



Reducing the Bioavailability of Polychlorinated Biphenyls (PCBs) from Sediment to Clams

Overview

- PCBs in sediment threaten local food chains

- Fish consumption advisories
- Adverse health effects, possibly cancer



- Traditional “dredge and dump” is expensive, disrupts habitat, and leaves residual PCBs

- Need new *in-situ* technologies to clean up PCB-contaminated sites

Hypotheses

Adding activated carbon to PCB-contaminated sediment can reduce PCB bioavailability to clams.

Effectiveness will depend on:

- Carbon dose
- Carbon size

Scientific Approach

- Obtain PCB-contaminated sediment from Hunters Point Naval Shipyard, San Francisco, CA (Superfund site)



- Expose clams (*Macoma balthica*) to Hunters Point sediment with and without carbon amendment



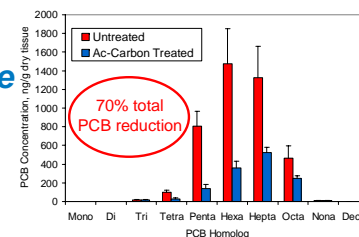
- Carbon and sediment well-mixed for one month
- Clams in sediment for 28 days
- 20 clams per jar



- Measure PCB concentrations in clam tissues, using gas chromatography (GC)

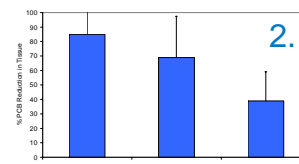
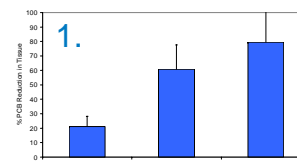
Results and Impact

70-80% reduction in total PCB uptake by clams, at high carbon dose and short contact time



% reduction in PCB uptake

- increases with carbon dose
- decreases with carbon size



- Field demonstration at Hunters Point

- Validate laboratory results
- Investigate mixing strategies

- Potential benefits for impaired sites

- Increase redevelopment opportunities
- Limit human exposure to PCBs through food

Collaborators: Martine van den Heuvel-Greve (Dutch National Institute for Coastal and Marine Management); Samuel N. Luoma (United States Geological Survey); Richard G. Luthy (Stanford University)

For more information, please see (1) McLeod, et al. 2004 *Environ. Sci. Technol.* 38:4549; (2) *Stanford Report* 9/1/2004, <http://news-service.stanford.edu/news/2004/september1/aqua-mog-91.html>