

Assessment of bioavailable methylmercury in San Francisco Bay using Diffusive Gradient in Thin films (DGT)

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Design for marine deployment of DGTs

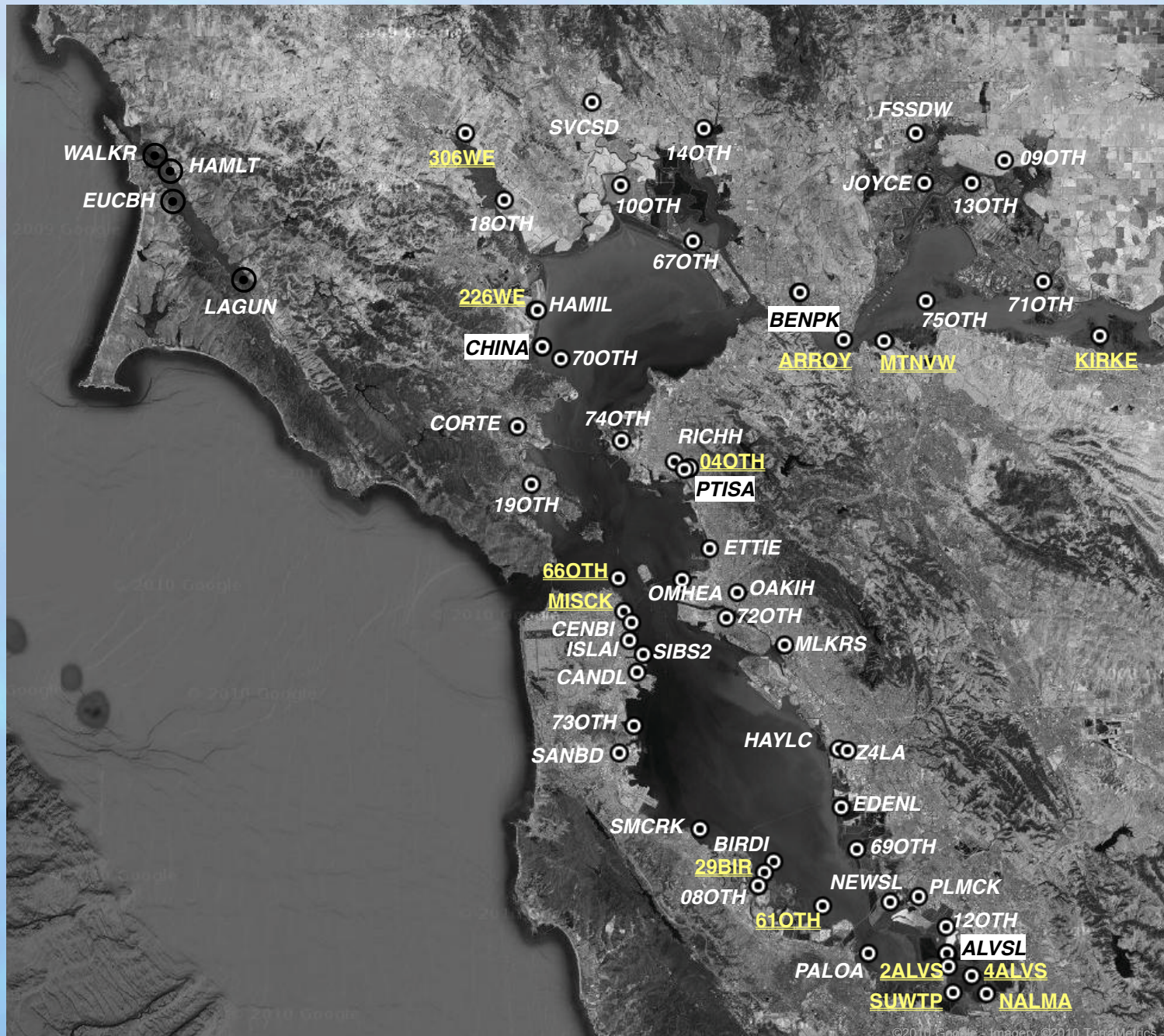


Each sample is actually the average of three DGT devices (water)

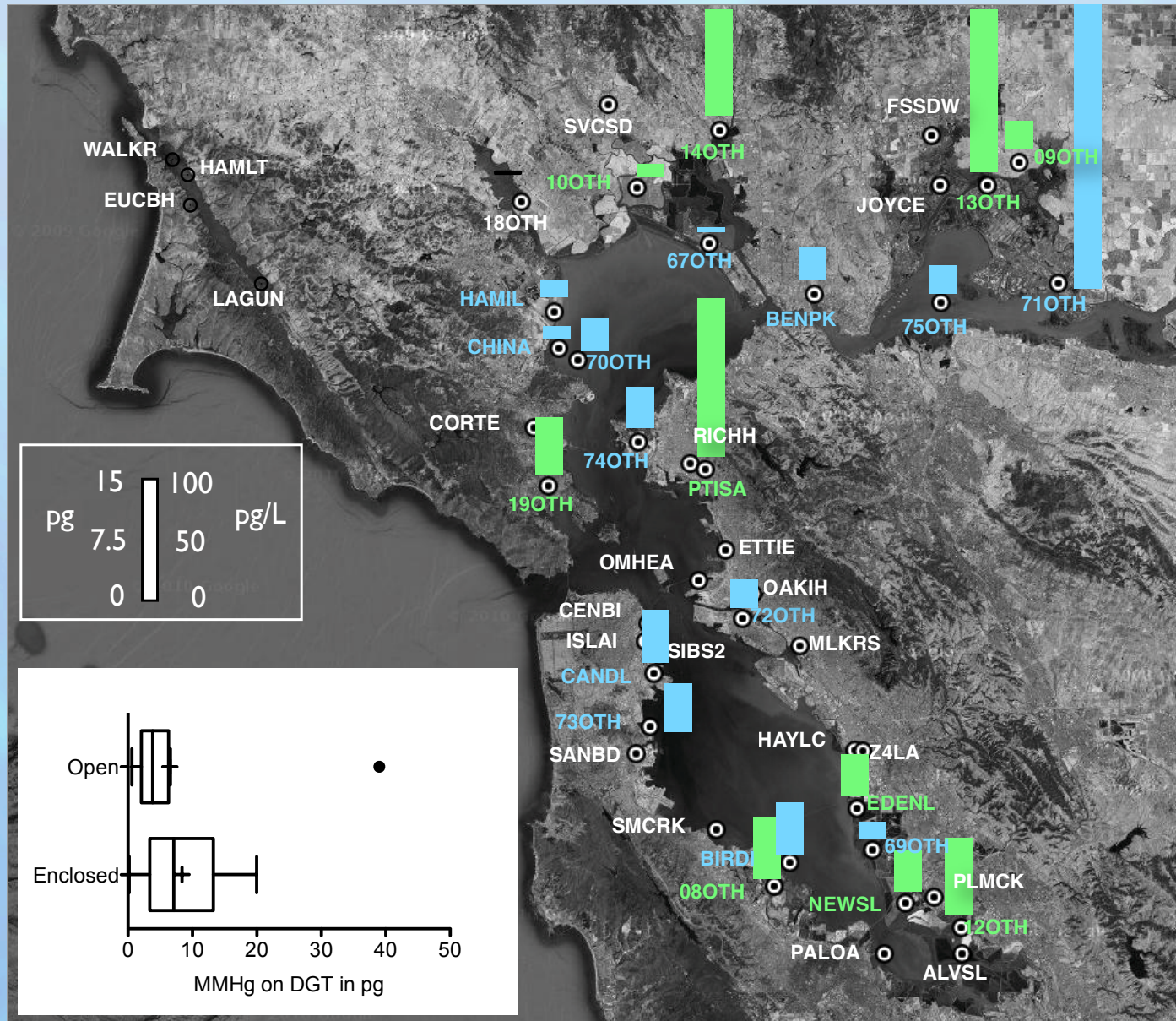
Study objectives

- Can we employ DGT samplers to identify sources of bioavailable MeHg in the bay?
- How does the information provided by DGTs compare to results from the small fish sampling program?

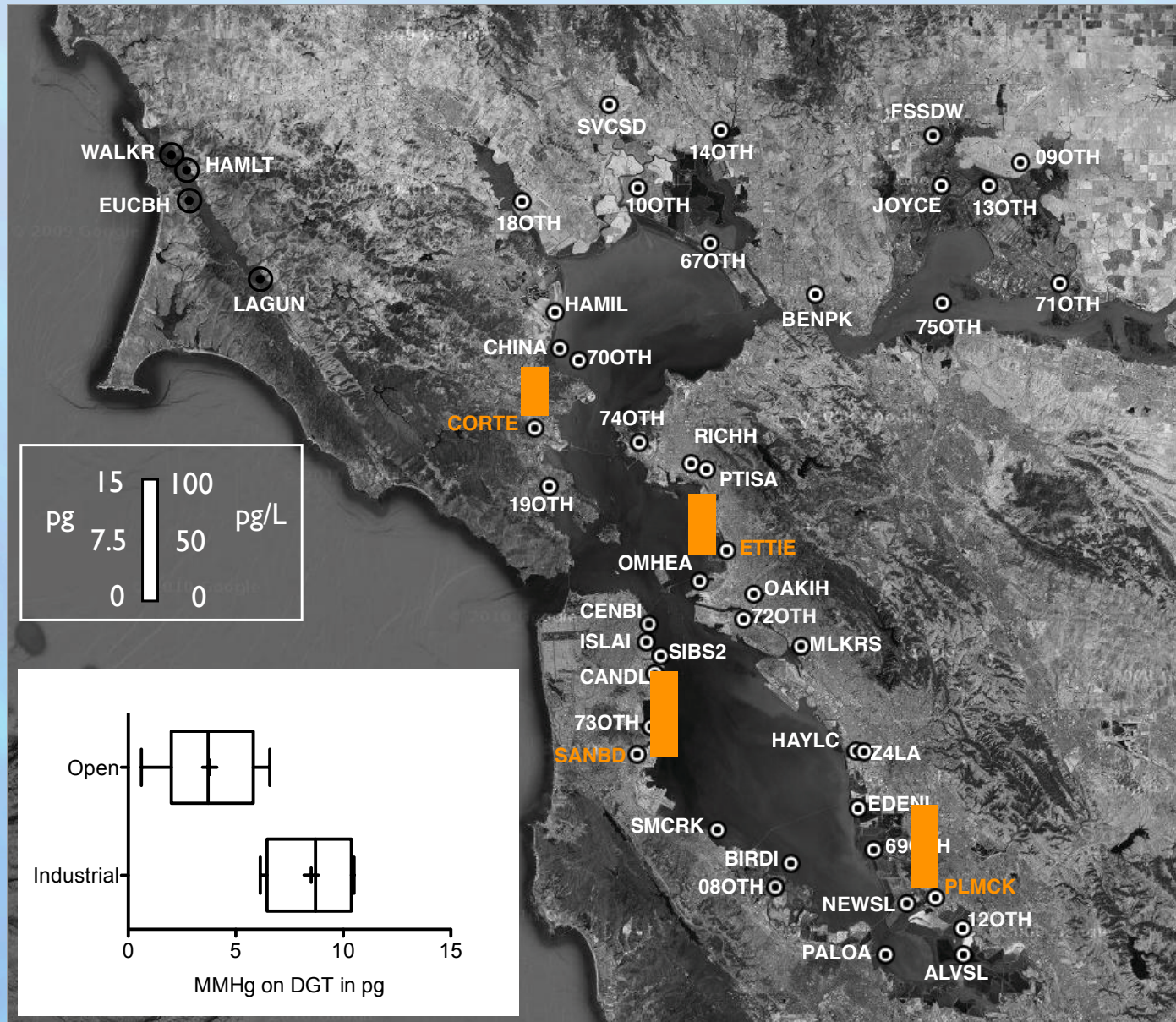
Sampling stations 2008 + 2009



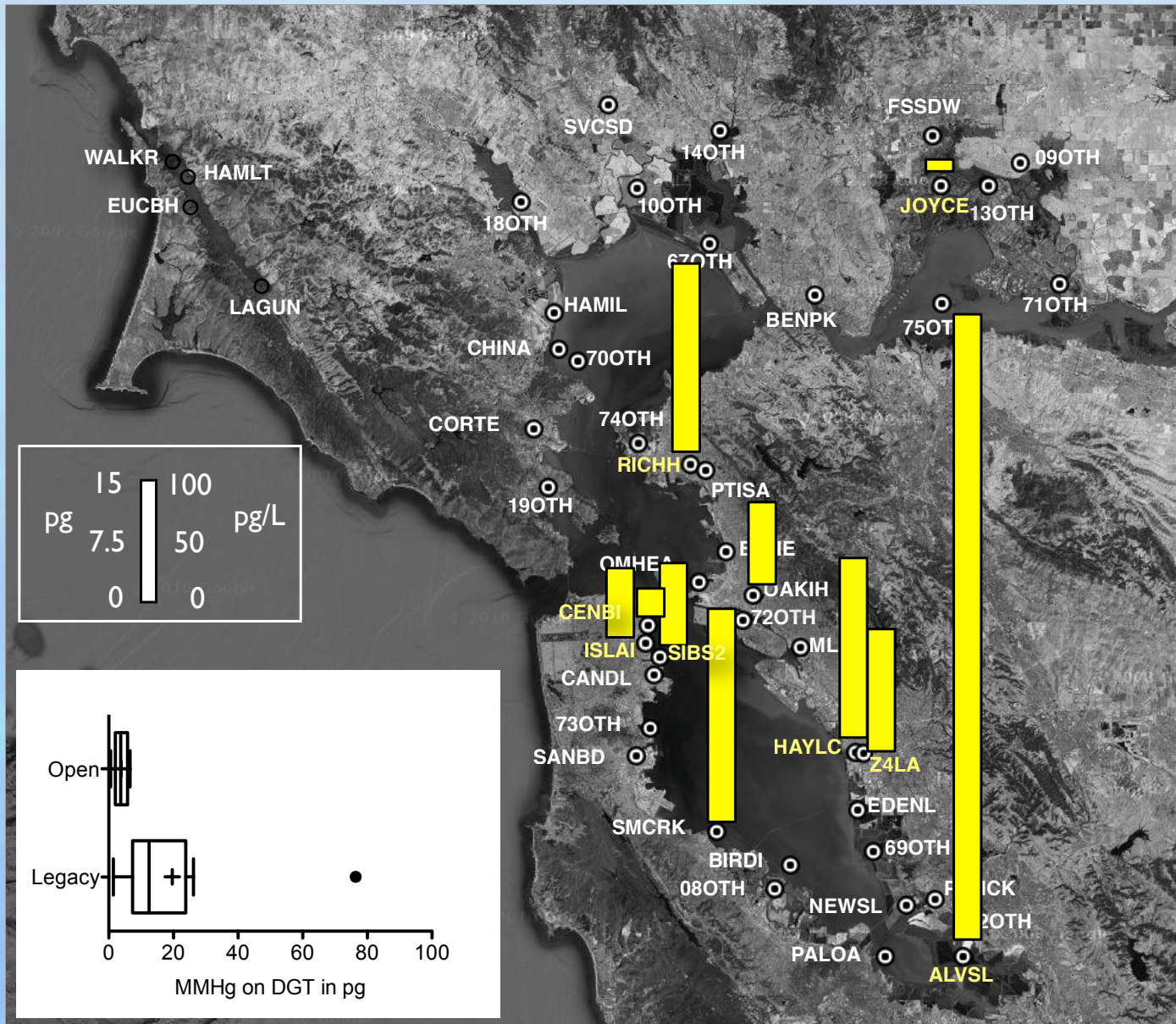
Open vs. enclosed bays



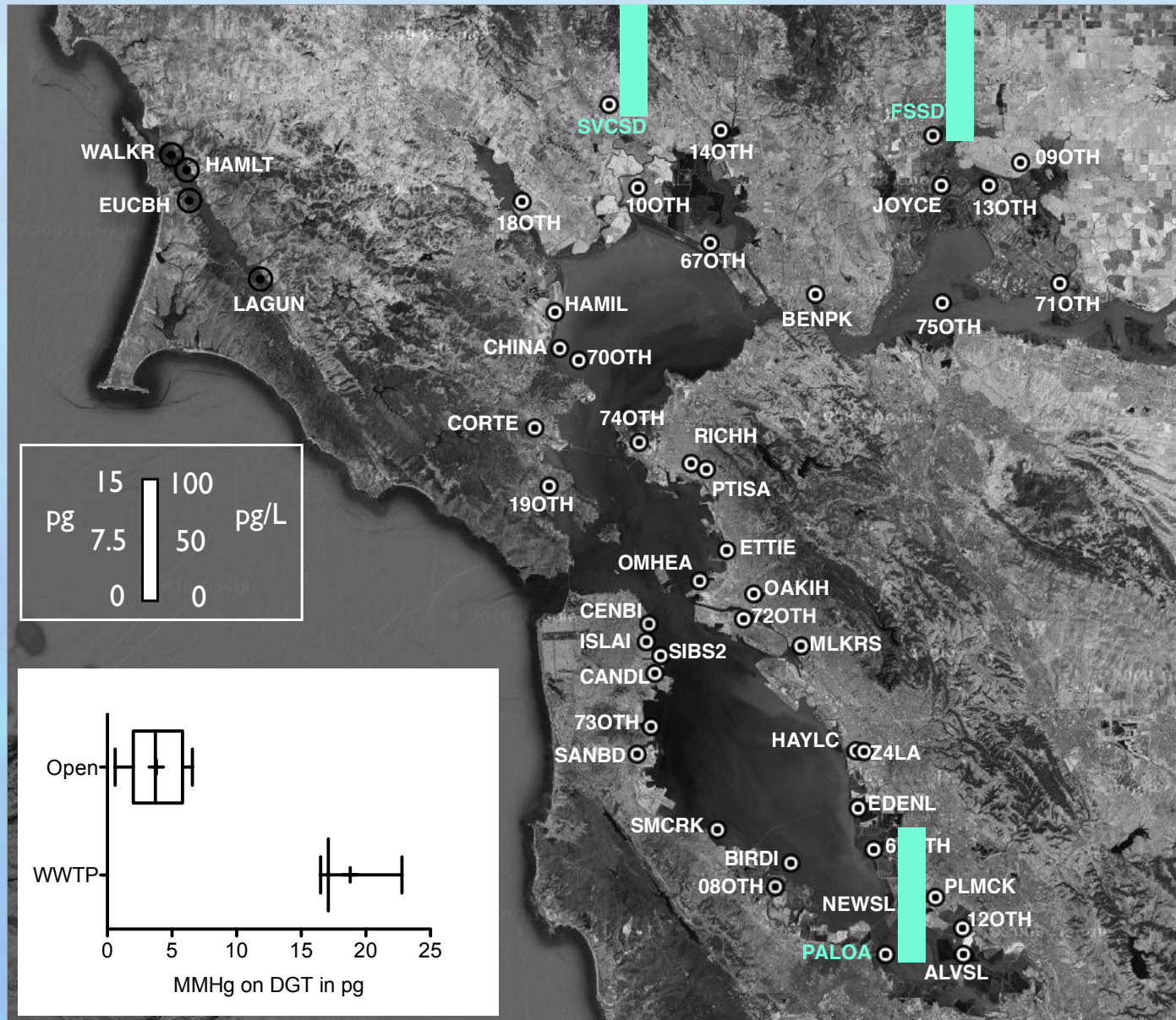
Industrial sites



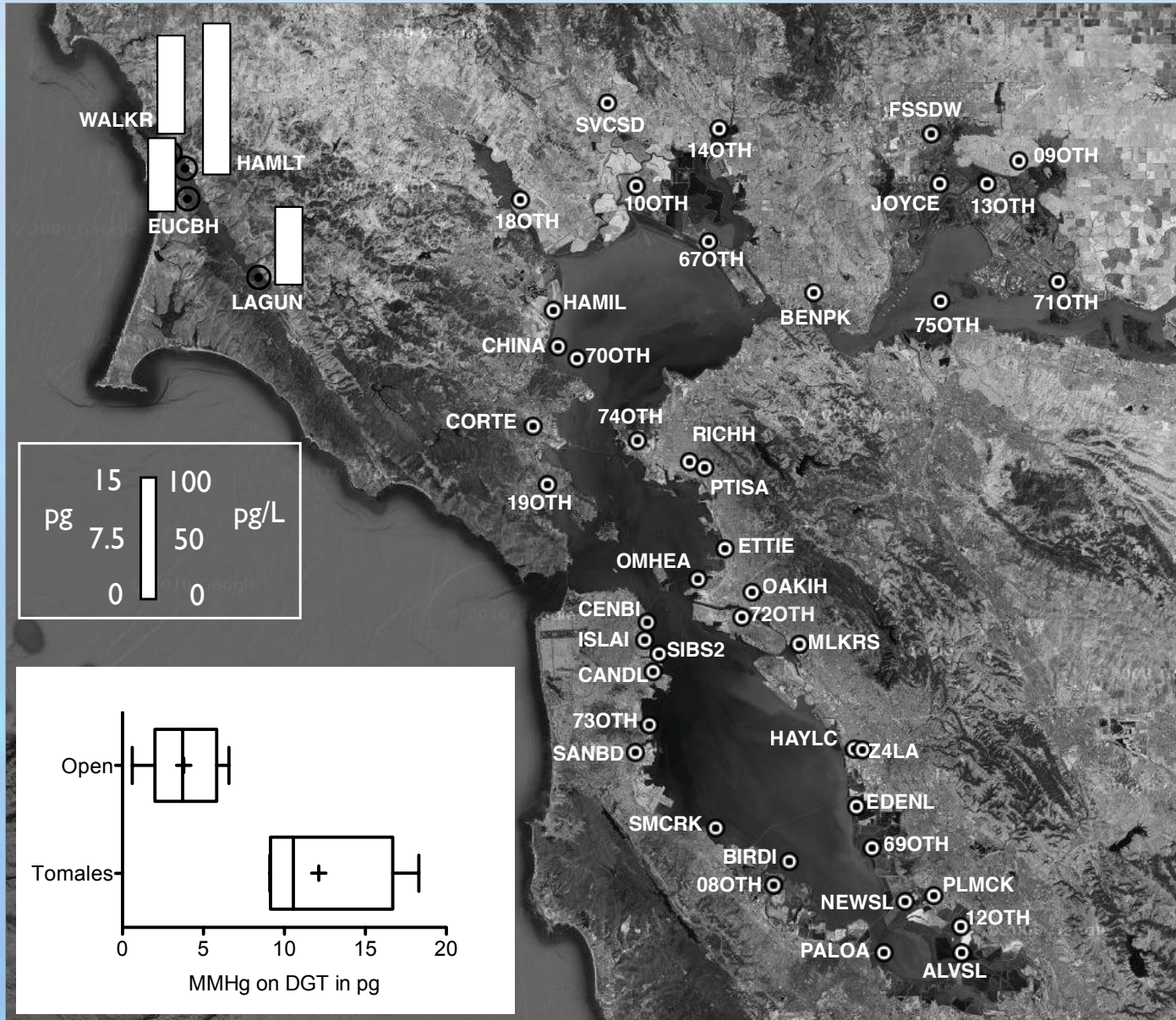
Legacy sites



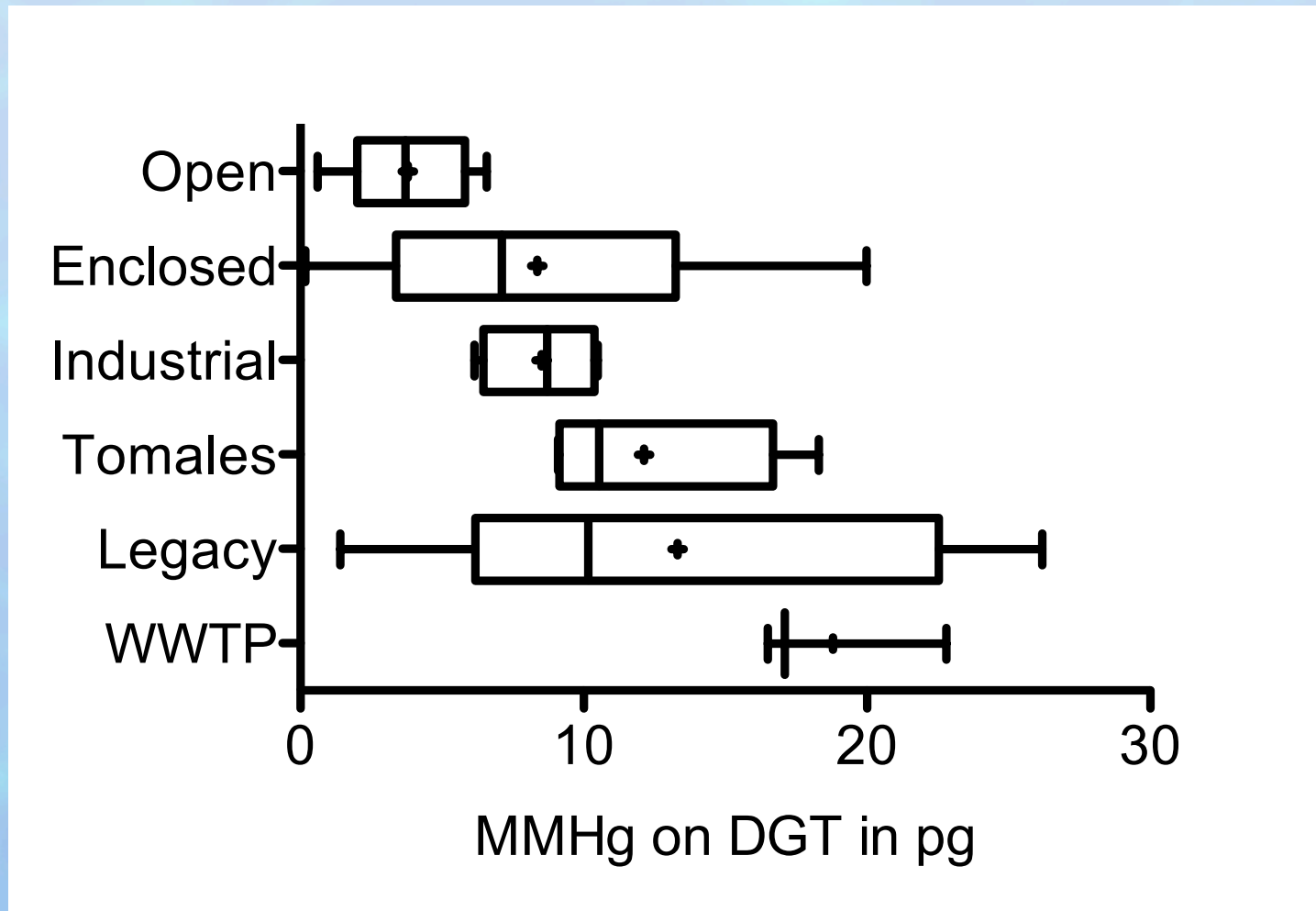
Waste Water Treatment Plants



Tomales Bay

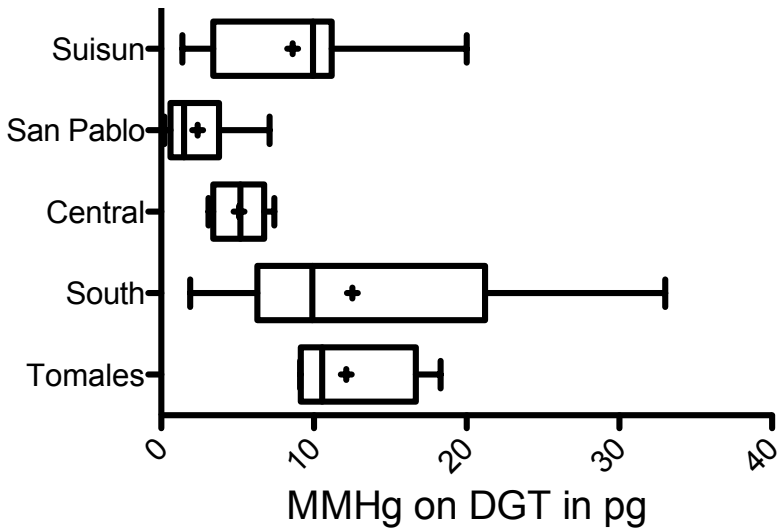
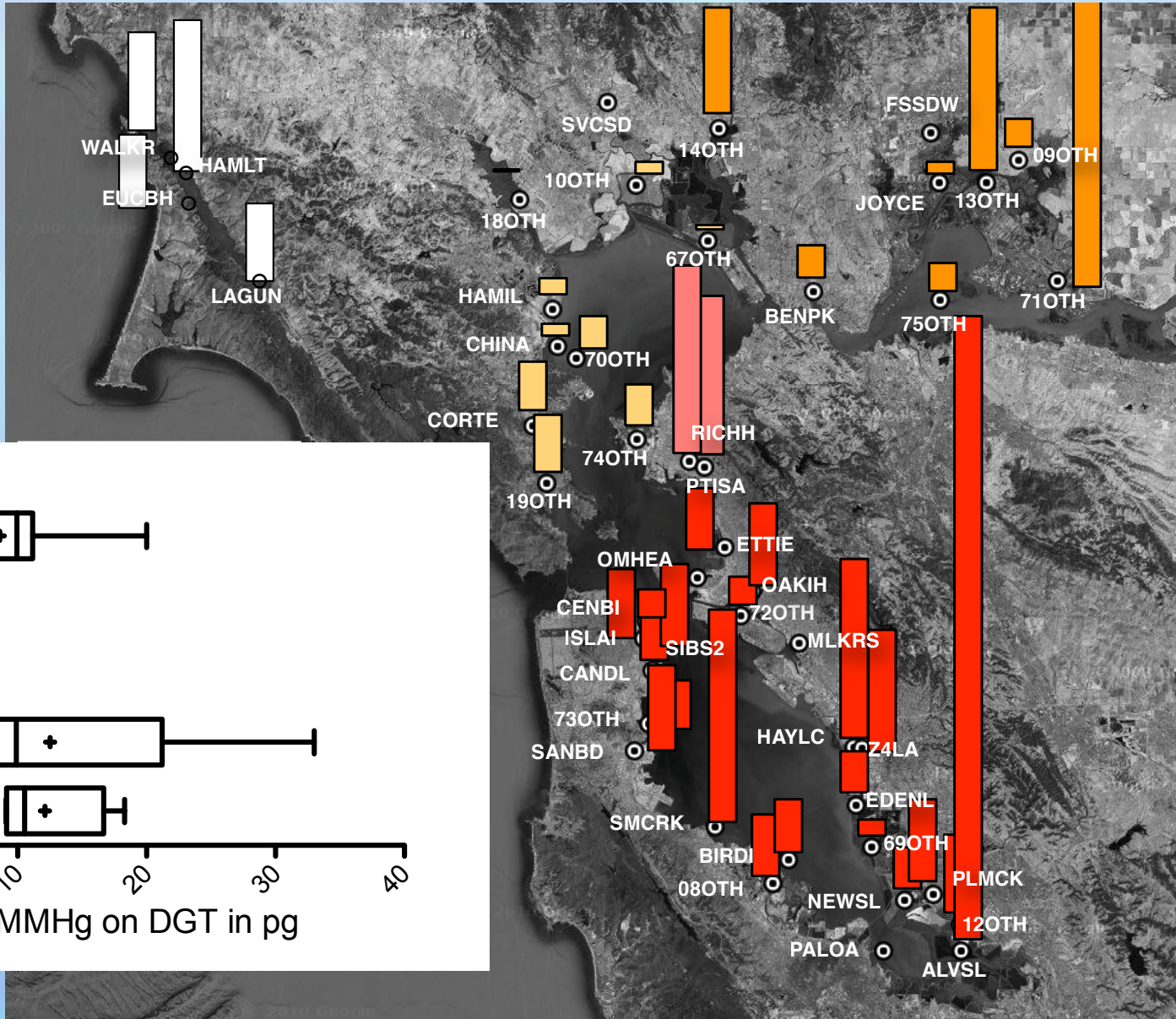


Comparison among sites

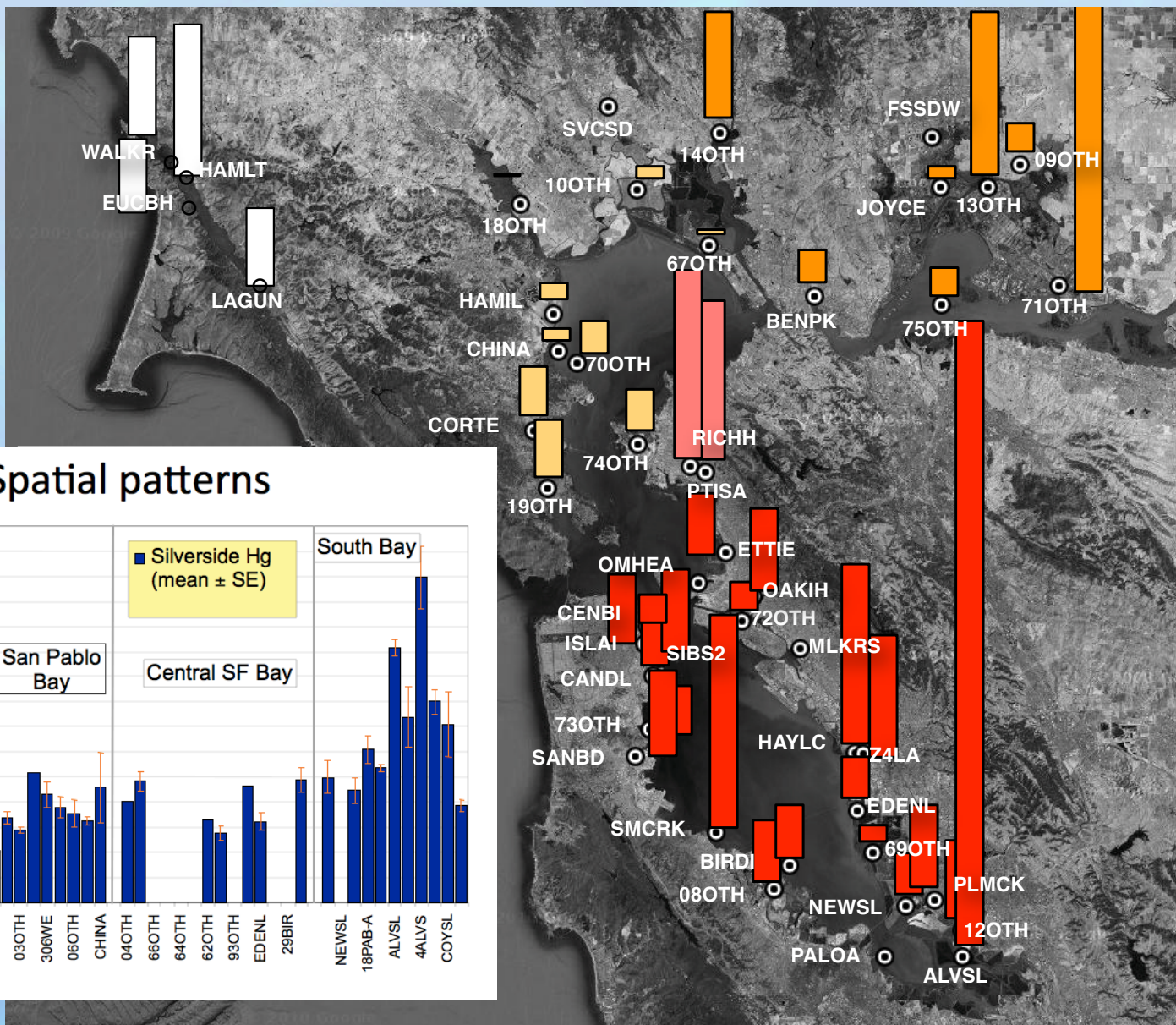


DGT MeHg in pg

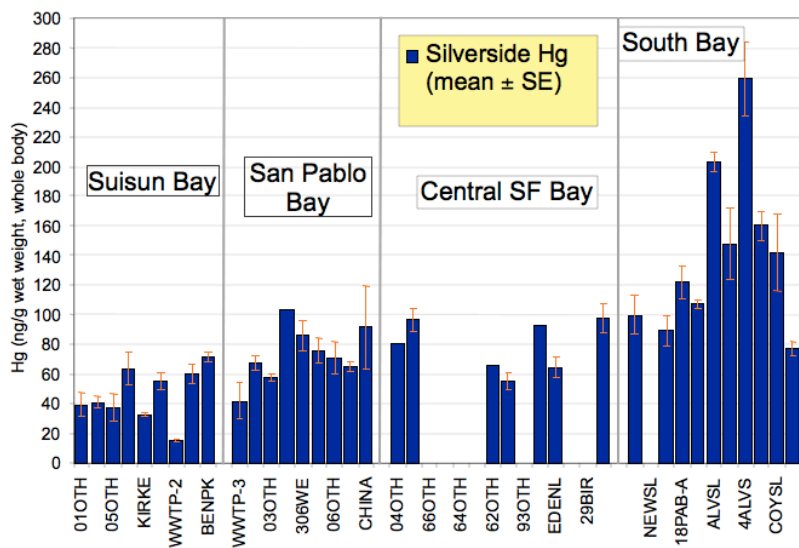
Regional patterns 2009



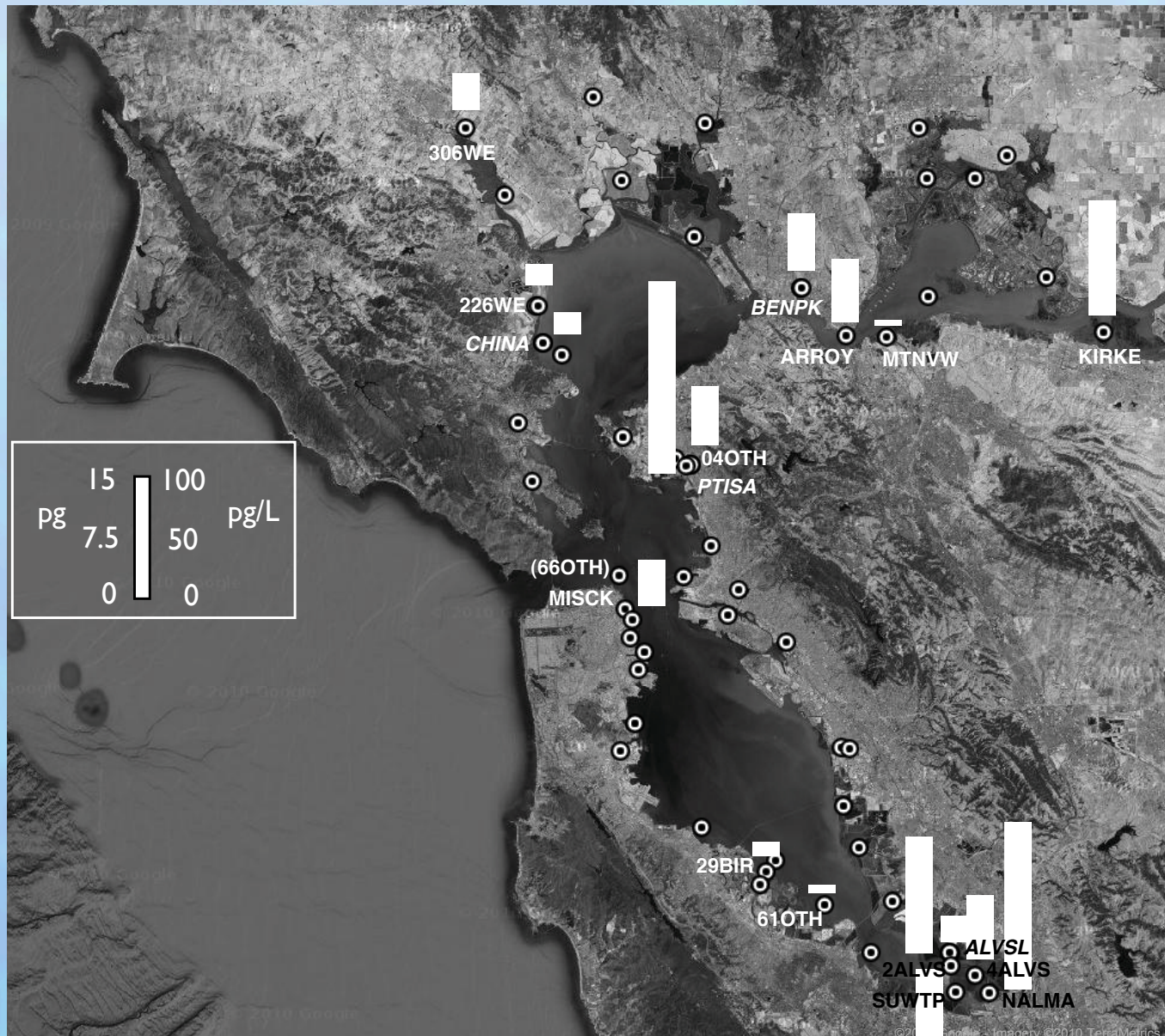
Regional patterns 2009



Spatial patterns

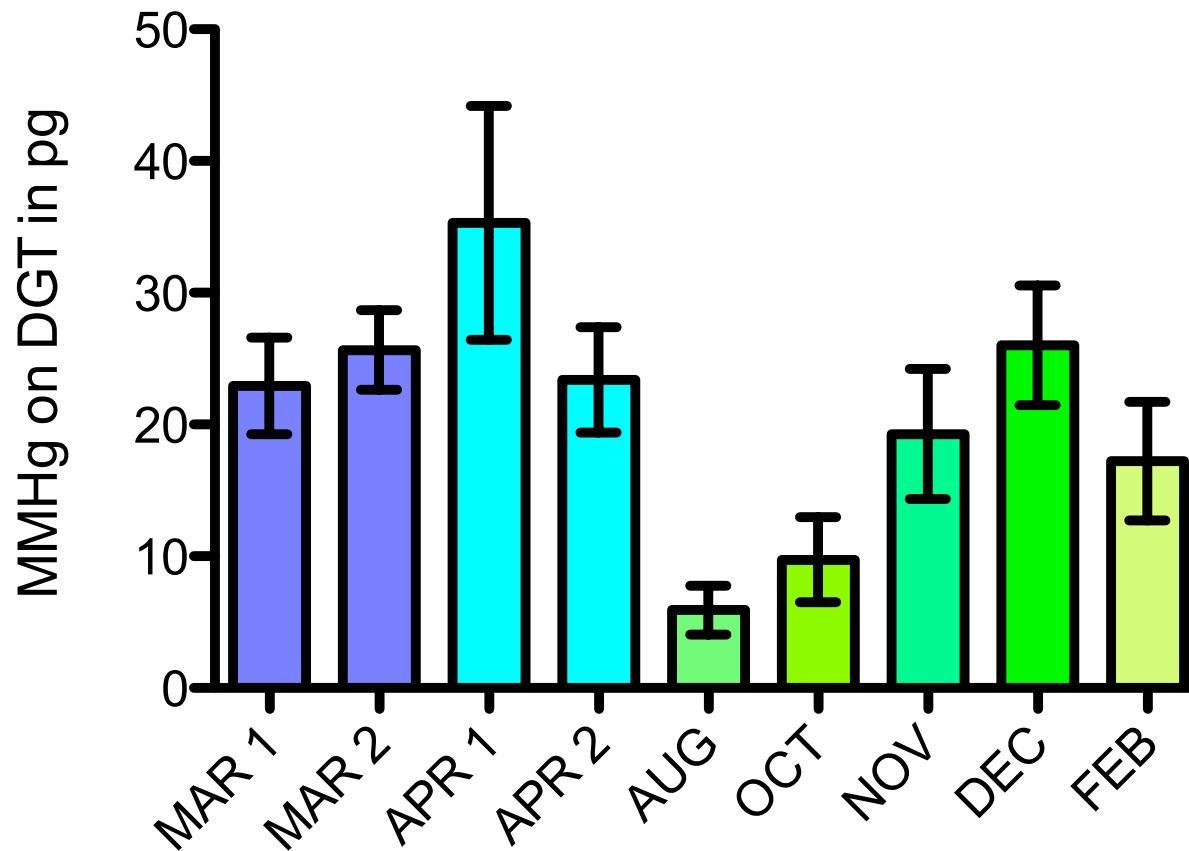


Regional patterns 2008



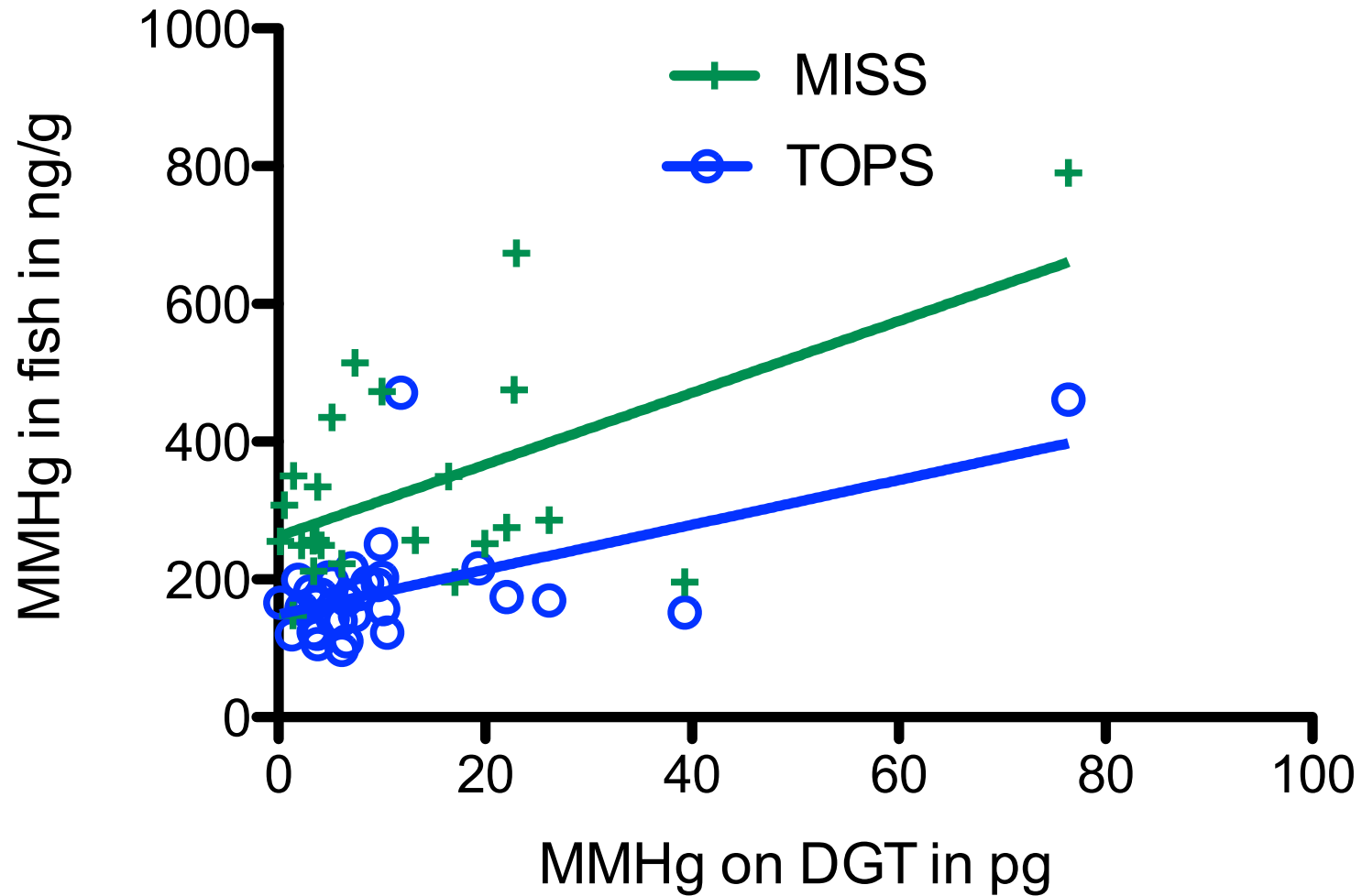
Seasonal study

MLK Regional Shoreline

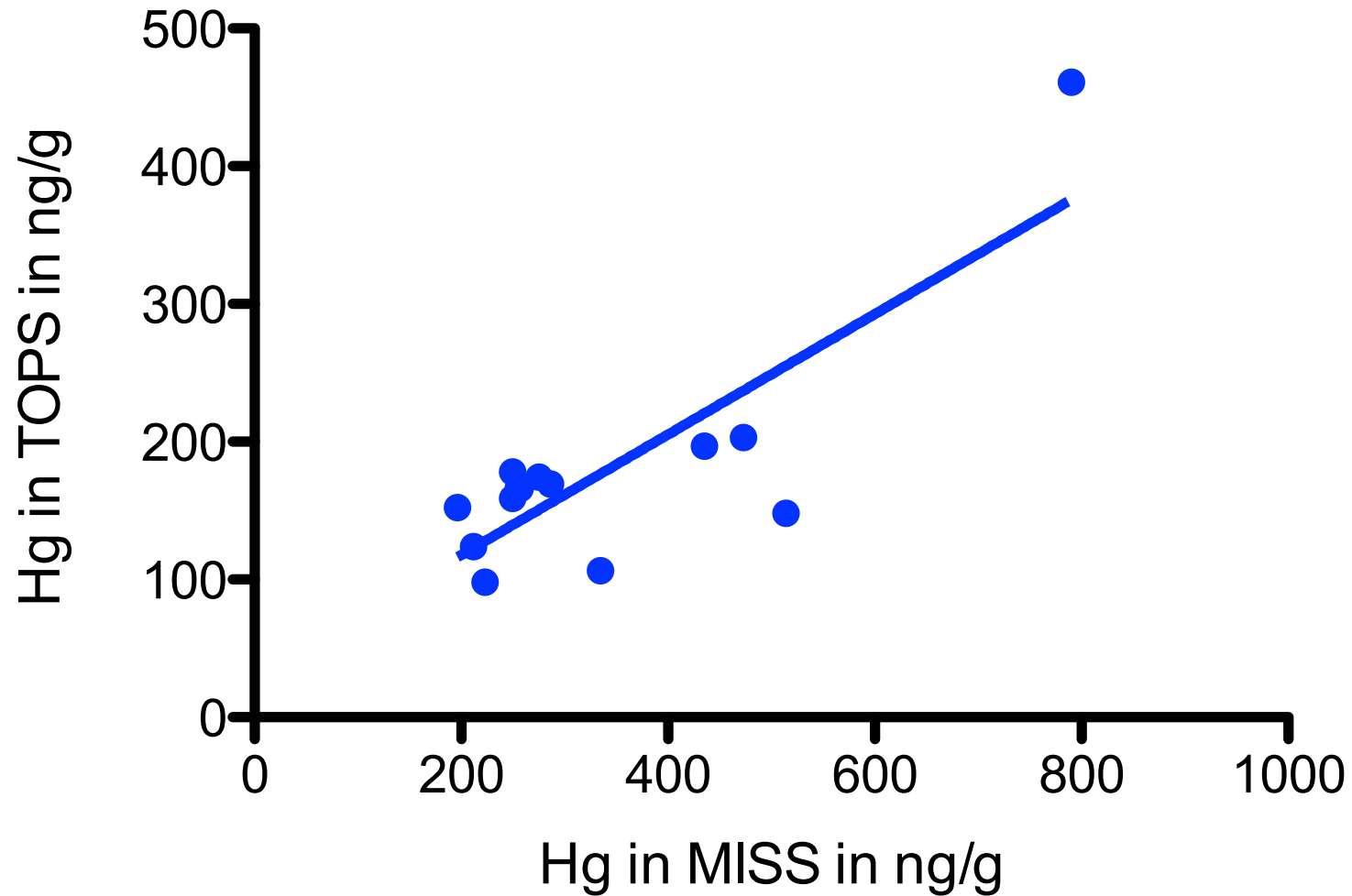


**Comparison of DGT
data with results from
small fish sampling
program**

Comparison of MMHg uptake in DGT and Hg concentration in small fish



Comparison of Hg concentrations in two small fish species



Summary

- DGT technique offers an alternative (complementary?) tool to

- identify areas with elevated MMHg:

Alviso, Point Isabel, Suisun Bay(?), WTP

South Bay > Central Bay > San Pablo Bay < Suisun Bay

- monitor seasonal variations in MMHg
- 4 week deployment optimum for Bay area
- can be deployed almost anywhere (as long as they do not dry out)
- DGT and fish data do not correlate well, though both consistently identify high level MMHg areas

Future studies

Source tracking I

- Sacramento River vs. Guadalupe River influence
- Suisun Bay hot spots
- combine with annual MMHg input budgeting (Guadalupe River)

Source tracking II

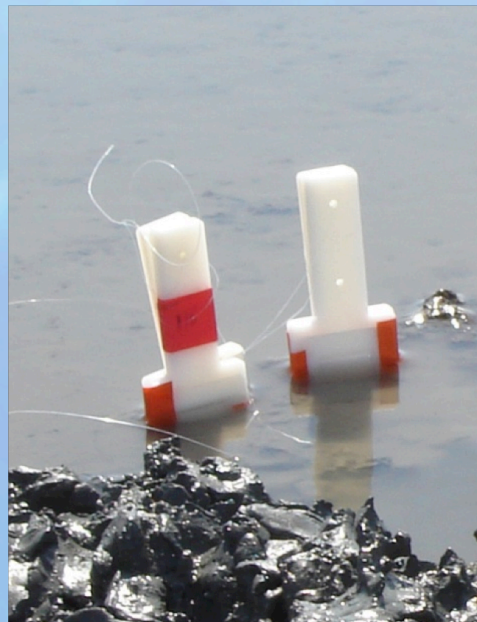
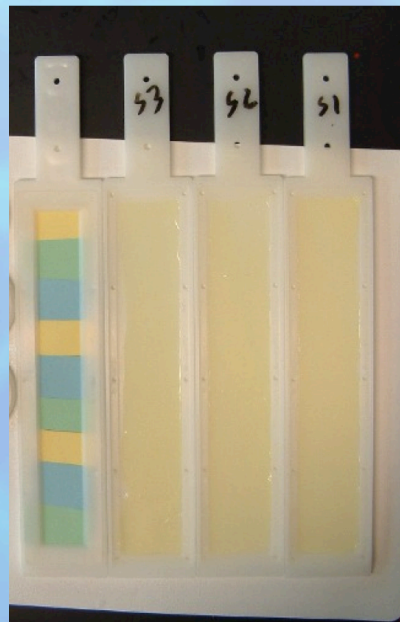
- Waste Water Treatment Plants
 - In-place production of MMHg, enhanced by WWTP discharge?
 - elevated MMHg in WWTP discharge?

MMHg source budget

- 12 months sampling program
 - contrast impact of mining (e.g. Guadalupe River/Alviso Slough) to wetlands to WWTPs
 - requires hydrology, discharge volumes

Sediments as MMHg sources

- MMHg production in sediments and export to Bay:
- marshes - mudflats - WWTP channel
- methylation assays using isotope enriched Hg or sediment DGTs



Unsolved questions

- MMHg in Salt Ponds
- Point Isabel situation

**Are DGTs ready for Bay -
wide monitoring program?**