The Regional Monitoring Program for Trace Substances – Effective Application of Scientific Information in Multi-Agency Decision-Making

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Overview

- Monitoring Program Objectives
- Partners
- Program Design
- Important Findings
- Case Studies and Related Management Decisions
- Conclusions

The Golden Gate Watershed

RMP Objectives

- Describe patterns and trends in contaminant concentrations and distribution
- Describe general sources and loadings of contamination
- Measure effects of contaminants
- Compare monitoring information to guidelines
- Synthesize and distribute information

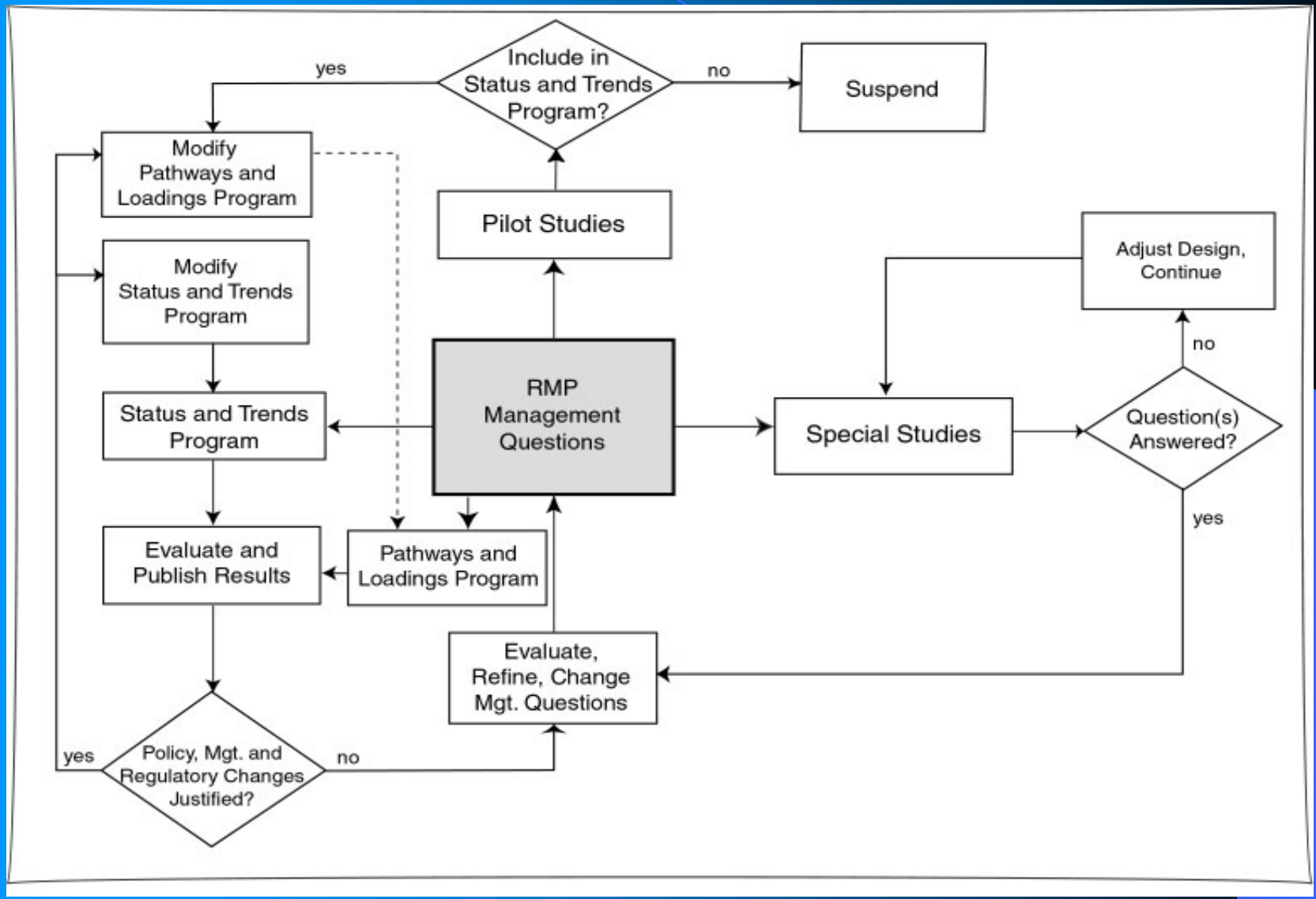
Institutional Framework

- State Regulatory Agency (San Francisco Bay Regional Water Quality Control Board)
- More than 70 “Program Participants” (funding through permit requirements)
- San Francisco Estuary Institute (science administrator)
- Collaborators, Partners, and Contractors

Checks and Balances

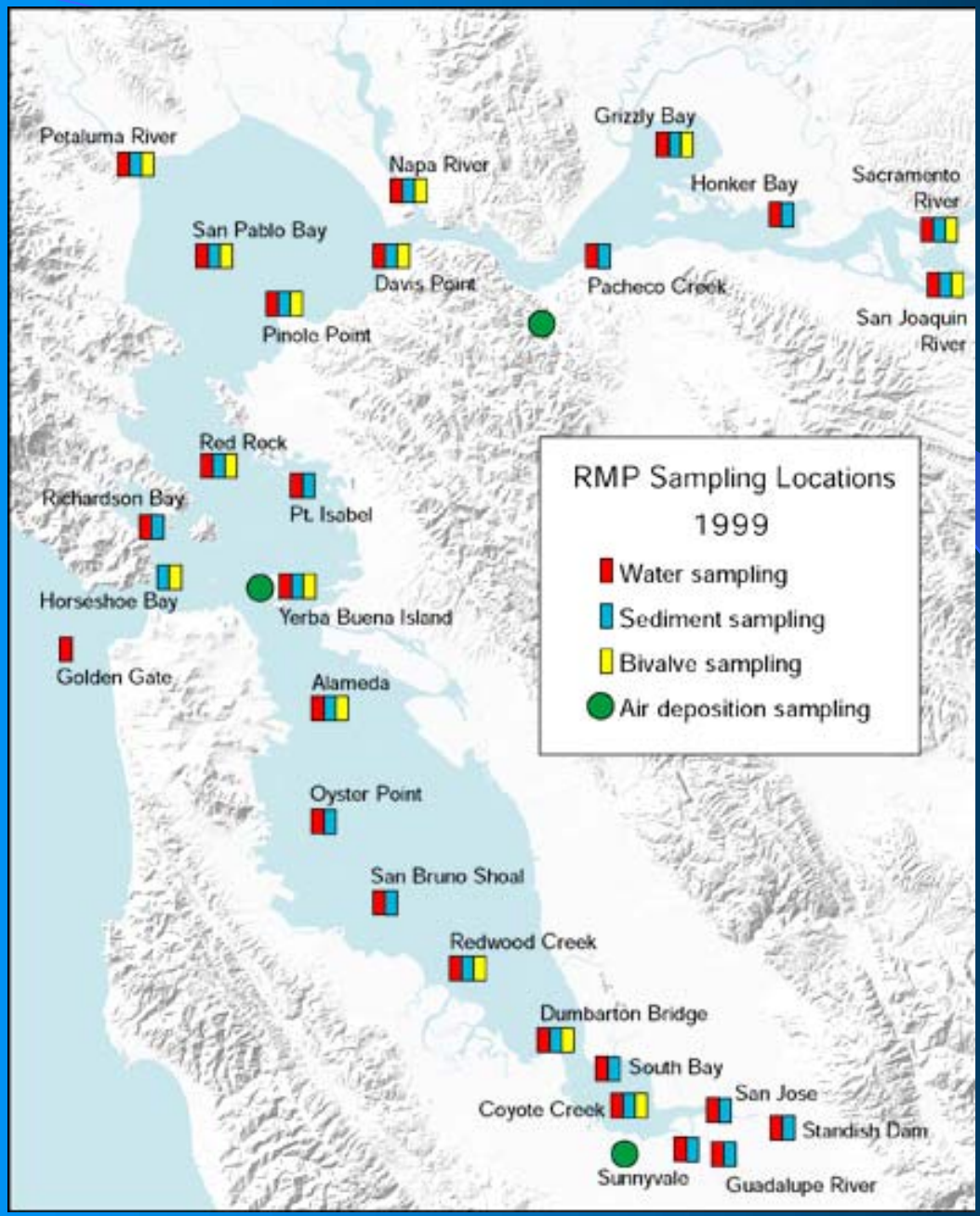
- Are management questions relevant?
- Are monitoring and study designs responsive to management questions?
- What is the uncertainty “comfort level?”
- Is funding sufficient?
- What kind of adjustments are in order?

Program Adjustments



Monitoring Design Considerations

- Initial Purpose: Contaminant Characterization in “Ambient Waters”
- Status
- Trends
- Pollutant Pathways, Loads
- Effects

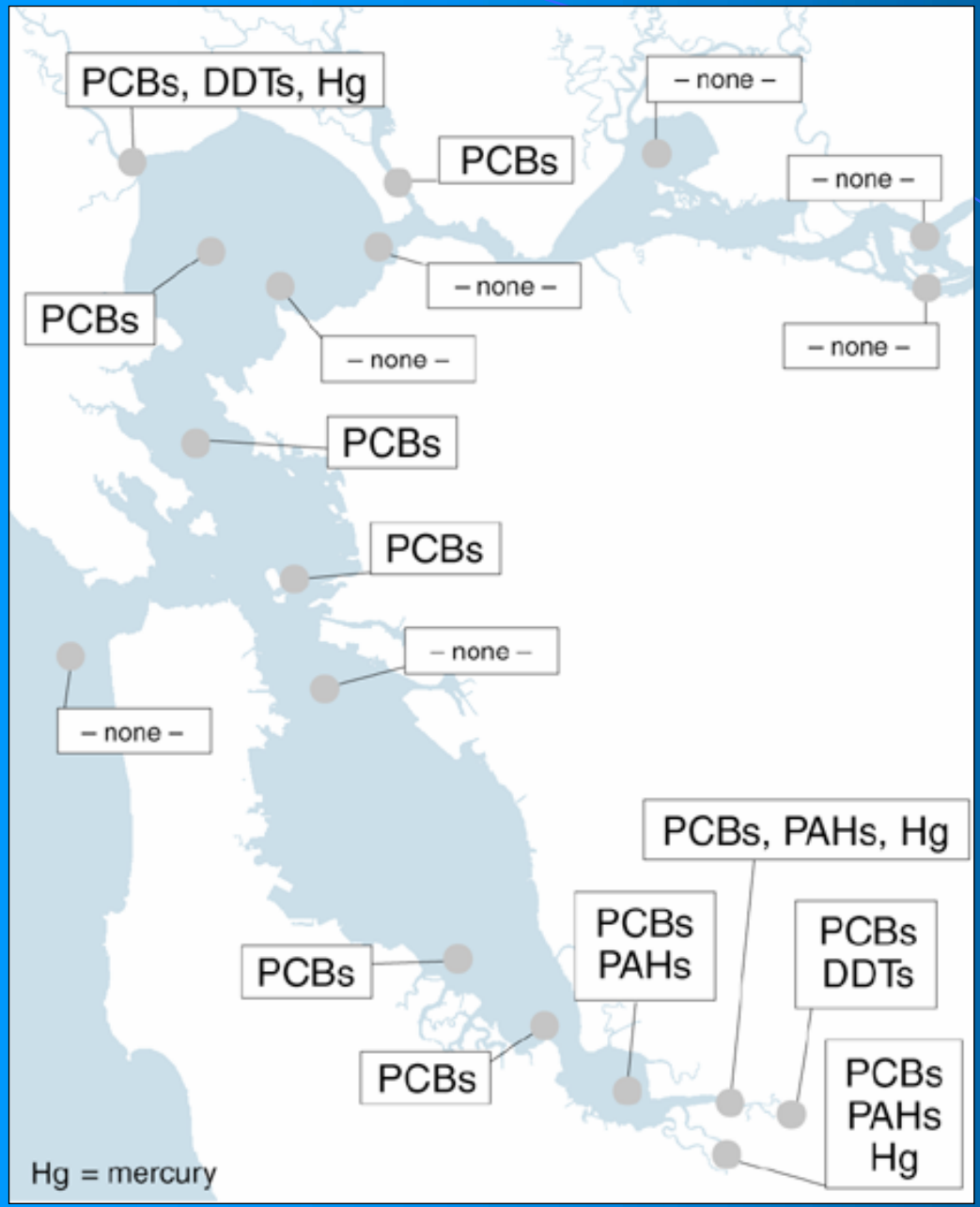

Petaluma River
Napa River
Grizzly Bay
Honker Bay
Sacramento River
San Pablo Bay
Davis Point
Pacheco Creek
Pinole Point
San Joaquin River
Red Rock
Richardson Bay
Pt. Isabel
Horseshoe Bay
Yerba Buena Island
Golden Gate
Alameda
Oyster Point
San Bruno Shoal
Redwood Creek
Dumbarton Bridge
South Bay
Coyote Creek
San Jose
Standish Dam
Sunnyvale
Guadalupe River
RMP Sampling Locations
1999
Water sampling
Sediment sampling
Bivalve sampling
Air deposition sampling

Revised Sampling Design Since 2002

- Probabilistic sampling for water and sediment
- Reduced number of bivalve stations
- Greater focus on determining loadings

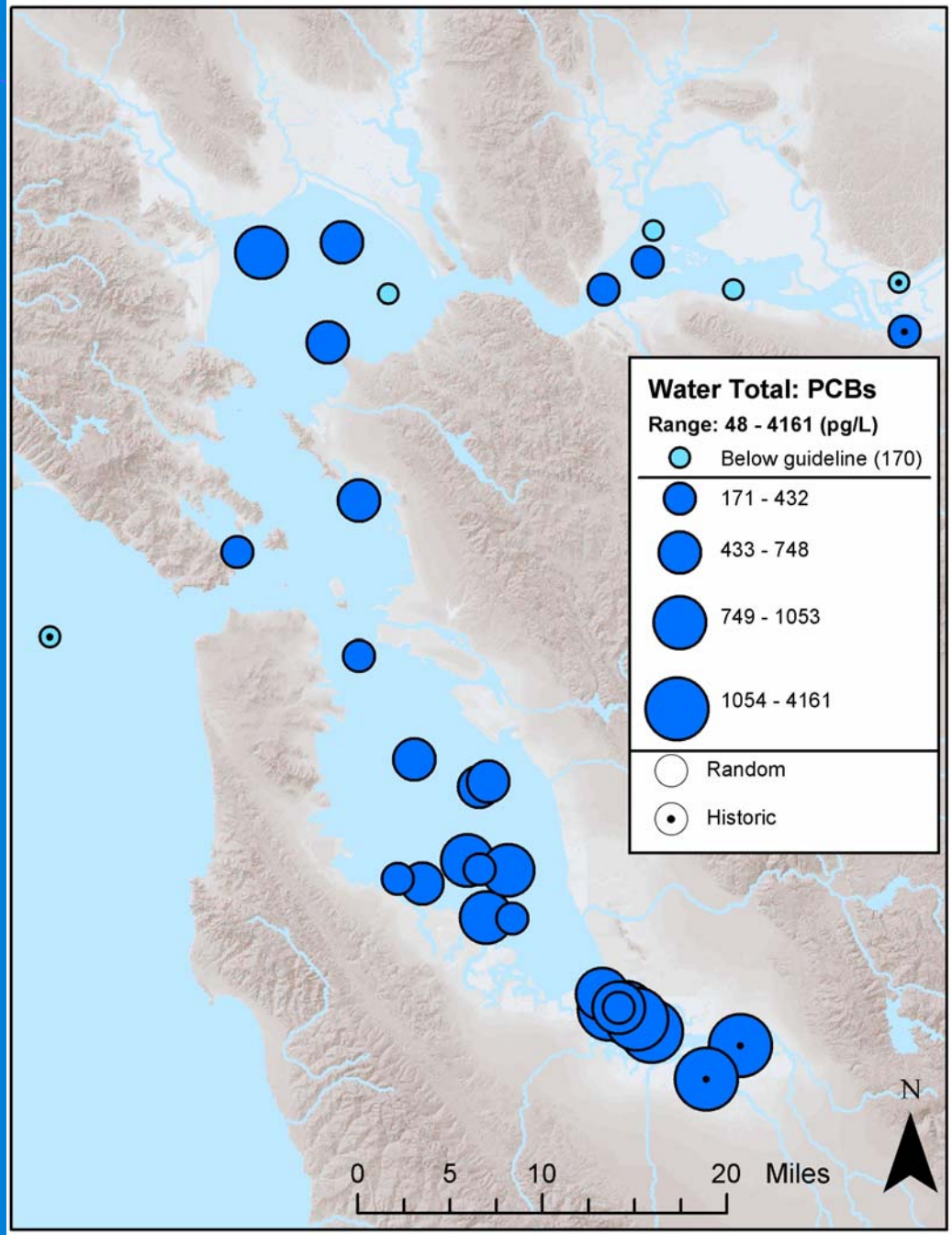
RMP data point out priorities

- Greater focus on a few priority issues: Mercury, PCBs, Se, modern pesticides, emerging contaminants
- Adjustments to 303(d) list
- Water quality criteria exceedances are not always good indicators of impairment (e.g. mercury, chromium, modern pesticides)
- Sediments are a reservoir of pollutants
- It is advisable to avoid future “legacy” contamination problems

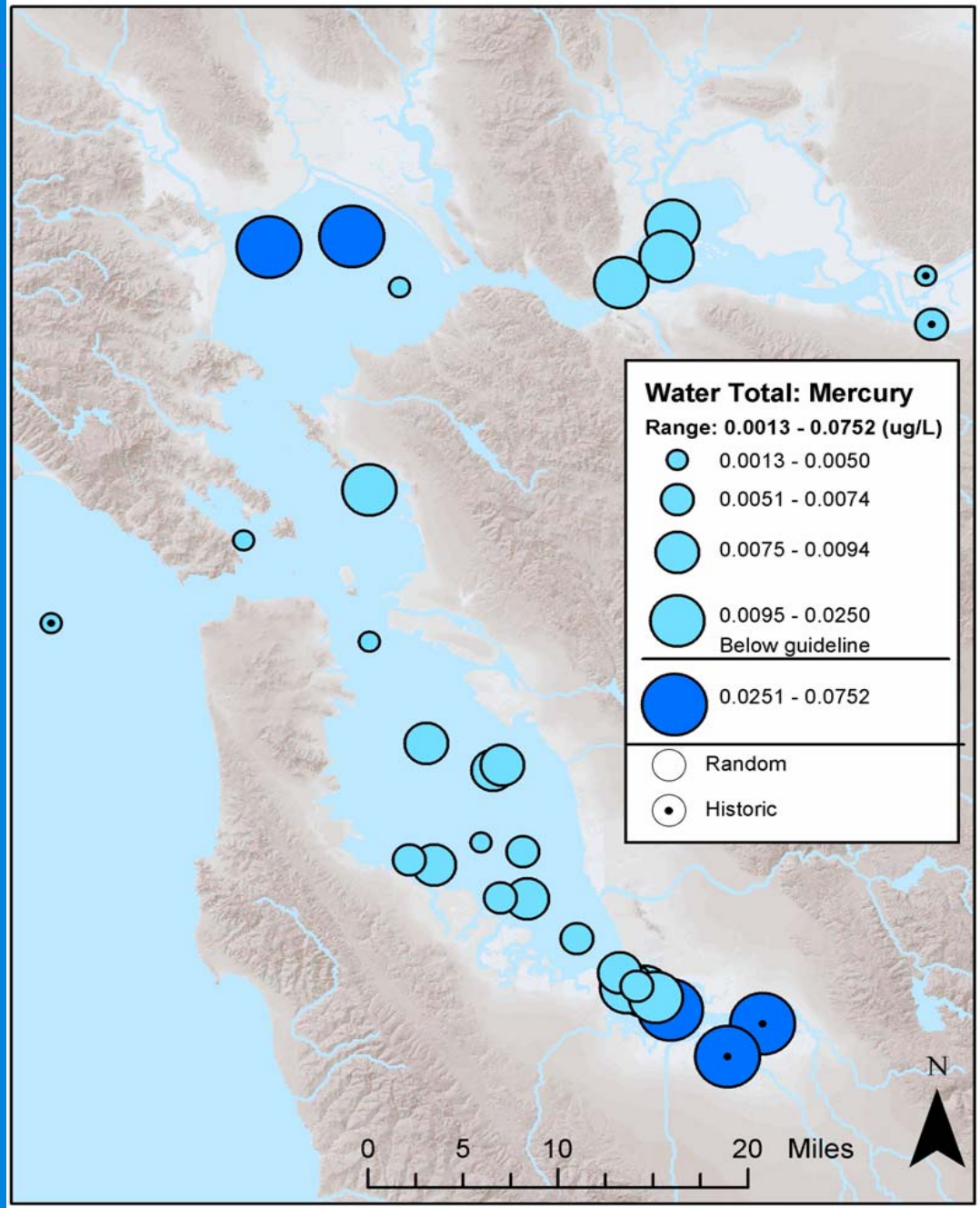


Contaminants in Water (guideline exceedances of more than 90% of the time, 1993-2001)

2002 PCB Data

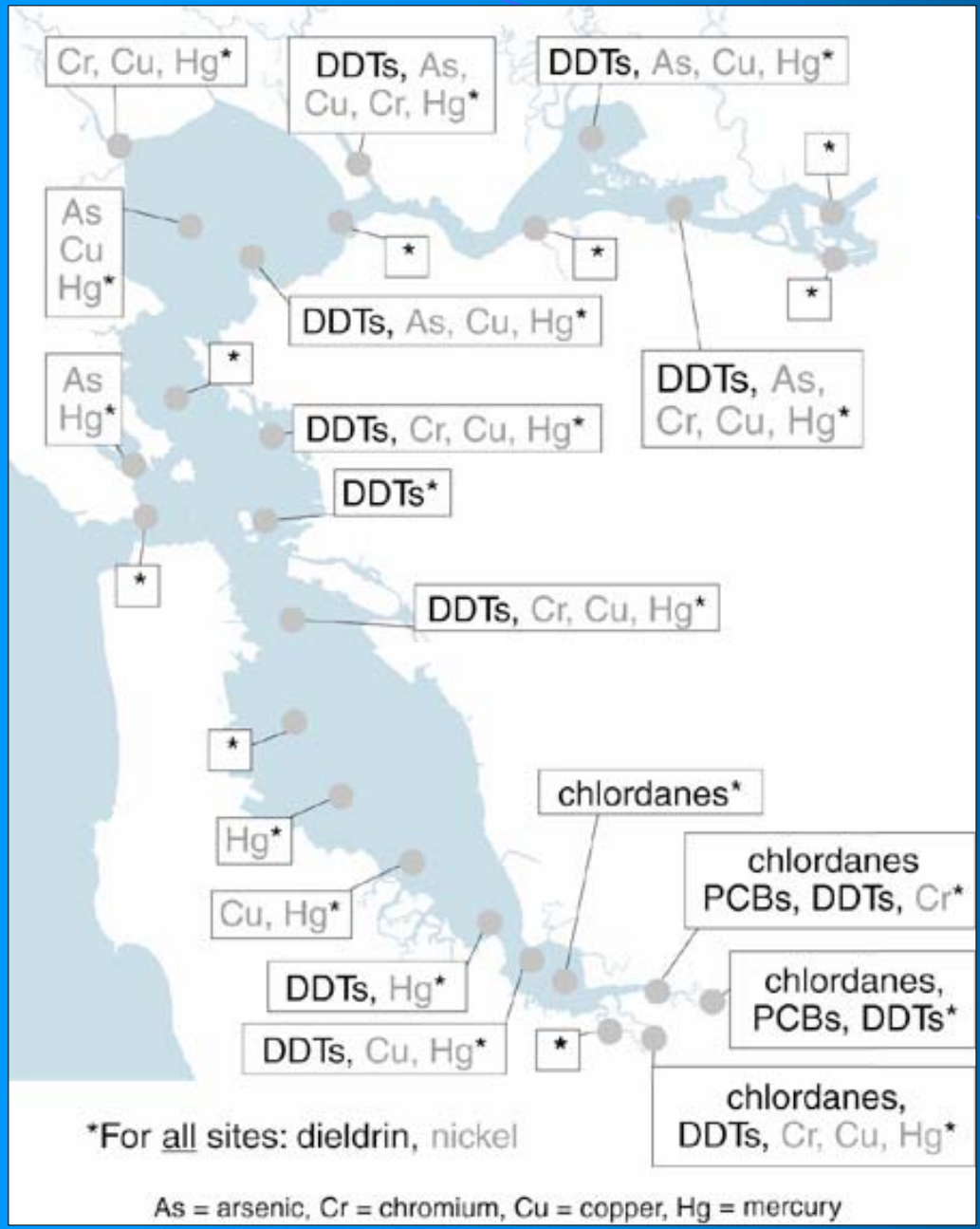


2002 Total Hg



Contaminants in Sediment

(ERL exceedances of more than 90%, 1993-2001)



Fish Contamination 1997
KEY
White Croaker
Shiner Surfperch
Jacksmelt
California Halibut
Striped Bass
White Sturgeon
Leopard Shark
Proportion of measurements
that exceeded guidelines
No. of measurements
San Pablo Bay
Suisun Bay
Davis Point
Berkeley
Oakland Harbor
San Francisco
Waterfront
South Bay
Bridges

Results from Successful Partnerships

- Impairment Assessment for Cu, Ni, and pesticides
- Mass Budget Models
- Development of Emerging Pollutant Surveillance Component
- Development of Compatible Database Formats (EMAP, NS&T, RMP, BDAT)

Copper and Nickel Impairment Assessment

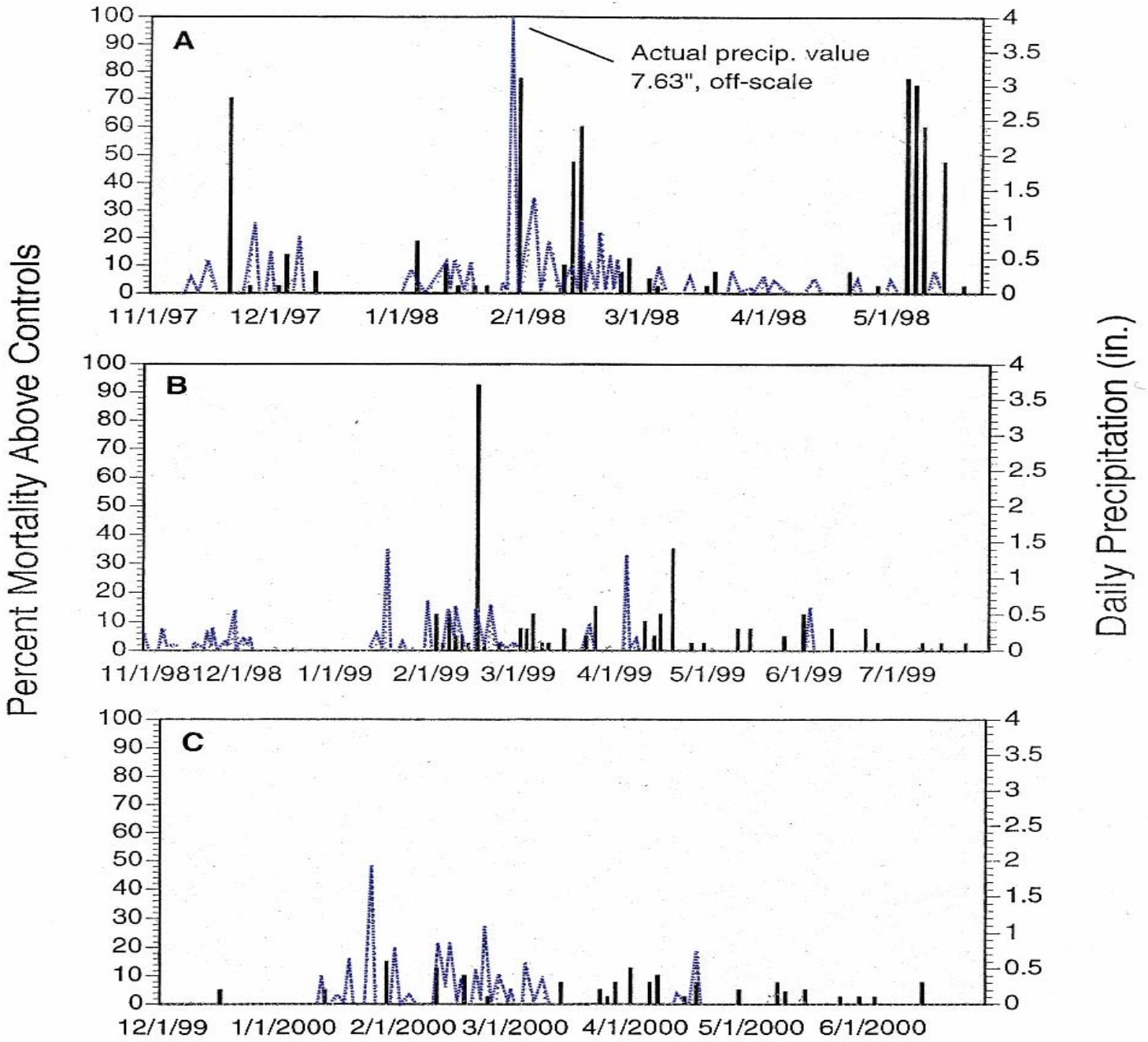
- Comparison of ambient concentrations to water quality objectives
- Selection of impairment indicators: *Mytilus,* sensitive phytoplankton taxa
- Development of endpoints
- Assessment of uncertainty
- Development of site-specific objectives (acute objectives of 6.9 and 11.9 ug/L)

Copper and Nickel Action Plans

- Baseline actions in watershed to prevent degradation, including evaluation of new indicators and triggers
- Quantitative triggers for additional actions
- Comparisons of ambient concentrations with trigger levels

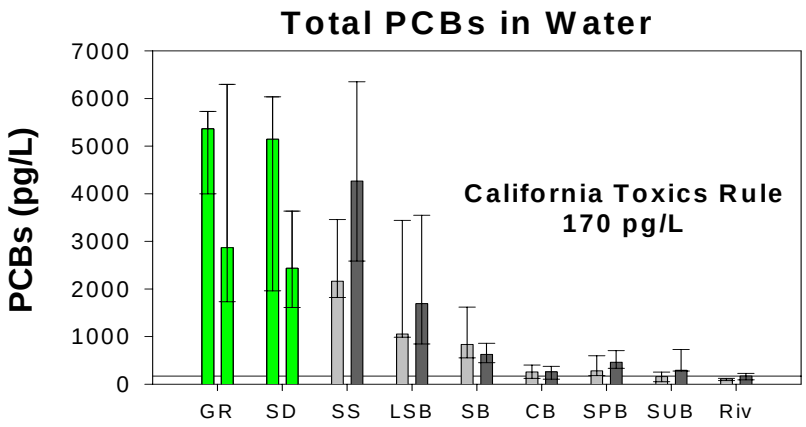
Evidence of Episodic Toxicity

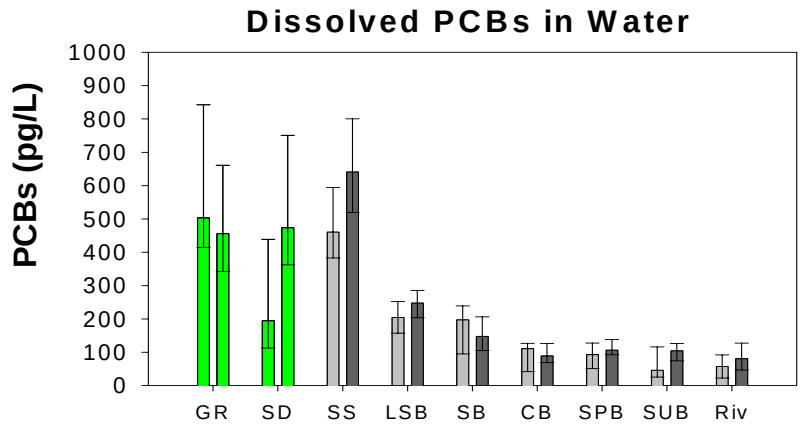
- Central Valley database augmented by “downstream” monitoring program
- Demonstration of urban runoff effects near Estuary margins
- Shifts from organophosphates to pyrethroids may be reflected in aquatic toxicity observations



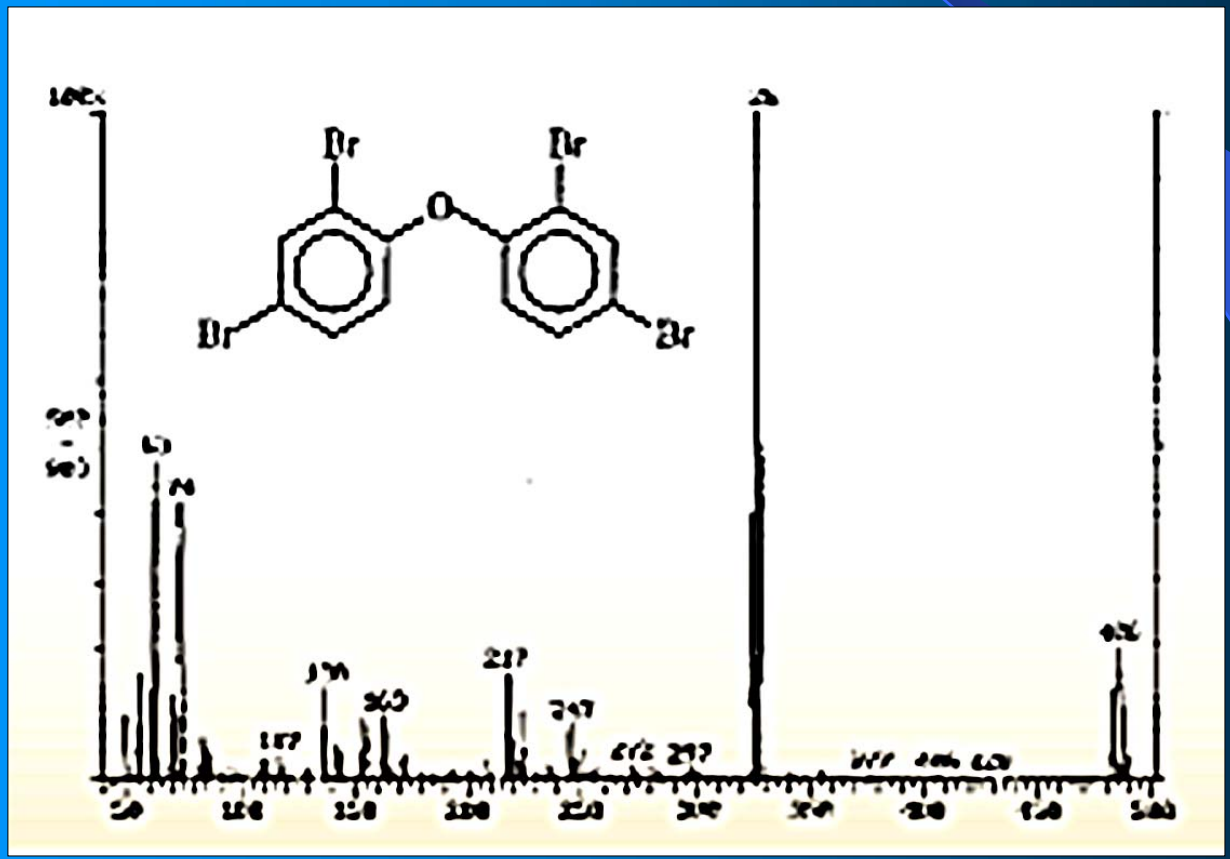
Percent Mortality Above Controls. (A) 1997-98; (B) 1998-99; (C) 1999-2000. Bars

PCB Gradient Data





Brominated Diphenyl Ether Mass Spectrum



Lessons Learned

- Communicate value of monitoring and special study information
- Clearly identify data users before collecting data and develop strategy for how to apply data in a management or regulatory context.
- Identify decision-makers that can make the greatest difference
- Allocate resources to integrate different federal and state programs at the regional level

Lessons yet to be Learned

- It’s a bad idea to release man-made substances into the environment before their persistence and unintended side effects are known
- Don’t try to mop the flooded floor prior to turning the tap to the overflowing sink off

Photo: Courtesy of Galen Rowell