



Valley Water

Clean Water • Healthy Environment • Flood Protection



Guadalupe River Watershed Hg TMDL Implementation and Reservoir Hg Management



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Valley Water's Mission

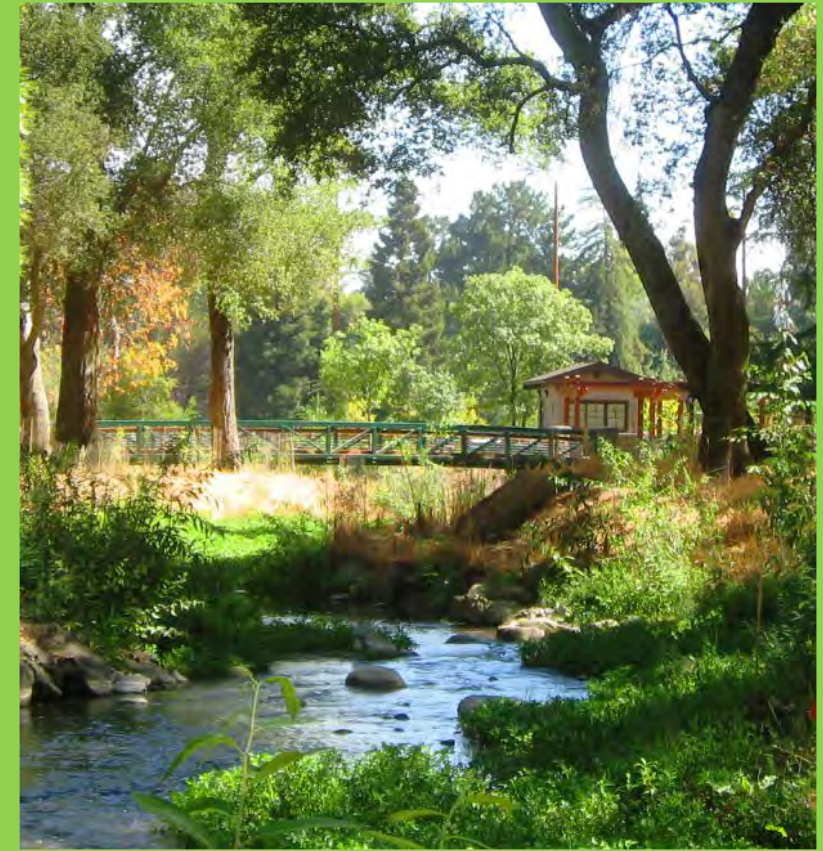
Wholesale Water Supply



Flood Protection



Environmental Stewardship



Where our water comes from

Our local water supply system

Legend

-  Local drinking water treatment plant (WTP)
-  Silicon Valley Advanced Water Purification Center
-  Cities
-  Lakes, reservoirs, rivers, bays & the delta
-  1 Mokelumne Aqueduct
-  2 Hetch Hetchy Aqueduct
-  3 Delta Mendota Canal
-  4 South Bay Aqueduct
-  5 California Aqueduct
-  6 San Felipe Project
-  Jones Pumping Plant
-  H.O. Banks Delta Pumping Plant
-  South Bay Pumping Plant
-  O'Neill Pumping Plant
-  Pacheco Pumping Plant
-  Coyote Pumping Plant

Our water sources...

- 55% District imported water**
 - 40% through Delta to replenish groundwater and supply water to drinking water treatment plants
 - 15% from Hetch Hetchy system
 - 40% local water**
 - natural groundwater
 - from reservoirs to groundwater
 - from reservoirs to drinking water treatment plants
 - 5% recycled water**
- 100% TOTAL SUPPLIES**

Based on average values from 2010 to 2014.



Our water use...

- 40% Groundwater**
 - 35% Treated Water**
 - 15% Hetch Hetchy**
 - 5% Recycled Water**
 - 5% Other Local Water**
-
- 100% TOTAL USE**

Based on average values from 2010 to 2014.

Water Conservation

A growing county has a growing thirst, but without enough water to meet the increasing demand of our region, a long-term conservation effort is imperative. While immediate actions have helped conserve the water we do have, the water district is helping residents and businesses implement long-term actions that will reduce the overall demand on our water supply, ensuring there is enough water to go around well into the future.

Graphics representation — not to scale.



The Valley of
Heart's Delight



**Silicon
Valley**



Image: Napa County Ag Preserve

New Almaden Mining District (San Jose, CA)



3,000 Miners

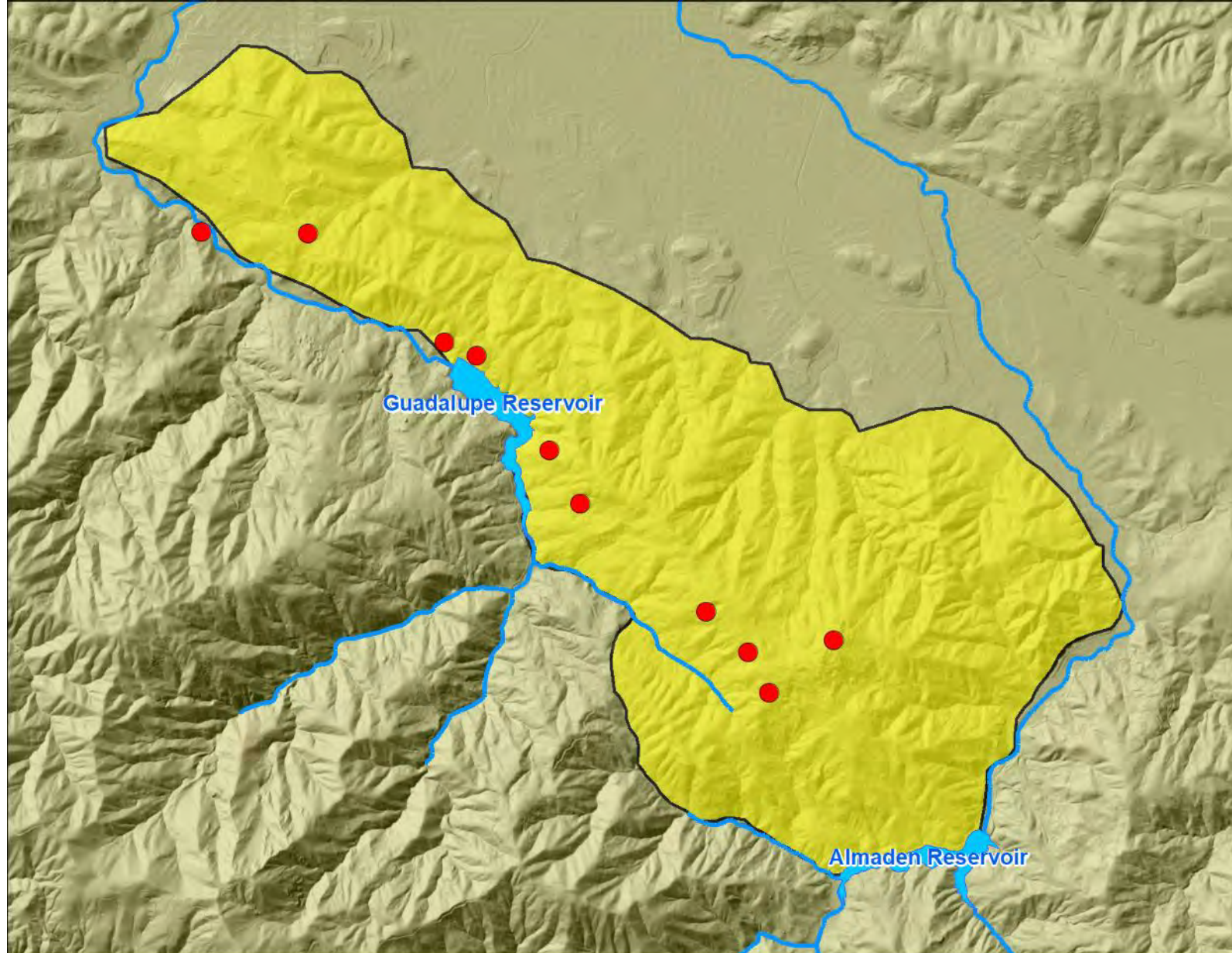
1.5M Metric Tons of
Cinnabar Processed



38,000 Metric
Tons of Hg



A Legacy of Hg Contamination



Fish Hg off the charts!



8 ppm MeHg

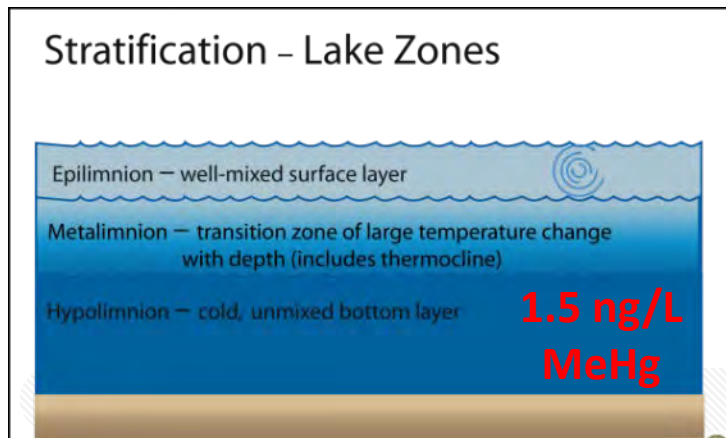
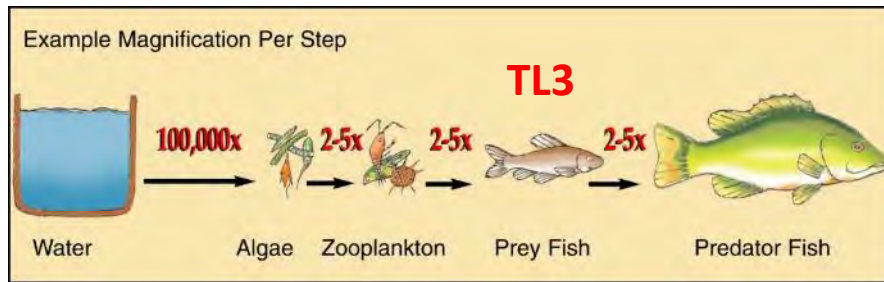


Guadalupe River Watershed Hg TMDL

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Guadalupe River Watershed Mercury TMDL (2008)

- 1.5 ng/L Total Methylmercury (Hypolimnion)
- 0.05 mg Hg/Kg Tissue: Trophic Level 3 Fish (50-150mm)
- 0.1 mg Hg/Kg Tissue: Trophic Level 3 Fish (150-350mm)



Attention!
Atención!
Chú ý!

PLEASE . . . DON'T EAT THE FISH!
Fish may be caught and released but should not be eaten. This watershed contains fish and sediment that may be contaminated with mercury, which is harmful if ingested by humans.

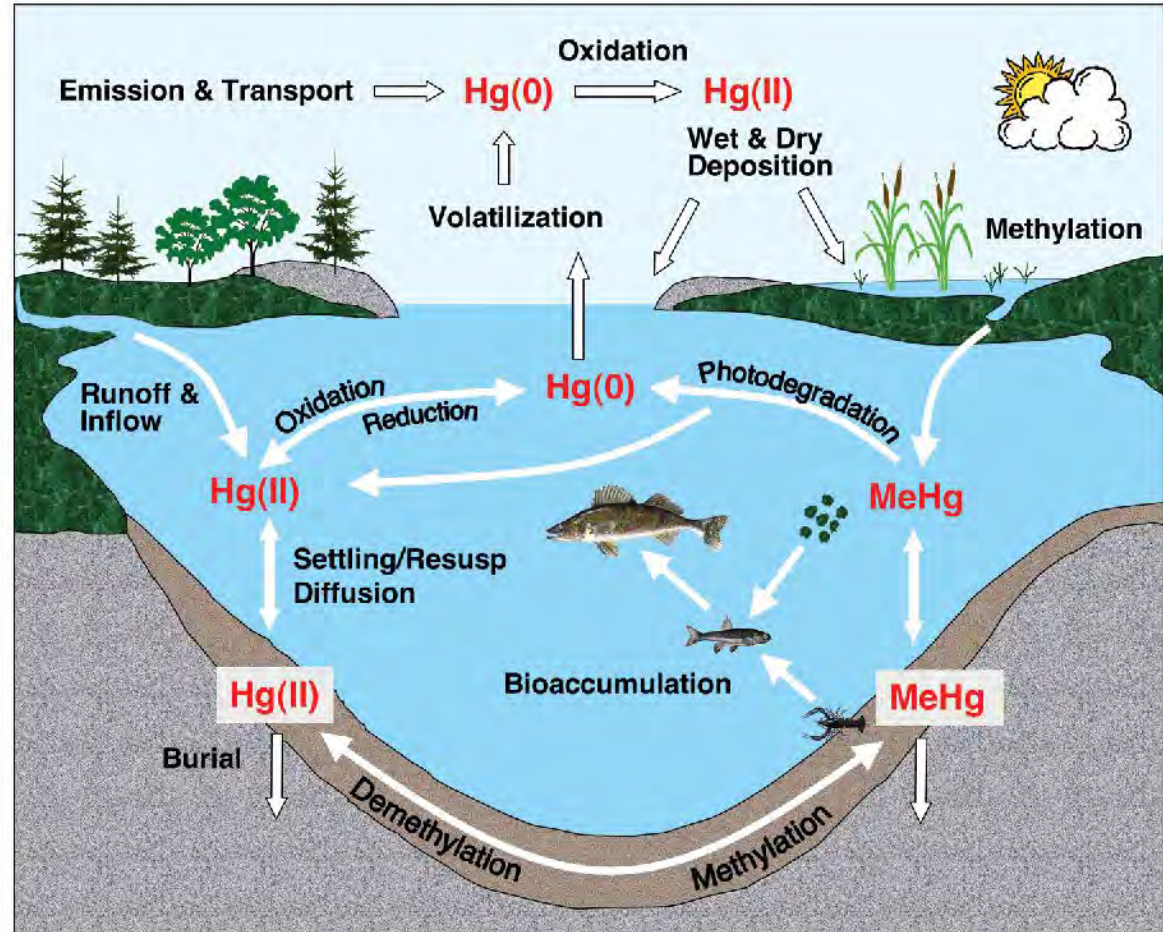
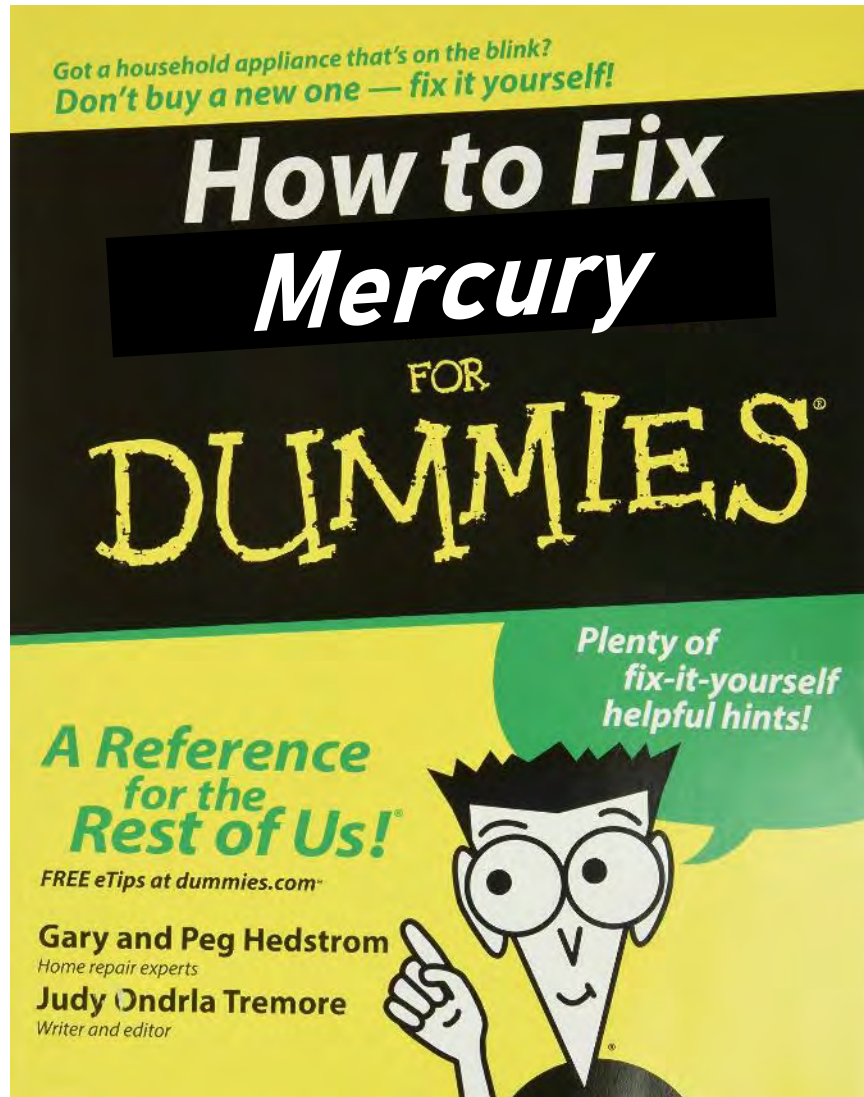
FAVOR DE NO COMER LOS PESCADOS!
Se permite pescar pero debe soltar los pescados porque es peligroso comérselos. Estas aguas contienen peces y sedimento que están contaminados de mercurio, una substancia dañina para los humanos.

LƯU Ý, XIN ĐỪNG ĂN CÁ!
Quý vị có thể bắt cá và thả lại chứ không nên ăn cá. Vùng phân chia nước này chứa cá và cặn có thể bị nhiễm thủy ngân, là chất nếu người ta ăn vào thì có hại.

Santa Clara Valley Water District

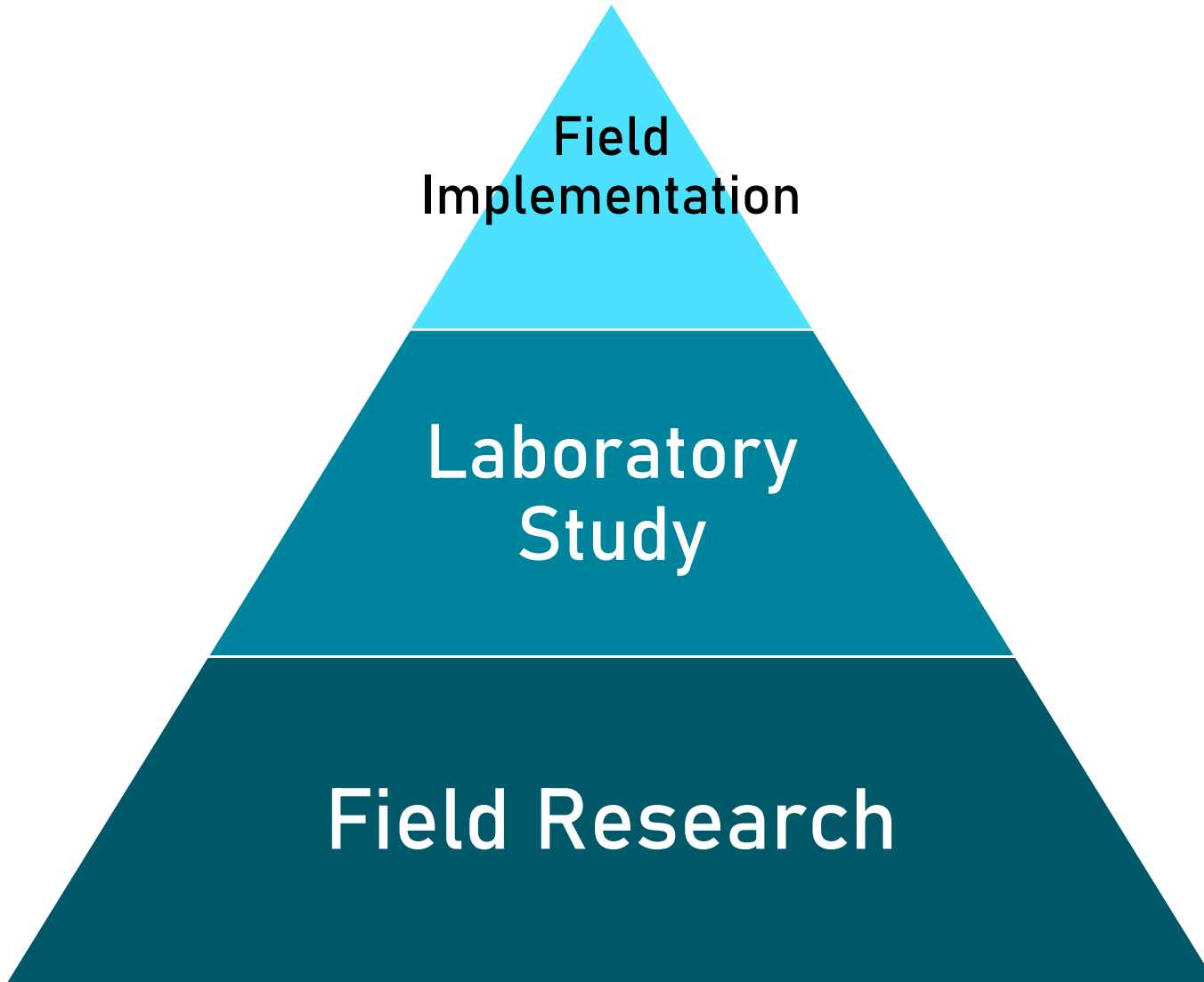
(408) 265-2600 — www.valleywater.org

There's just one problem..



3-Tiered Approach to Hg Management

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Implement and study management approach in a field setting.

Test a potential management approach in a controlled setting.

Build understanding of system.
Generate testable hypotheses.

Field Research

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Source Identification



Tetra Tech Conceptual Model (2005)

Atmospheric Deposition with UCSC (ongoing)

Cycling in Reservoirs



Monthly Reservoir Monitoring

USGS Water Column Methylation (2019-2020)

Special Studies

Bioaccumulation

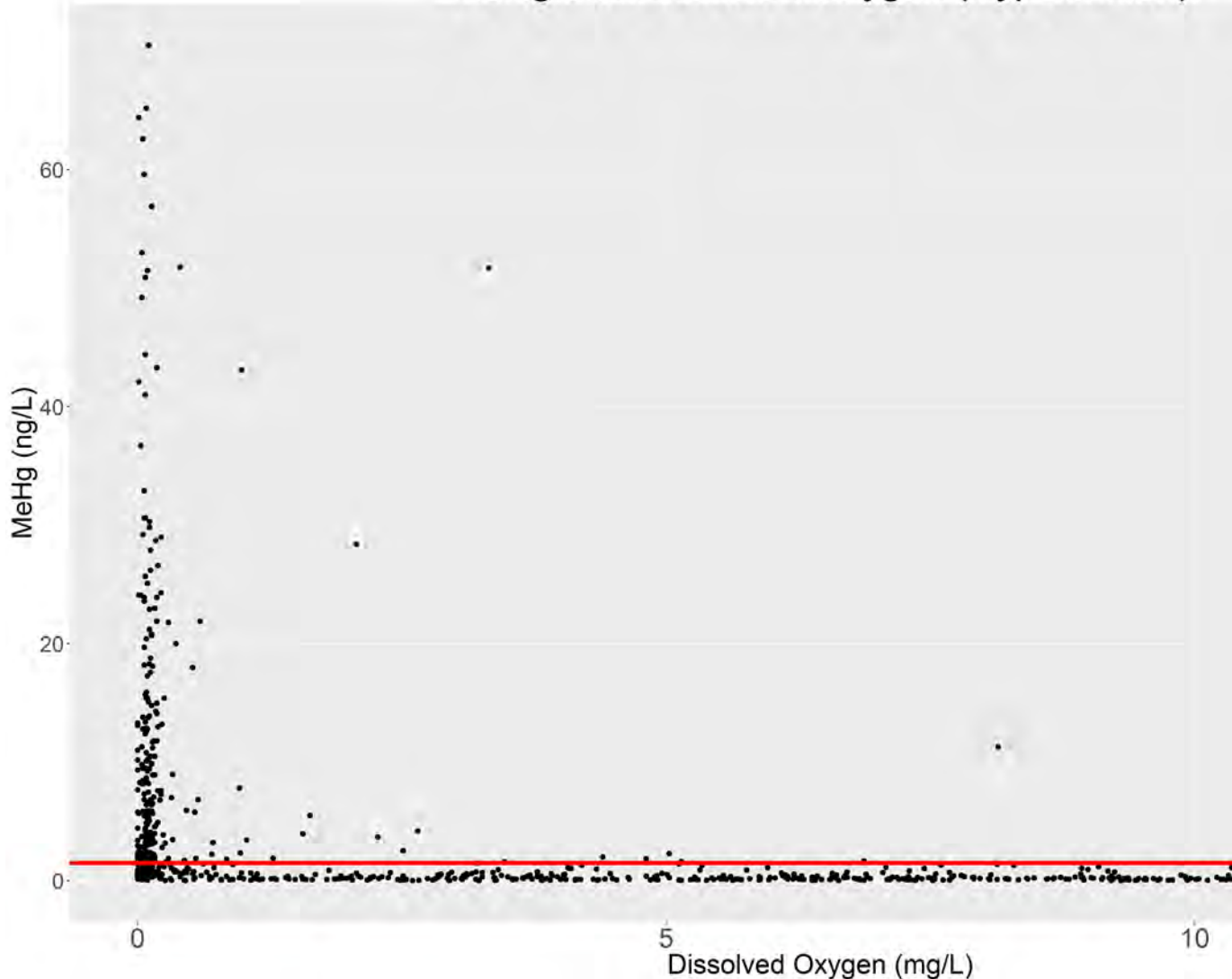


2x-Annual Fish Monitoring

Hg Bioaccumulation Food Web Study (2019-2021)

Field Results

MeHg and Dissolved Oxygen (Hypolimnion)



Laboratory Study

Oxidant Addition

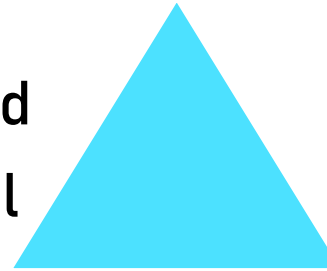
Incubation Study:
Oxygen and Nitrate Addition



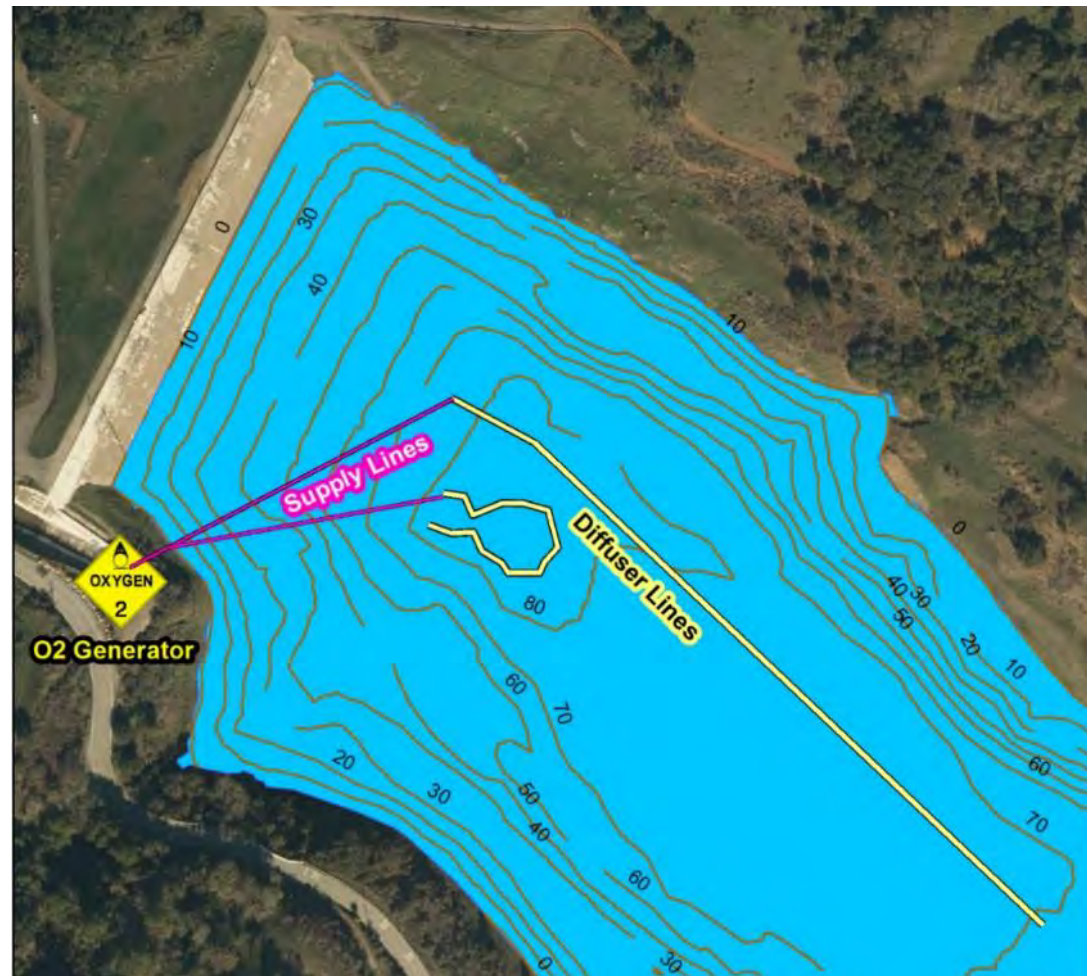
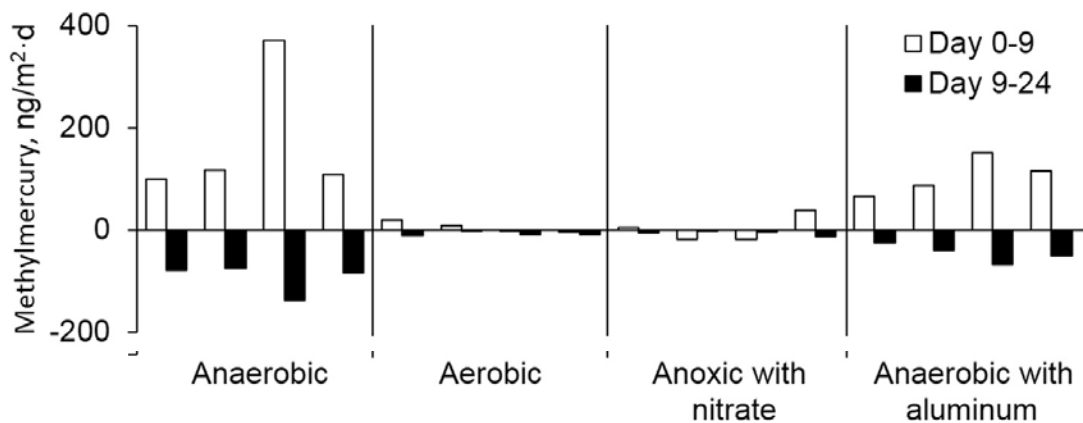
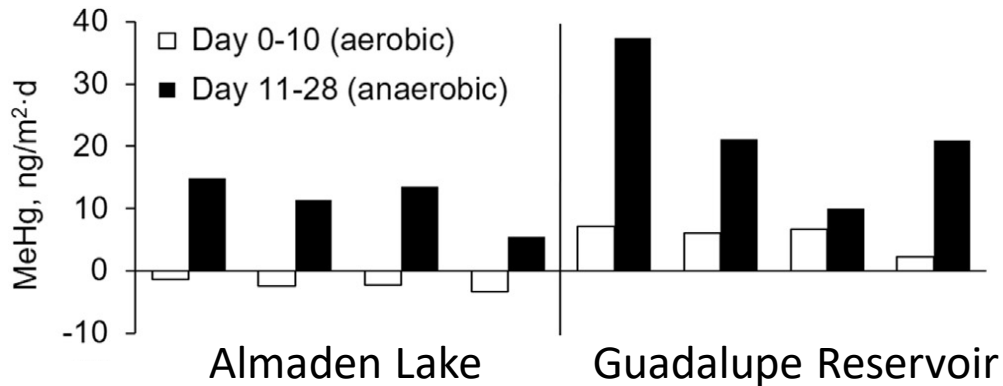
Laboratory Results



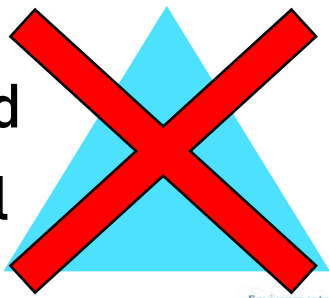
Field Trial



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Field
Trial



Implementation in
Four Reservoirs



Field Evaluation

Environmental Pollution 268 (2021) 115759

Contents lists available at ScienceDirect

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol



ELSEVIER



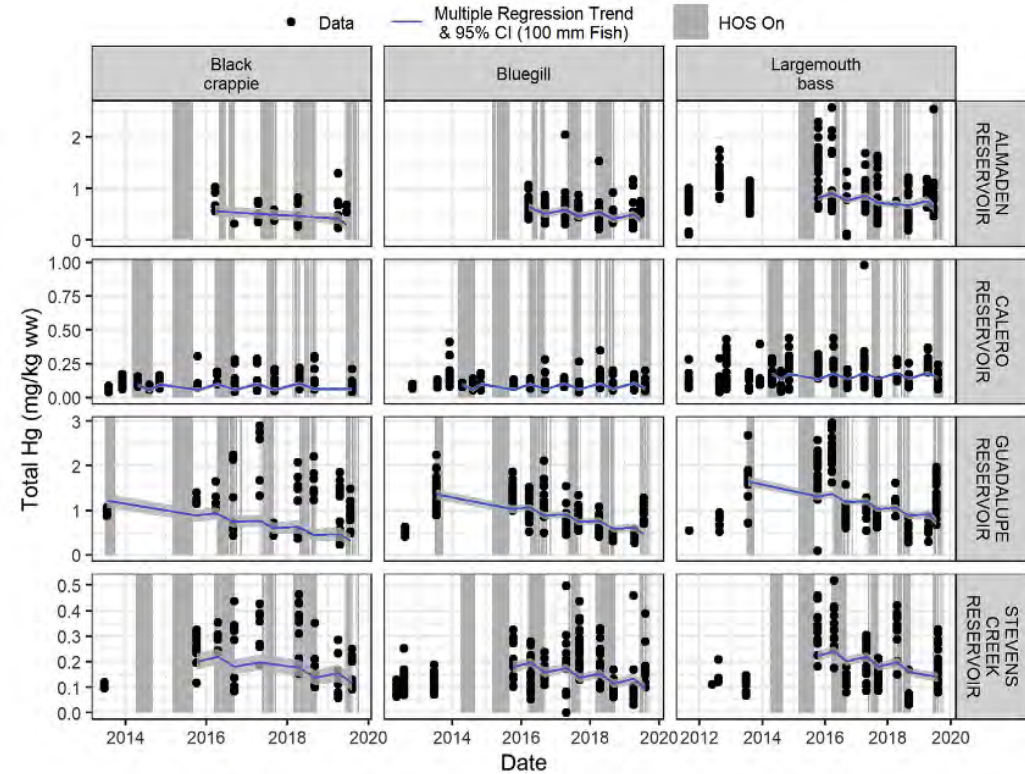
Effects of hypolimnetic oxygenation on fish tissue mercury in reservoirs near the new Almaden Mining District, California, USA [☆]

Mark Seelos ^{a, b, *}, Marc Beutel ^b, Carrie M. Austin ^c, Elisabeth Wilkinson ^a, Clayton Leal ^a

^a Valley Water, San Jose, CA, 95118, USA

^b Environmental Systems Graduate Program, University of California Merced, Merced, CA, 95343, USA

^c San Francisco Bay Regional Water Quality Control Board, Oakland, CA, 94612, USA



Fish Hg is declining in 3 reservoirs, but...

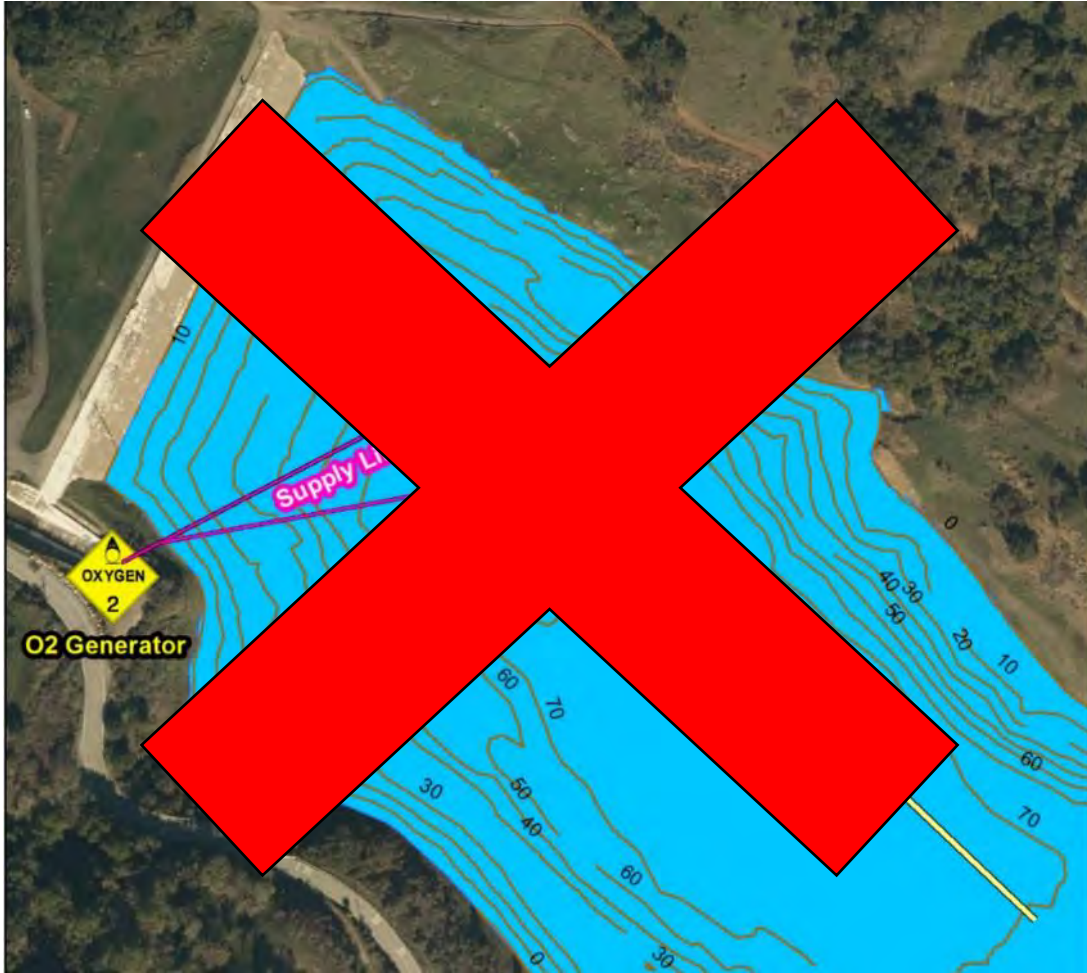
- It's not due to the HOSs.
- HOSs increase outflow temperature.
- HOSs cause algae blooms.
- HOSs are difficult to operate and expensive.

Field Evaluation



Laboratory Study

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Option 2: Sorbent Amendments



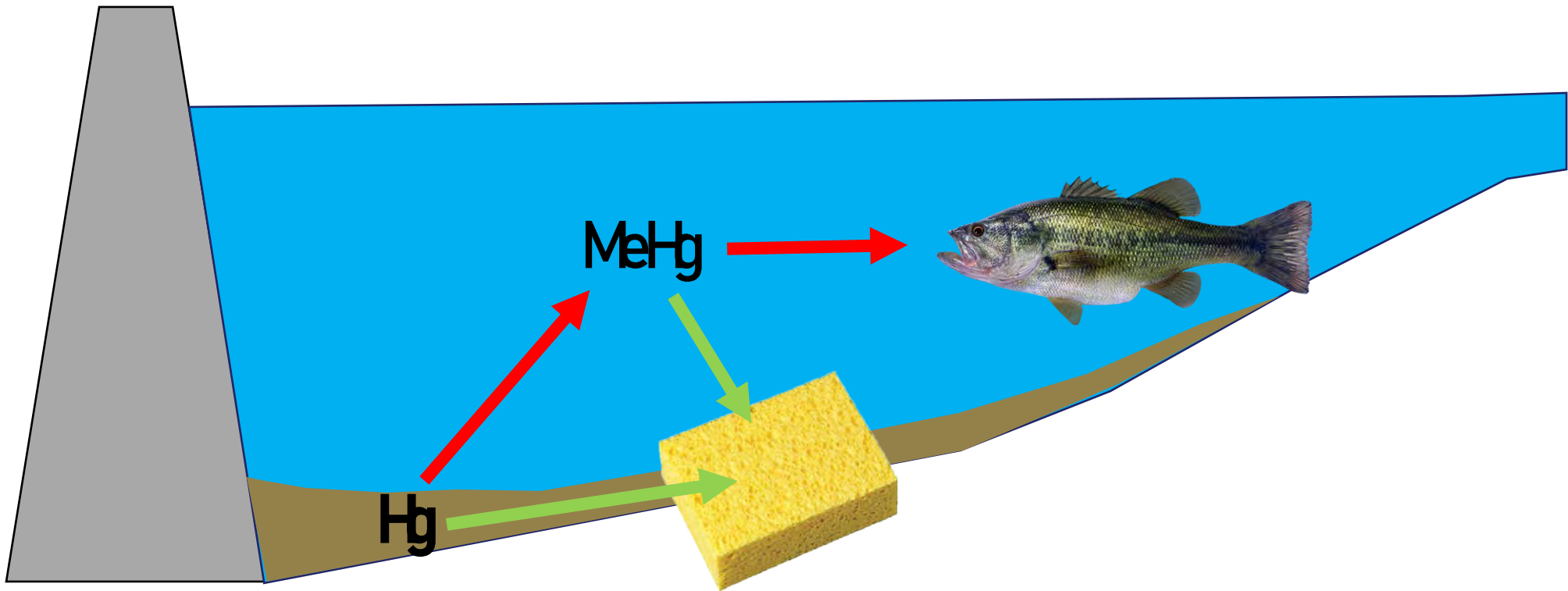
Evaluation of Manganese Oxide Amendments for Mercury Remediation in Contaminated Aquatic Sediments

Mark Seelos,* Edwin Rivas Meraz, Marc Beutel, Samuel J. Traina, Bryan Furhmann, Julia Burmistrova, Dimitri Vlassopoulos, and Peggy A. O'Day



Study of Sorbents and Application Methods:
Collaborative Study with UC Merced
2022-2024

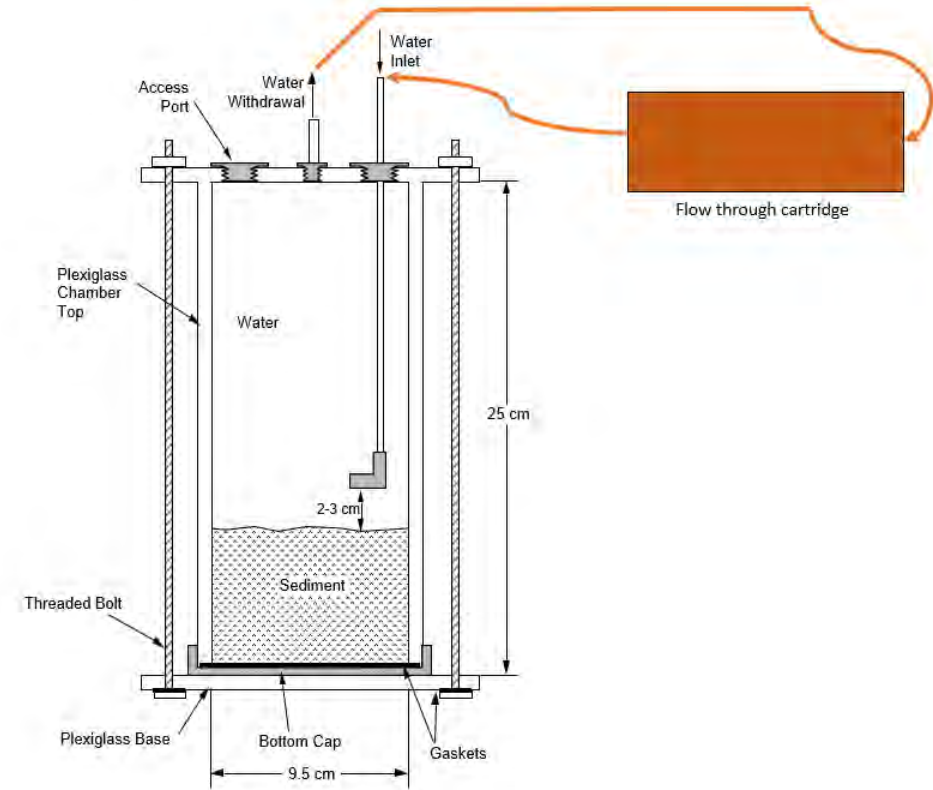
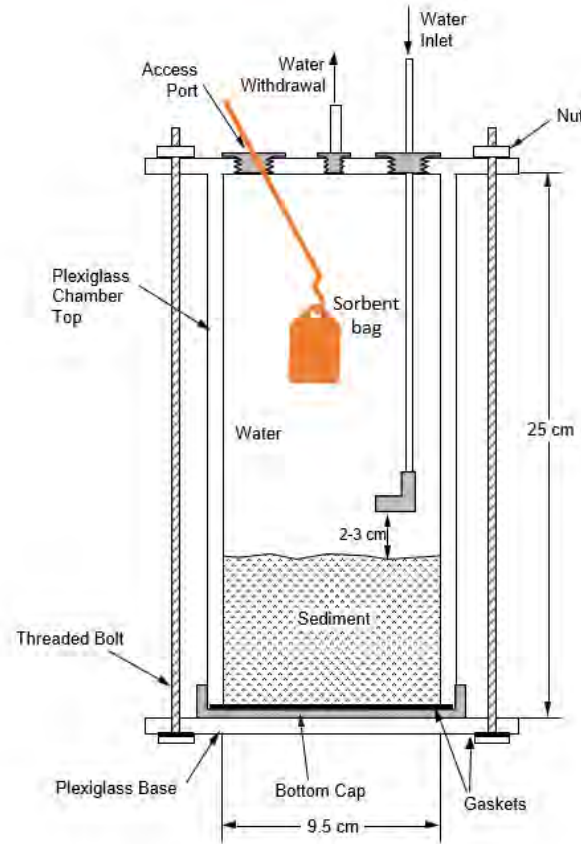
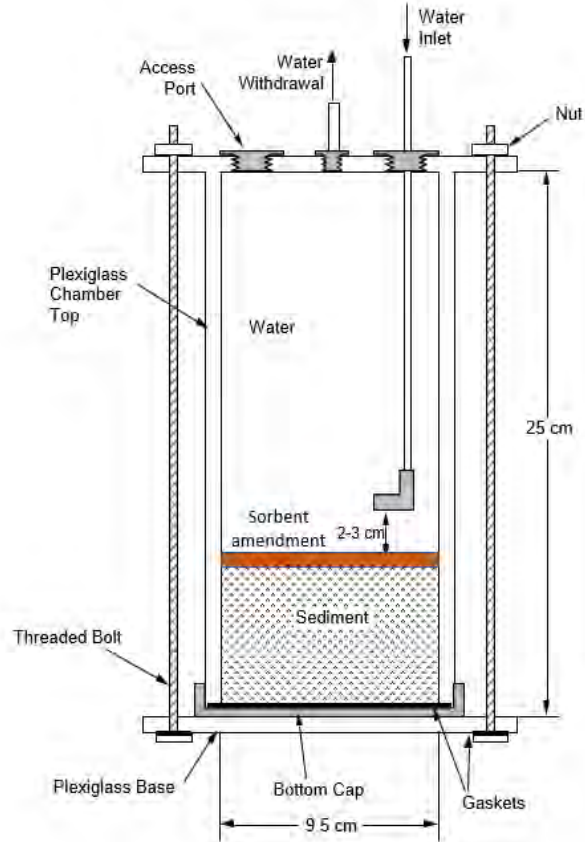
Phase 1: Which sorbent should we use?



Laboratory Study

Sorbent Application Methods 19

Phase 2: How should we apply the sorbent?

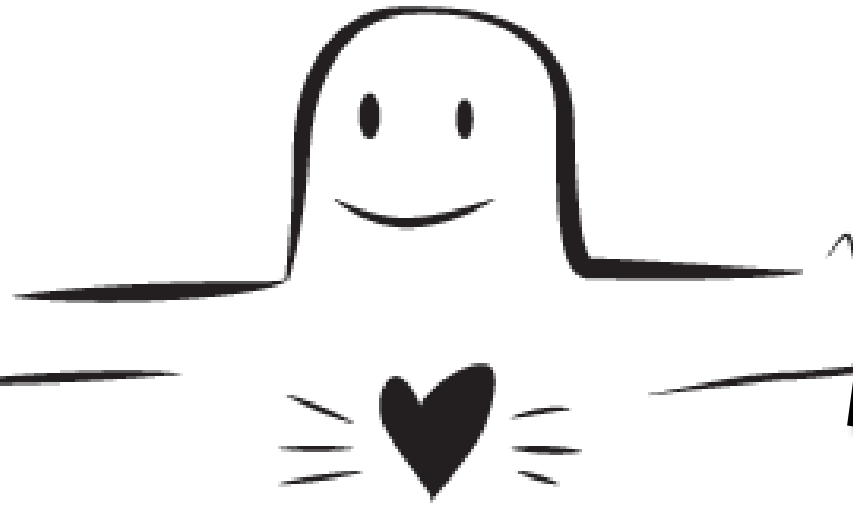
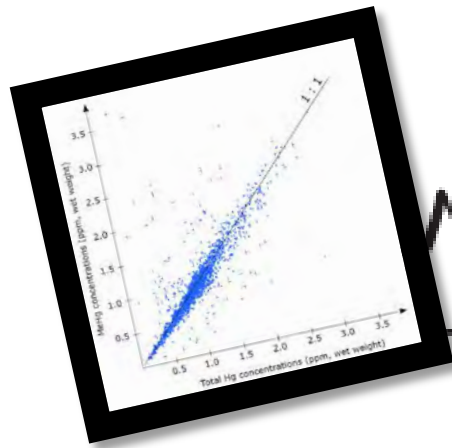




Key Takeaways

A MESSAGE TO WATER MANAGERS...

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SHARE WHAT YA GOT

valleywater.org

The Special Relationship

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Three **golden** principles (according to me).

1. We share a common goal.
2. Done Right > Done Fast
3. Agency money = public money.
Spend and compel wisely.

Enforcement Authority

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VS.

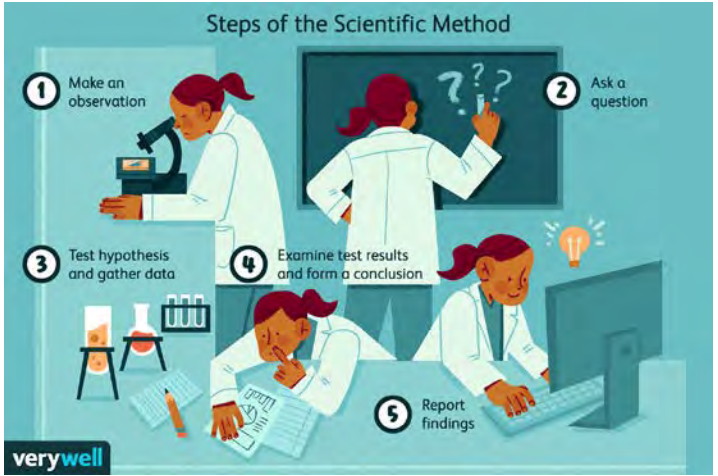


Proxy Enforcement

- CWC Section 13304
(Cleanup and Abatement Order)
- CWC Section 13267
(Monitoring and Reporting)

Will monitoring or cleanup measurably help progress toward the TMDL program objective?

What has worked well?



Slow, but proven effective!

What could improve?



Keys to Progress

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Consistent Funding



Consistent Messaging



S	Specific	Make your goals specific and narrow for more effective planning.	
M	Measurable	Define what evidence will prove you're making progress and reevaluate when necessary.	
A	Attainable	Make sure you can reasonably accomplish your goal within a certain timeframe.	
R	Relevant	Your goals should align with your values and long-term objectives.	
T	Time-based	Set a realistic, ambitious end-date for task prioritization and motivation.	

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Thank you!



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