

A detailed schedule of deliverables is presented below.

<b>Deliverable</b>	<b>Target Date</b>
Draft Technical Report on Multibox 2.0 Pollutant Screening	December

### **BUDGET**

<b>Subtask</b>	<b>Estimated Labor Cost 2008</b>
Multibox Pollutant Screening	\$40,000 (Pending Discussion by the CFWG)