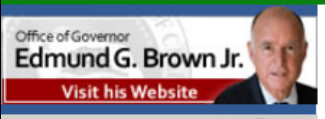
Statewide Mercury Control Program for Reservoirs

Reservoir Owner/Operator Workshop
Sacramento, CA

November 2, 2017



- CalEPA
- State and Regional Water Boards' Map
- Board Priorities
- Laws/Regulations
- Make a Payment
- Plans/Policies
- Programs
- Decisions Pending and Opportunities for Public Participation

File an Environmental

Statewide Mercury Control Program for Reservoirs

ADDRESSING MERCURY IN CALIFORNIA'S WATERS

Mercury is negatively impacting the beneficial uses of many waters of the state by making fish unsafe for human and wildlife consumption. Although mercury occurs naturally in the environment, concentrations of mercury exceed background levels because of human activities. Gold and mercury mines and atmospheric deposition are the predominant sources of mercury, with minor contributions from industrial and municipal wastewater discharges and urban run-off.

State and Regional Water Board staff are developing a statewide water quality control program for mercury in reservoirs.

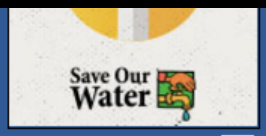
The Statewide Mercury Control Program for Reservoirs will address 132 reservoirs identified as mercury-impaired as of July 2017.

- **NEW!** The draft staff report and draft regulatory language submitted for scientific peer review are posted below.
- **NEW!** The revised draft summary is available here (and is included in the draft staff report submitted for scientific peer review, which is posted below).

SUBSCRIBE TO UPDATES

Receive information by email about the Statewide Mercury Control Program for Reservoirs. Subscribe online to:

- Mercury - Statewide Control Program for Reservoirs
  (located alphabetically under the WATER QUALITY TOPICS)*



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Agendas English/Español

Water Quality

Performance Report

STATEWIDE MERCURY RESOURCES

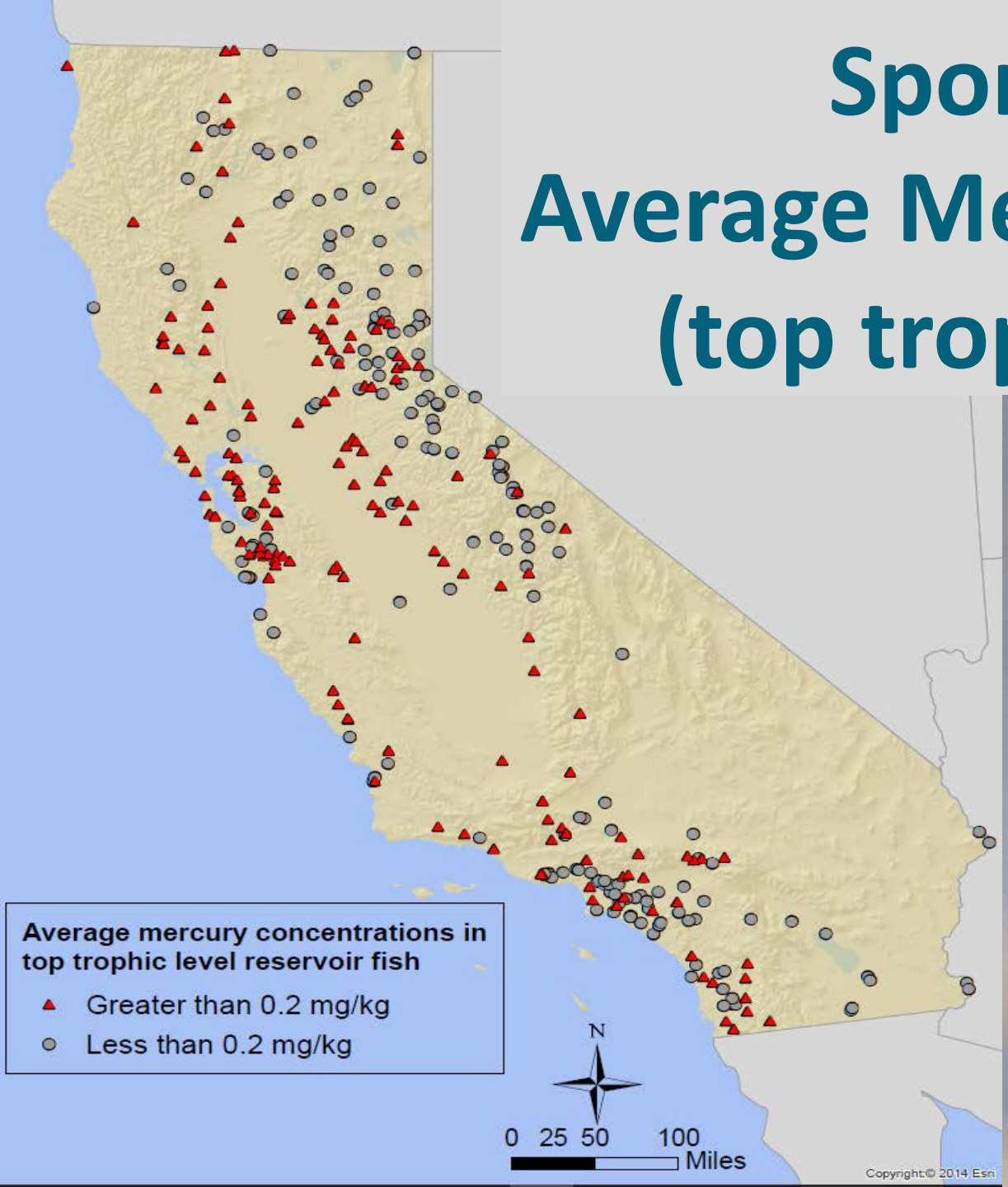
Peer Review Documents

The draft staff report and draft Mercury Reservoir Provisions (regulatory language) submitted to external scientific peer reviewers are provided here as a courtesy to stakeholders. Please note that no written public comments will be accepted on these documents at this time. A formal notice will be provided to the public, likely in mid-2018 at the earliest, identifying the public review period along with release of documents for review and comments, including proposed Mercury Reservoir Provisions, Staff Report, and other relevant supporting documents.

- Draft regulatory language, "Mercury Reservoir Provisions," full title:
  Amendment to the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California-Mercury TMDL and Implementation Program for Reservoirs

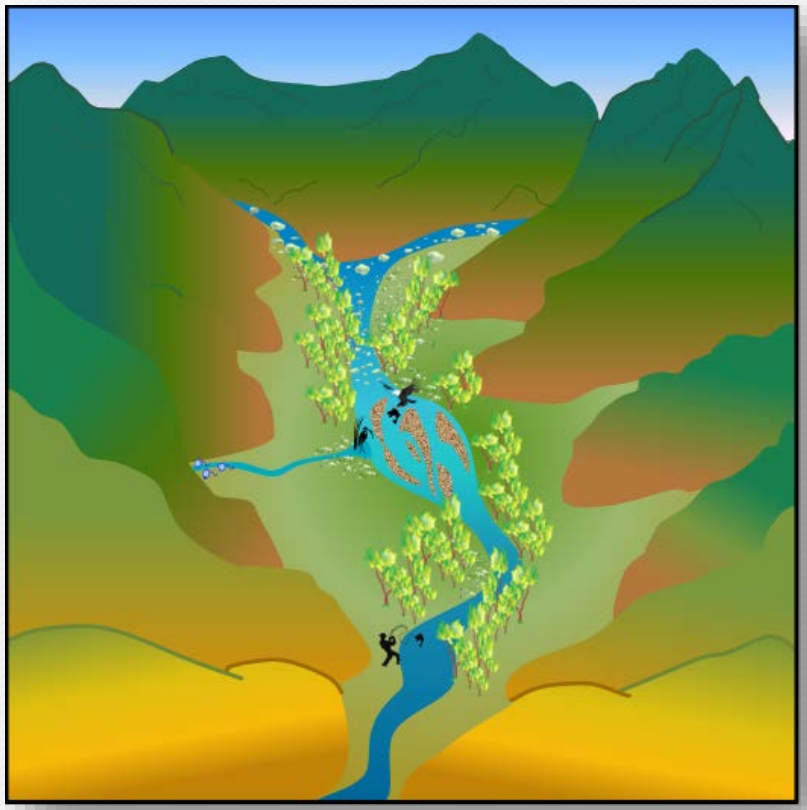
- Staff Report, full title:
  Draft Staff Report for Scientific Peer Review for the Amendment to the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, Mercury Reservoir Provisions - Mercury TMDL and Implementation Program for Reservoirs
  - Text, "Staff Report for Scientific Peer Review"
  - Figures, "Staff Report Figures"
  - Tables, folder of MS Excel tables, "Staff Report Tables"
  - Appendices, folder of PDF files and MS Excel tables, "Staff Report Appendices"

Sport Fish Average Methylmercury (top trophic level)

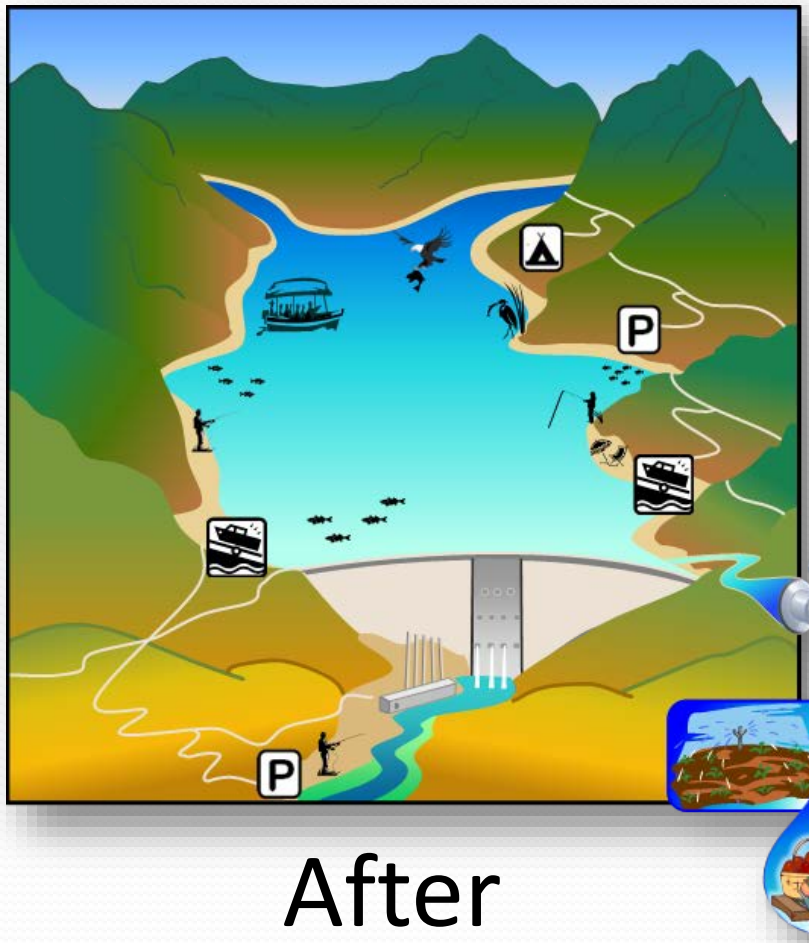


Benefits and Challenges

Building a Reservoir

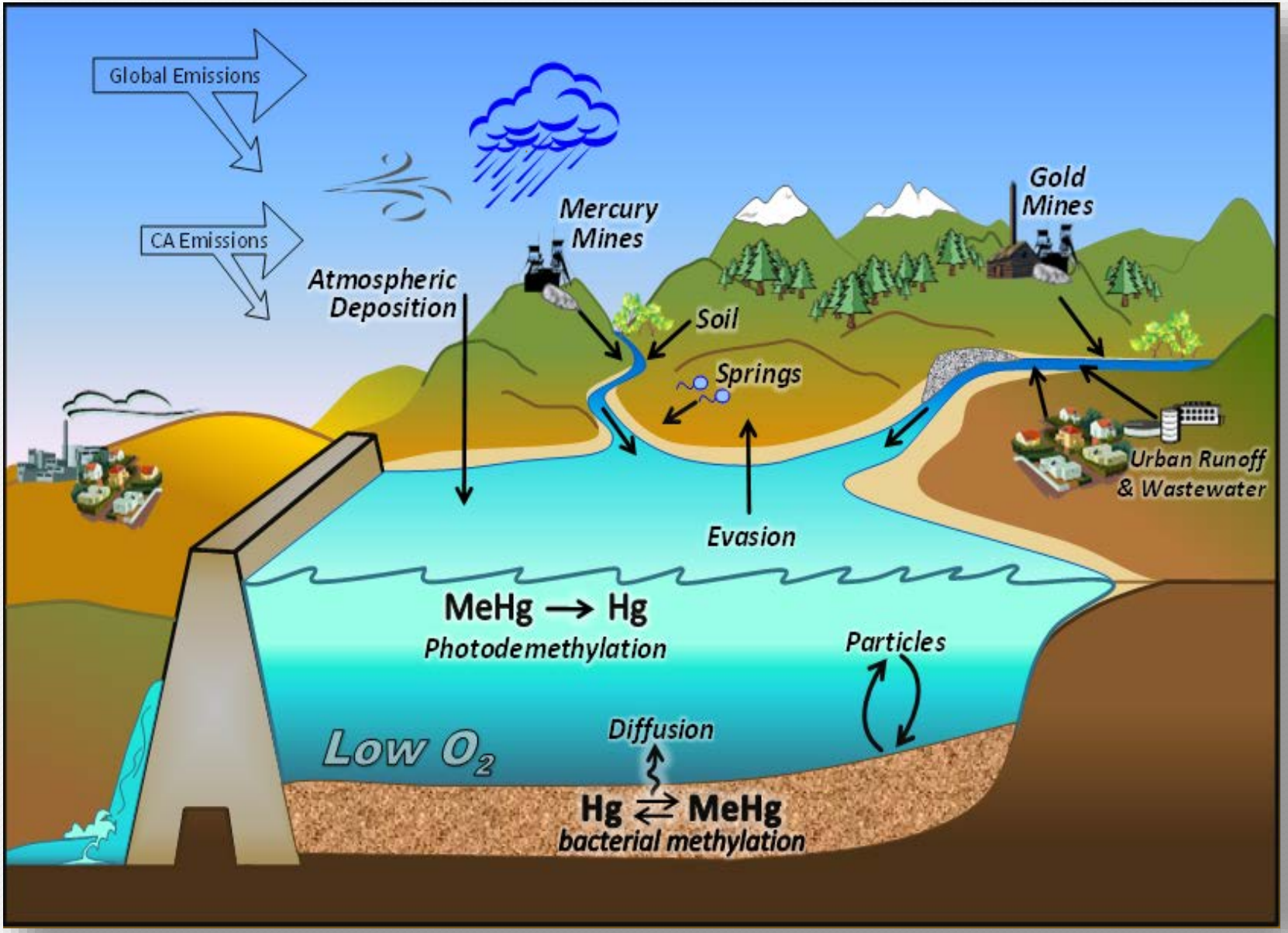


Before

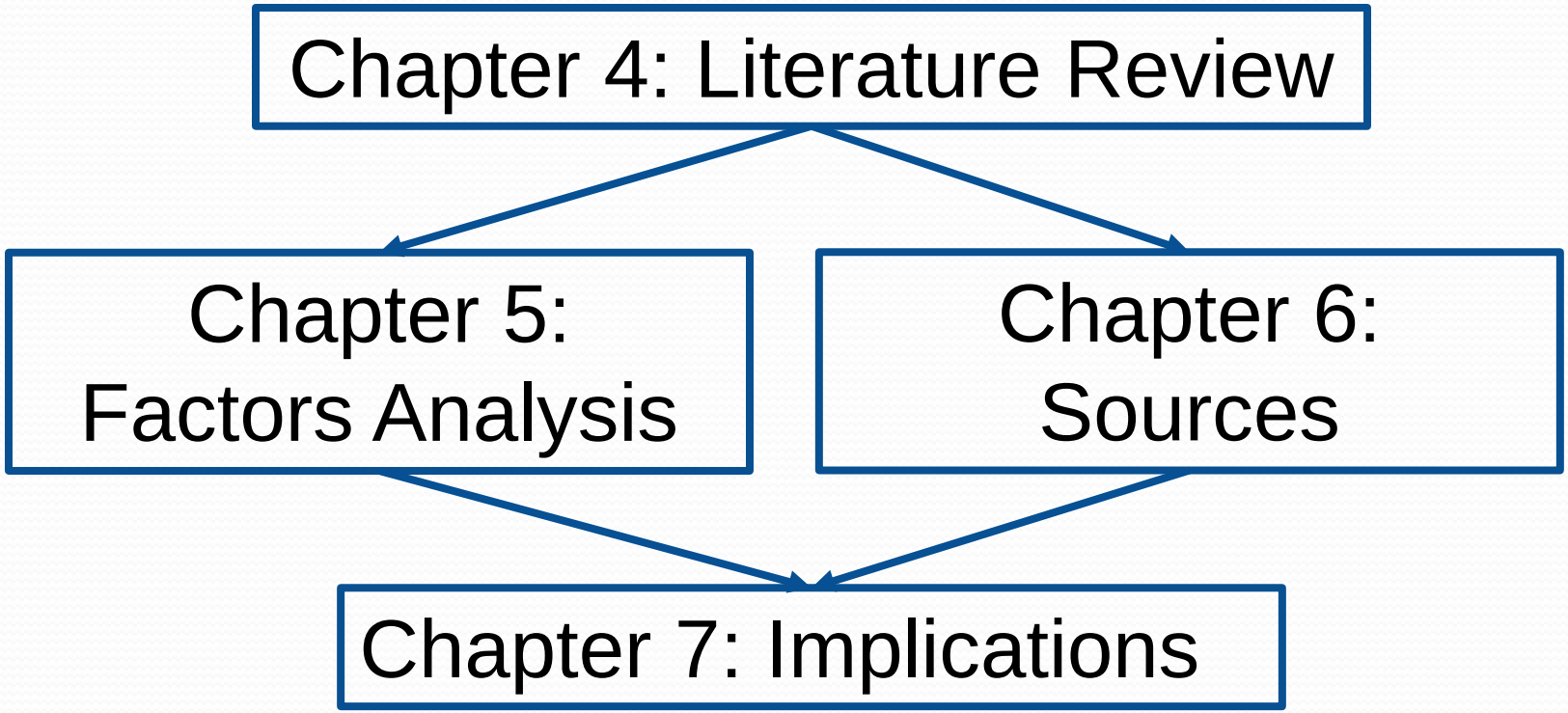


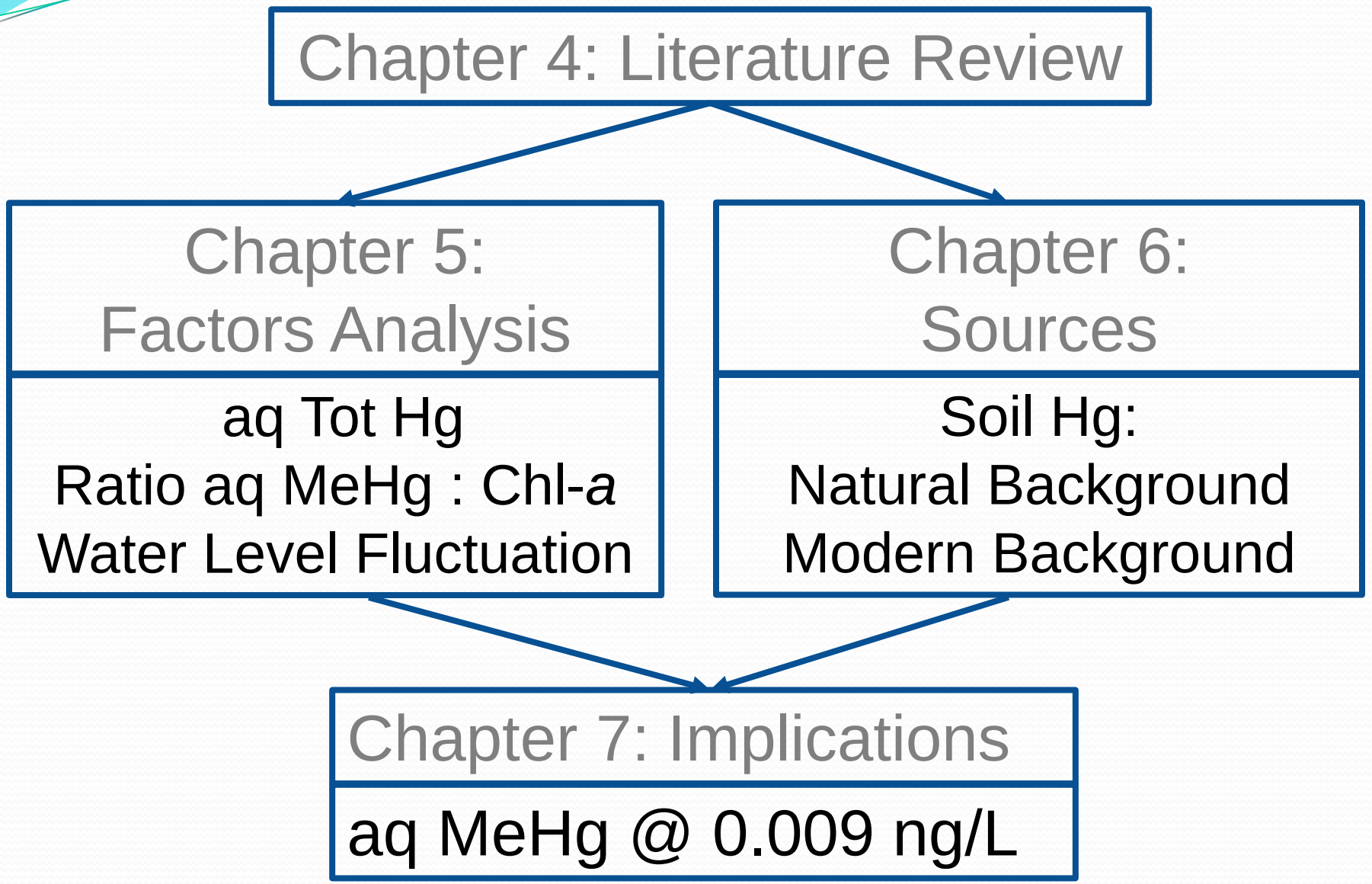
After

Reservoir Water Chemistry



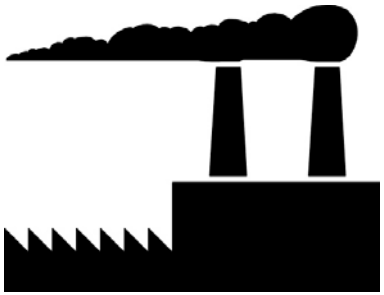
Staff Report – key chapters




Chapter 4: Literature Review
Chapter 5:
Factors Analysis
aq Tot Hg
Ratio aq MeHg : Chl-*a*
Water Level Fluctuation
Chapter 6:
Sources
Soil Hg:
Natural Background
Modern Background
Chapter 7: Implications
aq MeHg @ 0.009 ng/L

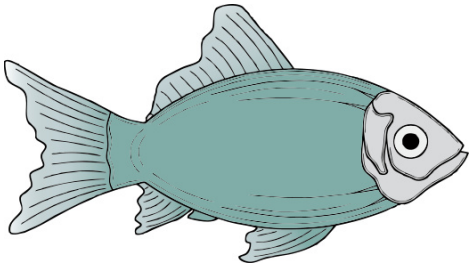
Implementation Plan

Pollution



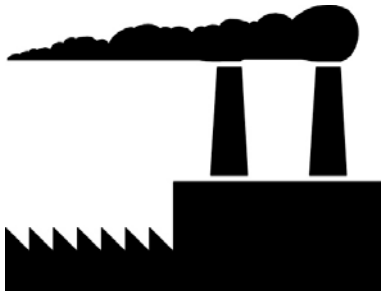
Water Chemistry

Fisheries



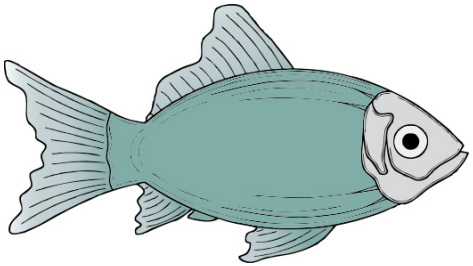
Water Boards

Pollution



Water Chemistry

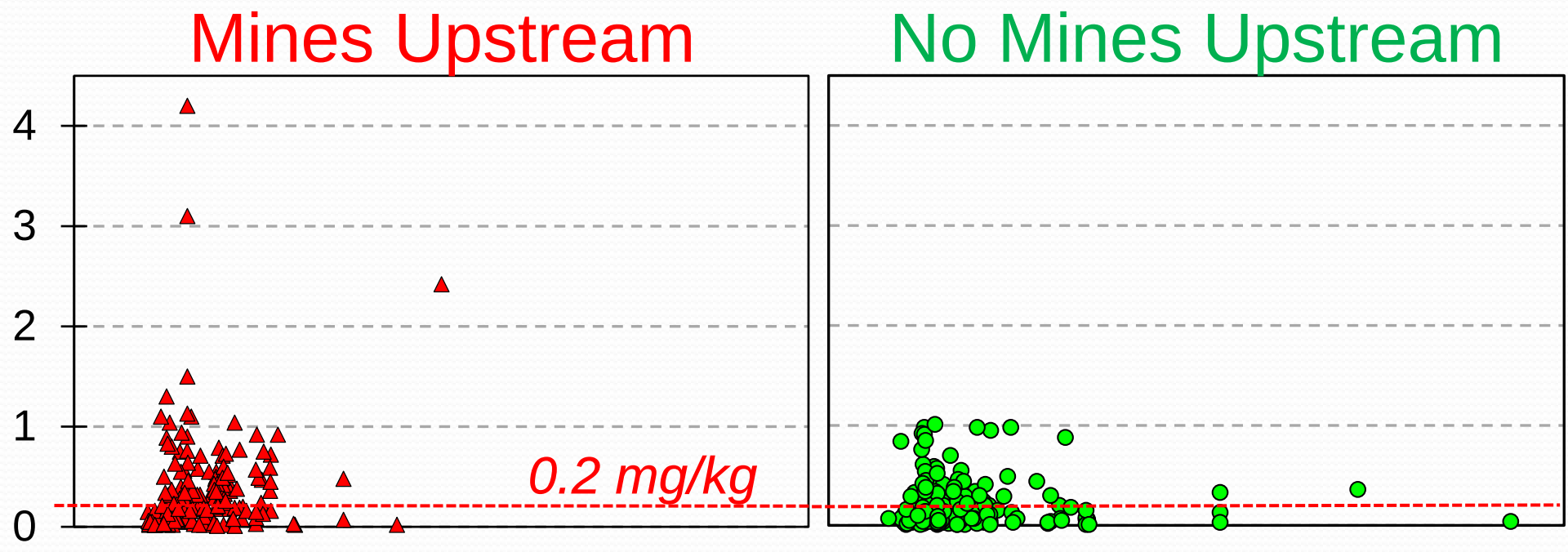
Fisheries



Summary
top of page S-4

- Mercury source control actions apply statewide – and (bullet 3) apply upstream of all mercury-impaired reservoirs
- Exposure reduction applies to all reservoirs
- Phase 1 pilot tests apply to non-hydropower mercury-impaired reservoirs

Challenge



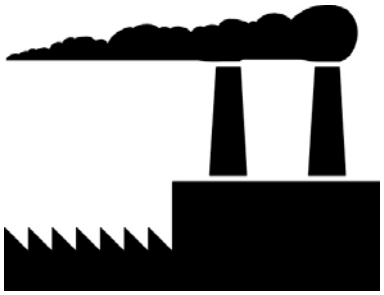
Y-axis: standardized-size sport fish MeHg (mg/kg)
X-axis: Hg Atmospheric Deposition rate (modeled g/km^2/yr)

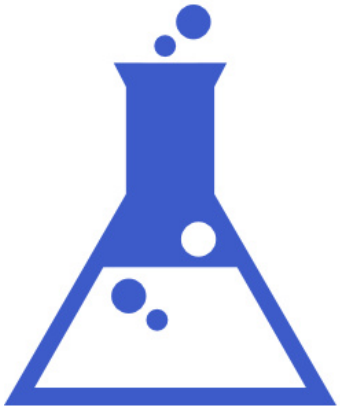
Reservoirs

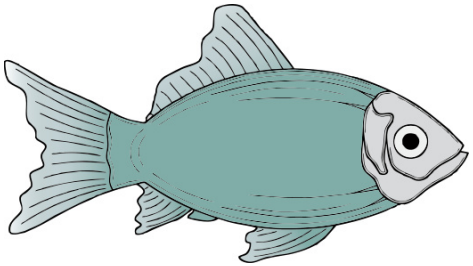
Pollution

Water Chemistry

Fisheries







Manage redox conditions

Water Chemistry

Redox sequence:

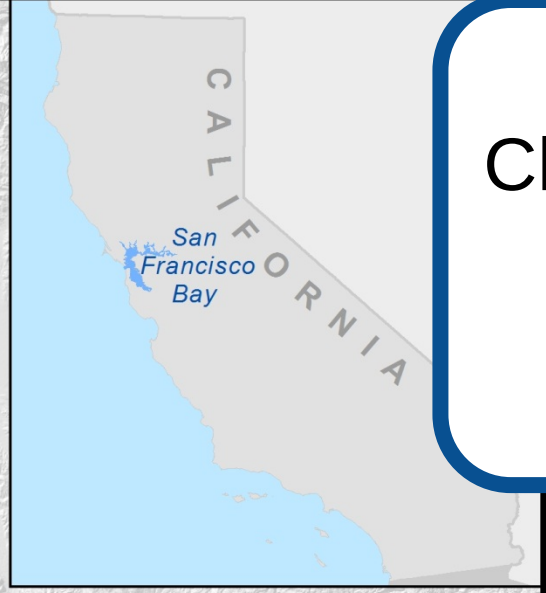
O_2 aerobic heterotrophs
NO_3^- denitrifiers
$MnO_2(s)$ fermenters
$Fe(OH_3)(s)$ fermenters
SO_4^{2-} sulfate reducers
H^+ methane producers

Desirable

Avoid

Oxygenation Pilot Tests

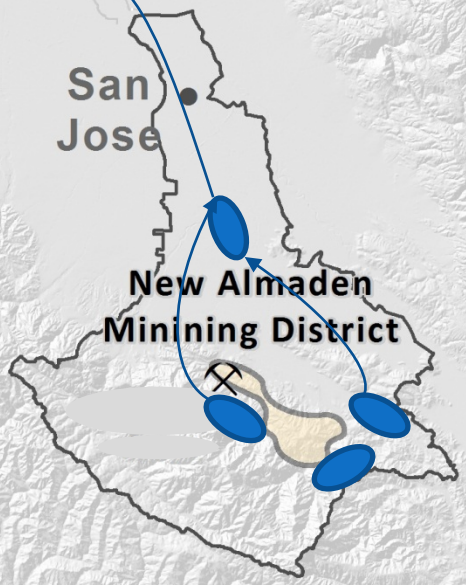
Water Chemistry



San Francisco Bay

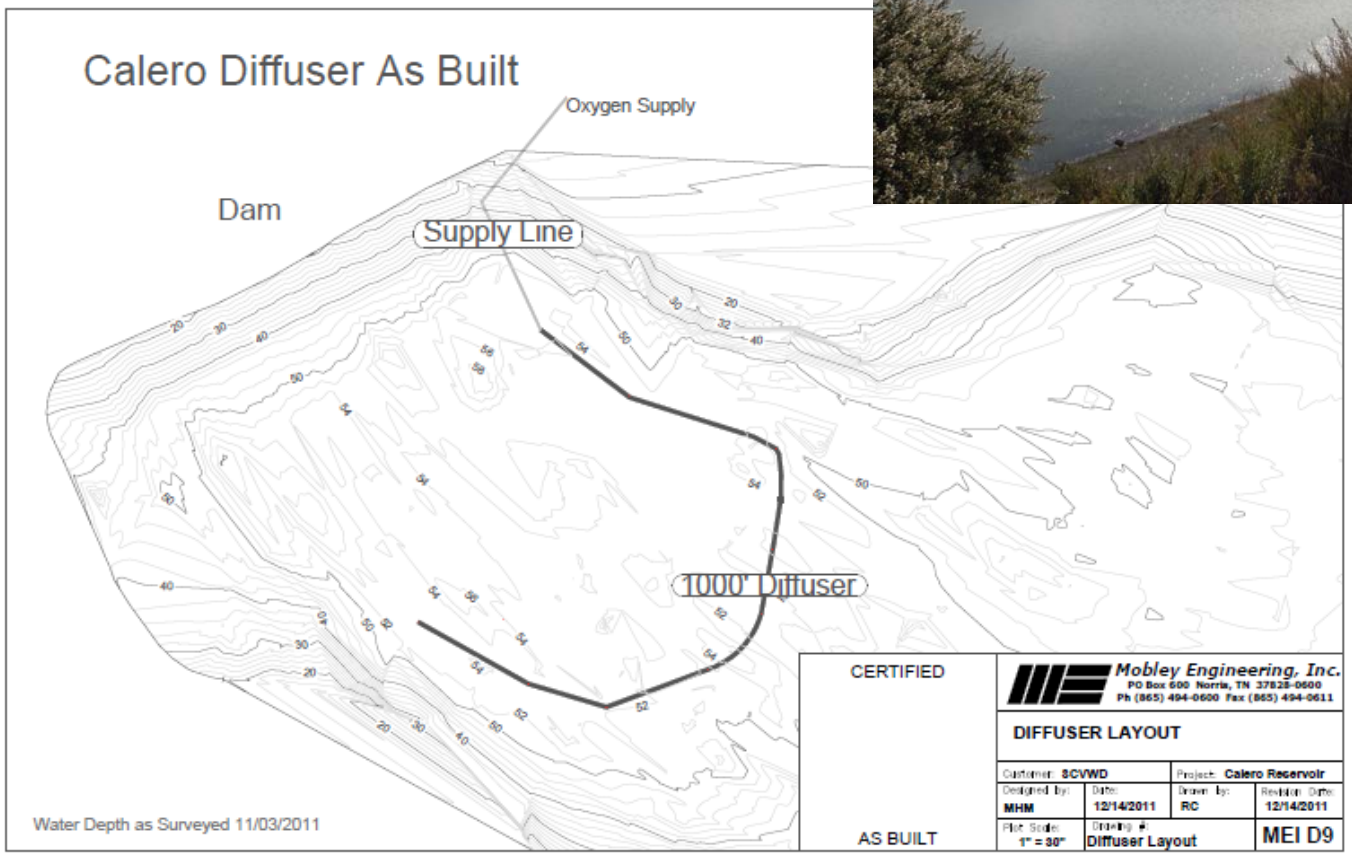
Santa Clara Valley Water District

- Solar-powered circulators
- HOS line diffuser



0 5 10 15 20 Km

Santa Clara Valley Water District



HOS:

Hypolimnetic Oxygenation System

Citation:

Dave Drury
SCVWD

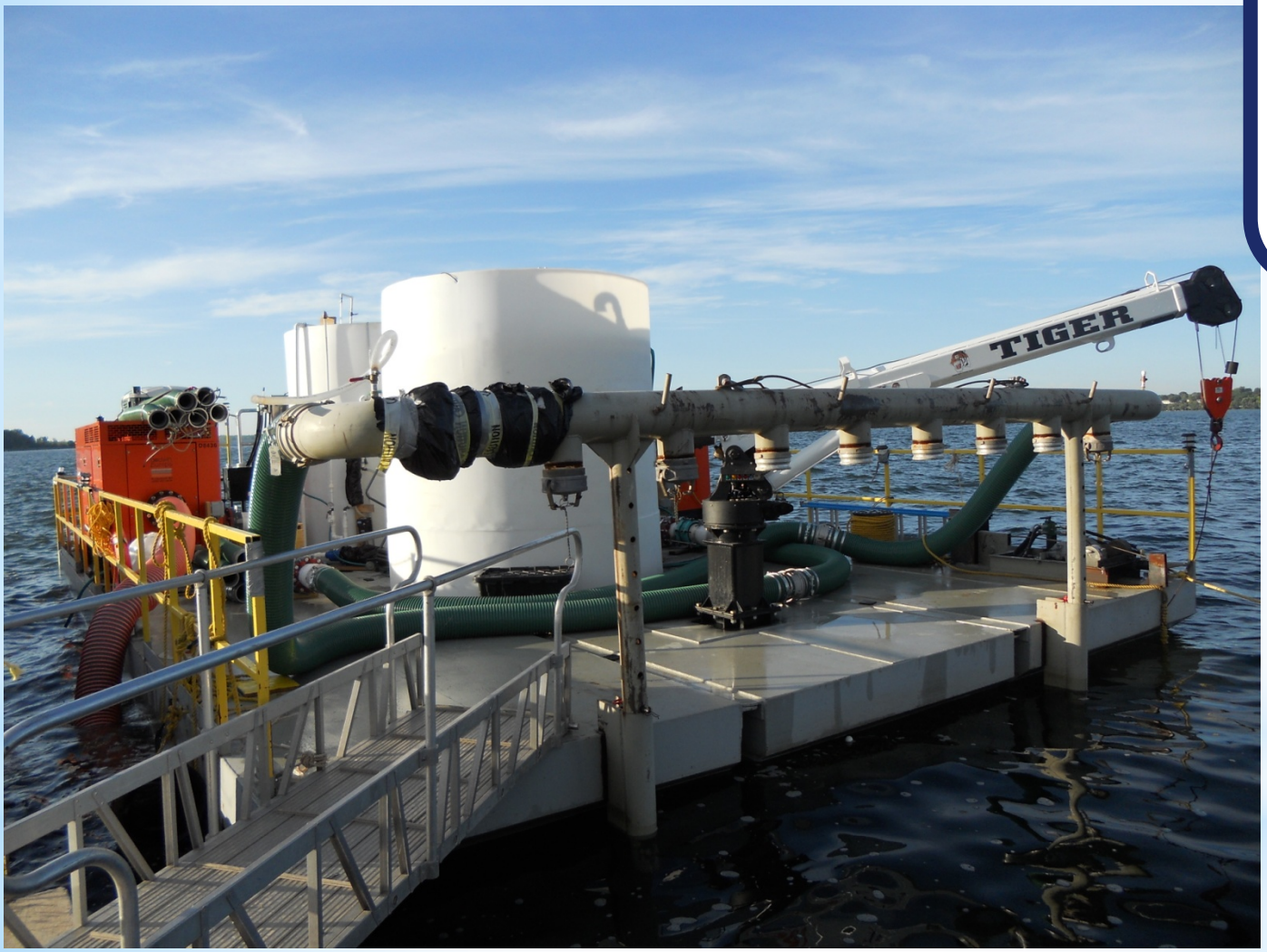
Source Removal and Nitrate Addition Onondaga Lake, New York

Water Chemistry

Citation:
Charles T. Driscoll Syracuse University

Manage redox with NO_3^-

Water Chemistry



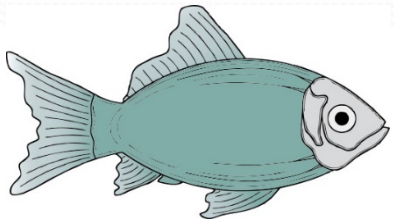
Citation:

Charles T. Driscoll Syracuse University

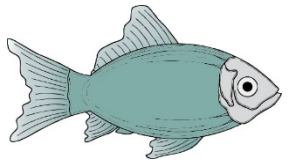
Reservoirs

Water Chemistry

Fisheries

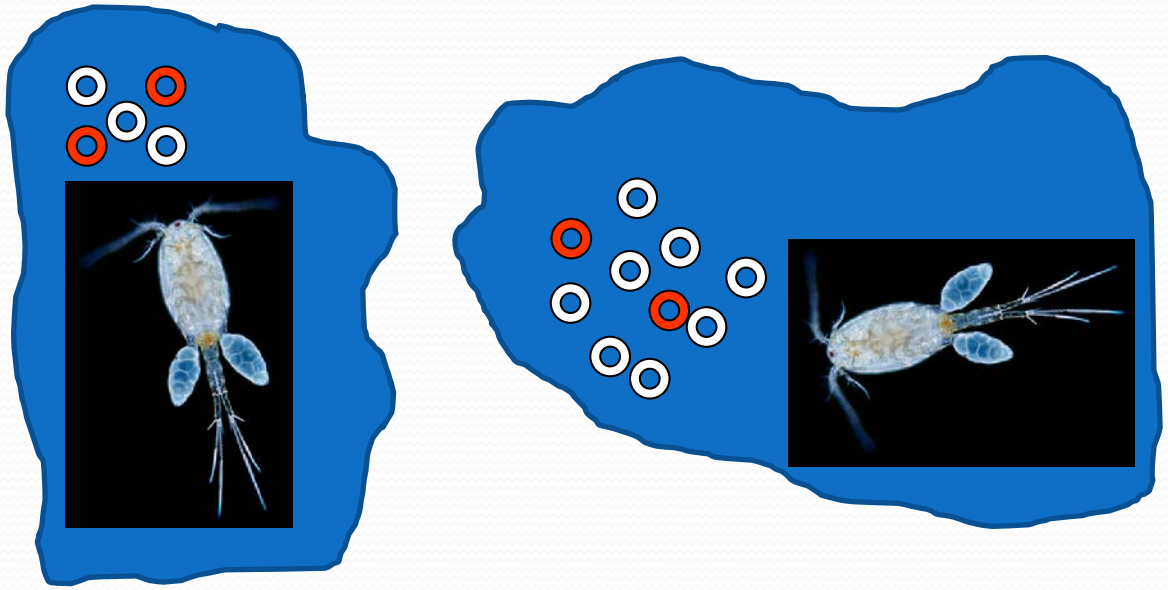


Fisheries



Food lower in MeHg:

Algal Bloom Dilution



Fertilize

increase algae

same MeHg

Carefully

no more than 2x Chl-*a*

and Chl-*a* ≤5 ug/L

Fisheries

Food lower in MeHg

Stock prey with low MeHg e.g., Rainbow trout

Citation:
Jesse Lepak

Questions?

Discussion: Pilot Tests

- What are the biggest limitations to coordinating for pilot tests?
- What other pilot tests would you suggest?