

Progress Report

Title of the project: Magnitude and extension of copper pollution effects on benthic faunal communities in San Diego Bay

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Progress report on activity from April 4, 2008 to June 15, 2008

Summary of the whole activity

Main results

In order to examine the current levels of copper in water (surface and bottom) and sediments (porewater and solids), we conducted a field sampling program on May 28 (Harbor Island West, HBW) and June 10 (American's Cup Basin i.e. formerly Commercial Basin, CB and Harbor Island East, HBE). A total of 35 sites, covering areas with and without boats were sampled as indicated in Fig. 1. Sample collection was made from a small boat. Surface water (50 cm) was collected per hand; bottom water (~30 cm above bottom) was collected with a special Niskin bottle. For macrofauna and sediment collection (top 5 cm), a new, self-designed "metal-free" mini gravity core device provided with an internal removable plexiglass tube (20 cm²) was used. This allowed us to take quickly nearly undisturbed, quantitative sediment samples, eliminating the use of expensive, time-consuming SCUBA diving. In addition, at each site, a sediment subsample (1.13 cm² x 1 cm depth) was taken with an end-cut syringe for chlorophyll *a* and phaeopigments analyses. All samples were transported back to the laboratory on ice for further processing at SIO. In addition, a portable SeaBird CTD was deployed from the boat at selected sites to obtain salinity and temperature of the water column.

For each activity line:

Activity carried out:

- Field: exploratory sample collection in Harbor Island (west and east) and American's Cup Basin (Commercial Basin).
- Laboratory: prior to the field work, all material used was acid-washed (Nitric acid 10%) for at least 2 weeks and thoroughly rinsed with milli Q water in a clean room. In the laboratory, an aliquot (5 ml) was transferred to a small vial for Cu-ISE (free ion Cu⁺⁺) measurements. Water samples for dissolved copper (CuD) determination were filtered through a pre-weighed polycarbonate membrane (0.45 μm, 47 mm) using an acid- cleaned Nalgene analytical filter unit. All filtered water samples were acidified to pH < 2 with Optima grade nitric acid (Fisher) and stored until analysis. Filters containing suspended particulate matter were stored in pre-cleaned Petri dishes and kept frozen inside Ziploc bags. In the lab, porewater was obtained after centrifuging approximately ~30 cc of sediment in 50 ml polypropylene at 4000 rpm x 10 min. Then, the supernatant was carefully suctioned with a 5 ml syringe. Two aliquots of 5 ml were separated. One was filtered through a 13-mm, 0.45 μm PTFE filter and acidified to pH < 2 with Optima grade nitric acid and stored for total dissolved copper; the other one was immediately frozen for further Cu-ISE (free ion Cu⁺⁺) measurements.

An additional fraction of homogenized sediment was separated on pre-weighed crucibles for determining total organic matter content. Another sediment fraction was transferred to small acid-washed vials, dried at 60°C in an oven, and homogenized to powder for further determination of copper. The remaining sediment was frozen for further grain size analysis.

- desk : Literature search to obtain historical record. Order supplies and gear for the field program. Determine sampling sites using GIS through our collaborator Guillermo Mendoza.

Table of activity - percentage carried out

Activity	Field	Laboratory	Desk
	Previous/this period	Previous/this period	Previous/this period
Exploratory	%0 / 100%	%10 / 20%	%20 / 10%

Activity in progress:

- field:

- laboratory:

Determination of total organic matter, grain size analysis (percentage of sand/mud), pigment content in sediments.

Drying sediment for further determination of bioavailable copper. Preconcentration of water samples taken in Harbor Island West (May 28, 2008) and determination of CuD, part being carried out by our collaborator, Dr. Francisco Delgadillo at UABC.

Measuring of ion Cu⁺⁺ using an ion selective electrode in collaboration with Dr. Alberto Zirino.

- desk : search and revision of literature

Deliverables

Report produced

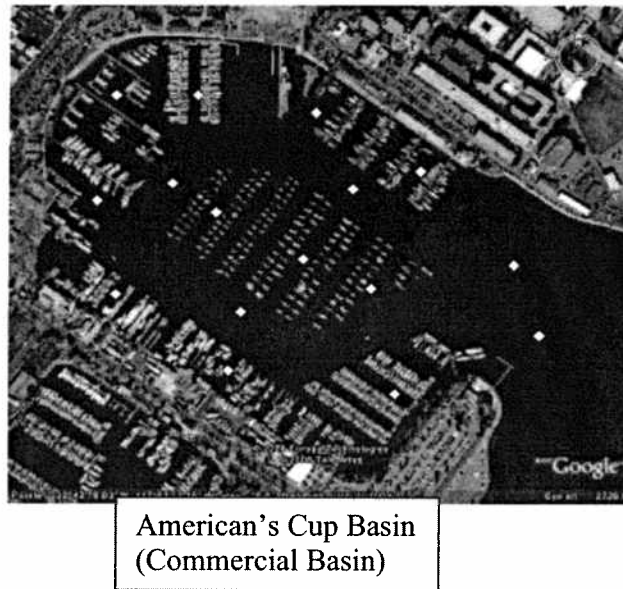
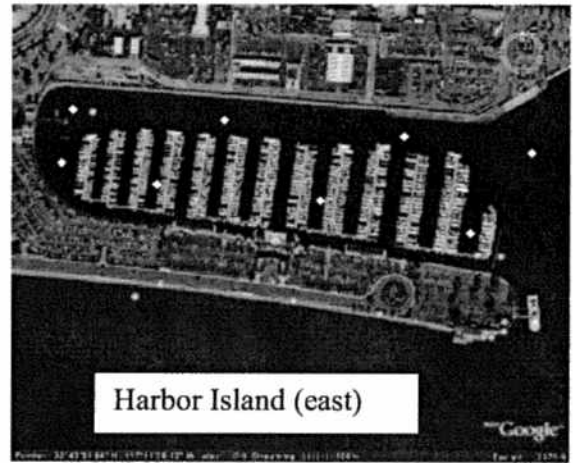


Fig. 1. Exploratory sampling sites (diamond symbol) in San Diego Bay