The Critical Edge: Lessons Learned from 15 Years of Monitoring the Margins

Philip Trowbridge
Don Yee
Jay Davis
Scott Dusterhoff
Lester McKee
San Francisco Estuary Institute

2017
Margins are...

A major gap in the RMP
Margins are...

15% of the Bay
Margins are…
Essentially mudflats
(by our definition at least)
Why do you care?

- Everyone: Recreational and wildlife impacts
- Stormwater: Finding sensitive watersheds
- Dredgers: Dredged material beneficial reuse
- Wastewater: Nutrient effects, CEC screening
- NGOs & Public: Fish consumption advisories
- Water Board: Sediment hot spots, all of the above
What have we learned?
Margins are ...
Margins are ...

possible to sample after all!
Small Boats
Even Smaller Boats
Passive Samplers
Flow-Through Sensor Systems

USGS “Suitcase of Science” Flow-Through System

Chlorophyll-a in South Bay
March 23, 2017

USGS/SFEI Cruise 2017-03-23
Regional Monitoring

Central Bay Study 2015

South Bay Study 2017

Key
- Water Volume (2 - 5 L)
- Sediment Volume (1.75 - 5.44 L)
- Margins
- Micro
- Nano
- CECs
- PFAS
- Water

Proposed Microplastic Sampling Sites
Bathymetry data from the CaCIFG, 2002
Map datum and projection: NAD 1983 California State Albers
Map Created by Jennifer Sun, April 2017
Site Specific Studies of PCBs

• Focus on priority margin units

• Comprehensive study of San Leandro Bay
Margins are ...
Margins are ... more contaminated than the open Bay
Sum 40 PCBs in Central Bay Sediment
Corollary to #4

Margins are ... hard to make more contaminated by reuse of dredged material
Margins are …
Margins are …
sensitive to nearby sources.
Sum 40 PCBs
PCBs on suspended sediment in runoff
Margins are ...
Margins are ... where the wild things are
PCBs in Small Fish – An Eye Opener

• Very high concentrations
• High spatial heterogeneity
• Conceptual model upgrade needed
Charismatic monitoring targets
Margins are …
Margins are … responsive to management actions (maybe?)
Sediment cores show response to major actions

Yee et al. 2016 in review

↑ 2005  ↑ 1980  ↑ 1940

Yee et al. 2016 in review
But, have margins improved in the last 20 years?

PCBs in Sediment in Central Bay

No downward shift apparent for new margins data
Models predict 30% reduction in 10 years if sources stopped
Why are margins growing in importance for the region?
By 2050, flooding of contaminated sites is likely

24 inch SLR scenario in Richmond

Source: NOAA SLR Viewer
The pace of wetland restoration will double

Goal (100k ac)

Acres of wetlands restored

Measure AA Funding $500M over 20 years

Footnote: Data summarized from Project Tracker (ptrack.ecoatlas.org).
Wanted: More sediment

Sediment (MCY over 15 years)

- Baylands Goals Need
- Source

- Stored in reservoirs
- Stored in flood channels
- Dredged from the Bay
- Construction site removal
- Watershed

Preliminary Information

MCY = Million Cubic Yards
How can the RMP help?

• Status and trends monitoring for contaminants in the margins
• Sediment supply monitoring and modeling
• Regional wetlands monitoring
Summary

Margins are…

• #5 … possible to sample after all
• #4 … more contaminated than open Bay
• #3 … sensitive to nearby sources
• #2 … where the wild things are exposed
• #1 … potentially responsive to mgmt actions
• … ground zero for management decisions
• … a good fit for the RMP!