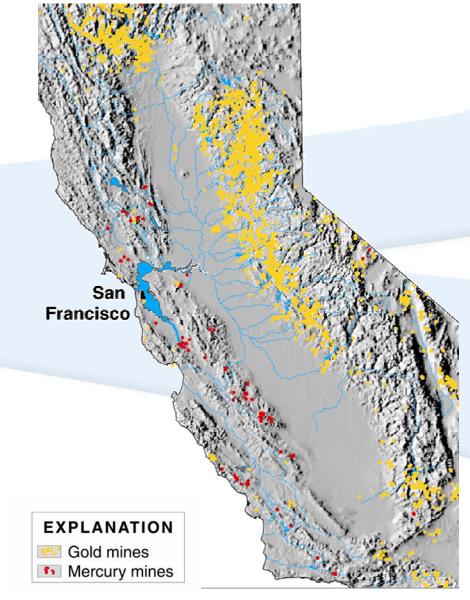
Agenda Item 5 Mercury Strategy for the Bay-Delta Ecosystem

A Unifying Framework for Science, Adaptive Management, and Ecological Restoration

Sources of Mercury



Adapted from USGS

Natural abundance

High in Coast Ranges Lower in Sierra Nevada

Mining sources

Current and historic wastes from 239 known mines, most in Coast Range (inorganic Hg & MeHg)

Up to 3.6-million kg of Hg lost during precious-metal processing in Sierra Nevada during the late 1800's (Alpers & Hunerlach 2000)

Riverine inputs

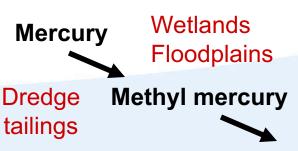
Contaminated waterways in Coastal and Sierra ranges continue to export inorganic Hg and MeHg to the Bay-Delta



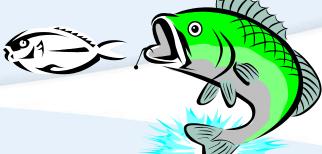
Hydraulic mining



Why is it a problem?



Protect or restore functional habitats in the Bay-Delta estuary.



Fish reproduction

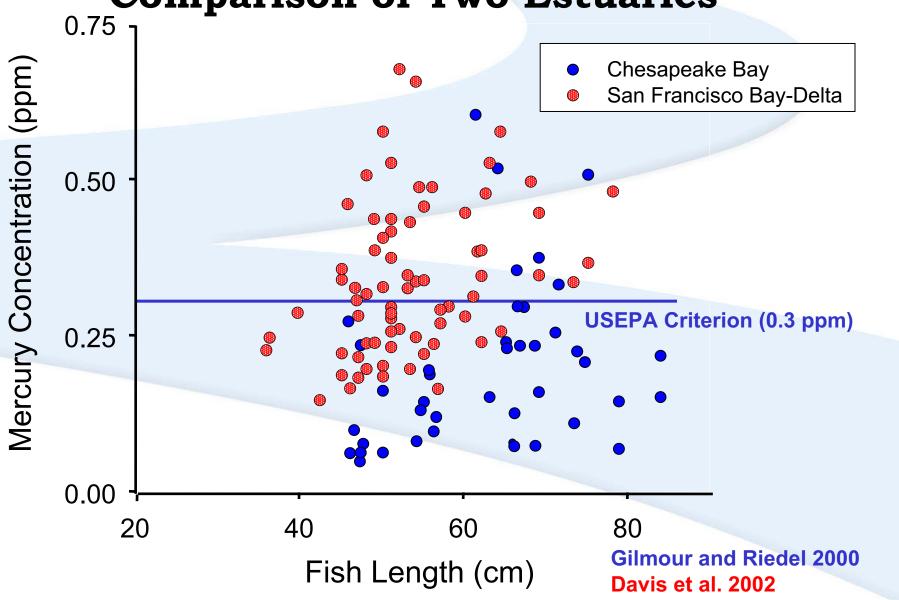
Eliminate to the extent possible toxic impacts to aquatic organisms, wildlife and people.





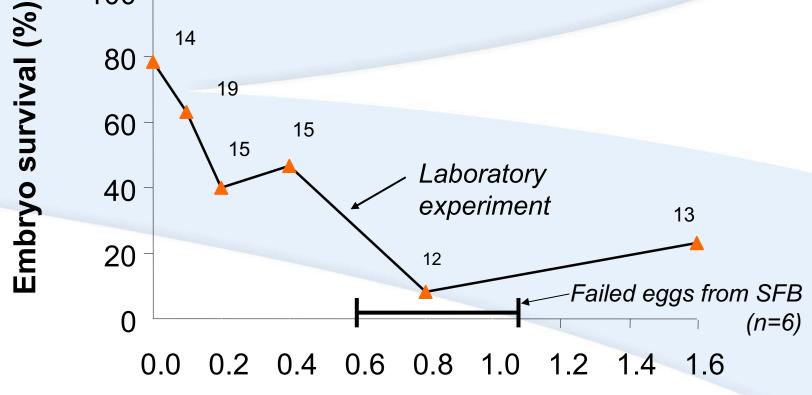
Neurological impairment

Mercury Contamination of Striped Bass Comparison of Two Estuaries



Methylmercury exposure: Is reproductive success being affected in California clapper rails?

Laboratory data by Heinz (USGS) Field data by Schwarzbach & Adelsbach (FWS) 100 14 80 19



Methylmercury in egg (ppm, as Hg)

Process for development of the mercury strategy



(review of past research)



Public workshop

(Identification of management questions, critical information gaps, goals)



Draft strategy document



Public & workshop participant review



Revisions to draft



Scientific peer review

Final strategy document

Mercury Strategy

- A Unifying Framework for Science, Adaptive Management and Ecological Restoration
- Problem: biotic exposure to methylmercury
- Management goal: To avoid increasing and to eventually decrease biotic exposure to methylmercury

The Mercury Strategy: Core Components and Linkages

Strategies for Reducing Exposure to Methylmercury (MeHg)

Evaluate & Remediate Sources of Mercury

Characterize

Prioritize

Remediate

Evaluate

Monitor, Assess Risk, Advise, and Evaluate

Monitor mercury in fish Assess health risks Communicate advice Measure performance

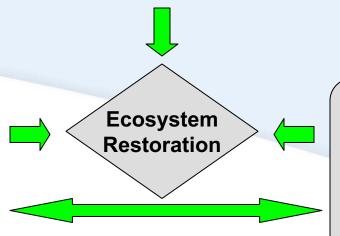
Manage Landscapes to Reduce MeHg

Identify factors controlling
MeHg production that
can be manipulated
Evaluate responses to
pilot-scale manipulation



Assess Ecological Risk

Quantify MeHg exposure in field Experimentally examine effects of MeHg on reproduction Identify trophic pathways, areas, and habitats associated with high exposure to MeHg



Assess Effects of Wetland Restoration on MeHg Exposure

Examine Hg cycling processes Identify controls on MeHg Evaluate effects on exposure

The Scientific & Management Challenge: Reducing Exposure to Methylmercury

<u>Approach</u> <u>Objective</u>

Source reduction Decrease mercury inputs to

environment and mass

available for methylation

Fish advisories Reduce dietary exposure in

humans

Landscape management Decrease methylmercury

(largely untested) production in ecosystems

Next steps

- Solicit proposals consistent with the strategy
- Develop monitoring program
- Build institutional framework to support strategy
- Develop implementation plan