

Mercury in the Delta and its Watershed

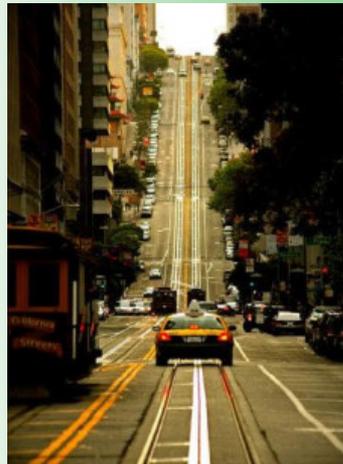
Integrating Watershed Plans with Total Maximum Daily Loads

Stephen McCord, Ph.D., P.E.
February 9, 2012

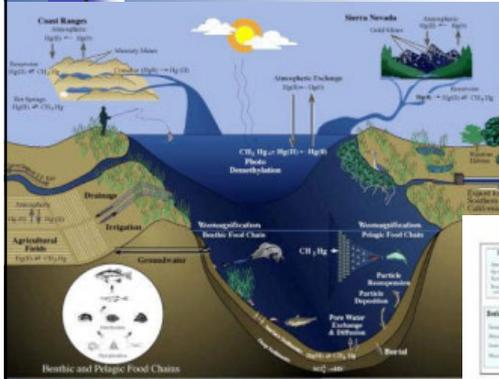


First, The Bad News: *It's Complicated*

1. Complex Science
2. Regulatory Inconsistencies
3. Strange Bedfellows

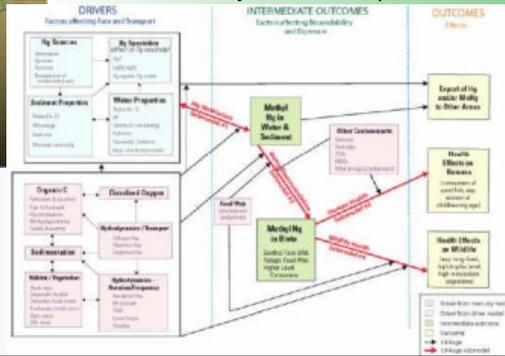


1. Complex Science

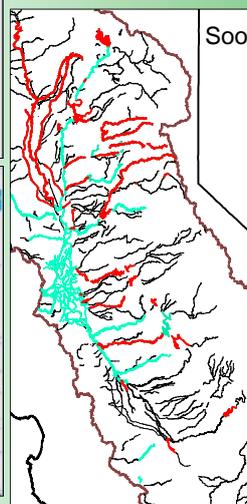
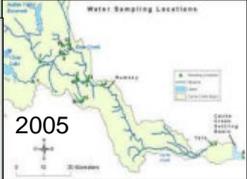
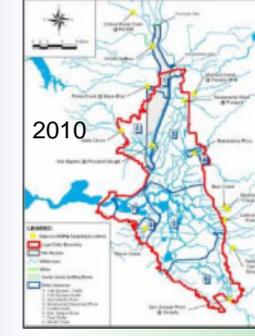


CALFED Conceptual Model

DRERIP Ecosystem Conceptual Model



2. Regulatory Inconsistencies – Layered TMDLs, Like an Onion

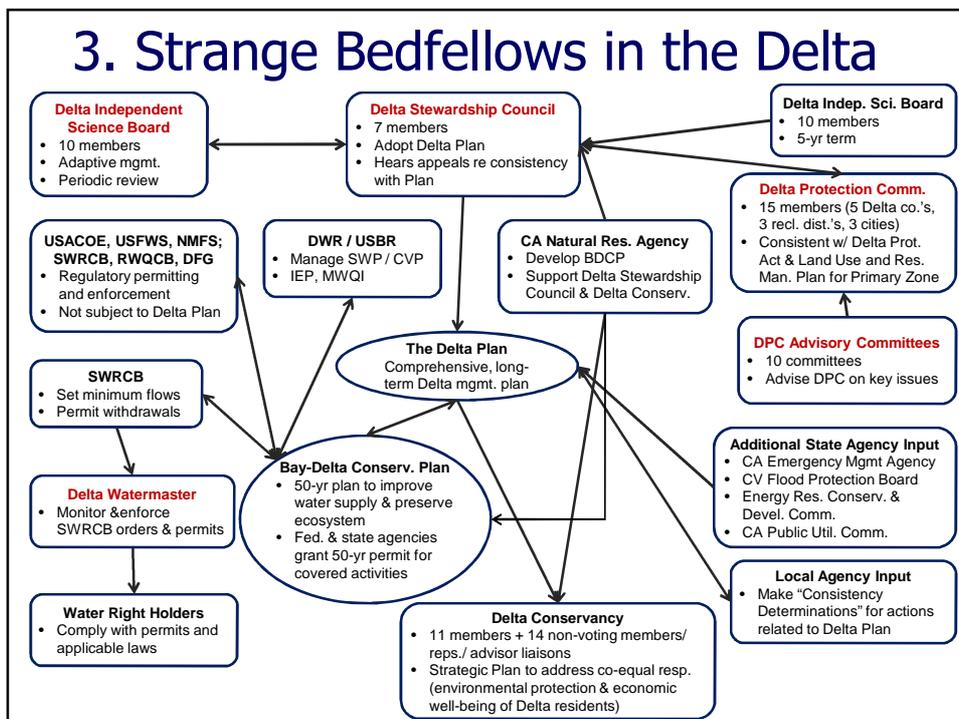


Oh, Mercury, how do I regulate thee? Let me count the ways...

- Clear Lake →
- San Francisco Bay
- Cache Creek
- LA Lakes →
- Delta →
- Statewide reservoirs →



3. Strange Bedfellows in the Delta



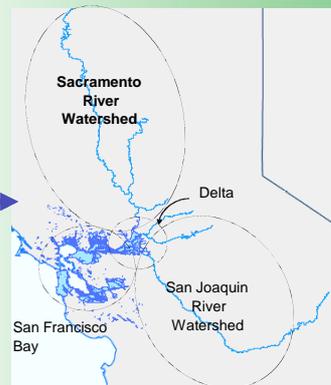
Now, Some Opportunities

1. Integrate regulatory efforts
2. Organize at the right scale
3. Adaptively manage
4. Conduct applied research
5. Pull it all together
6. Get creative!

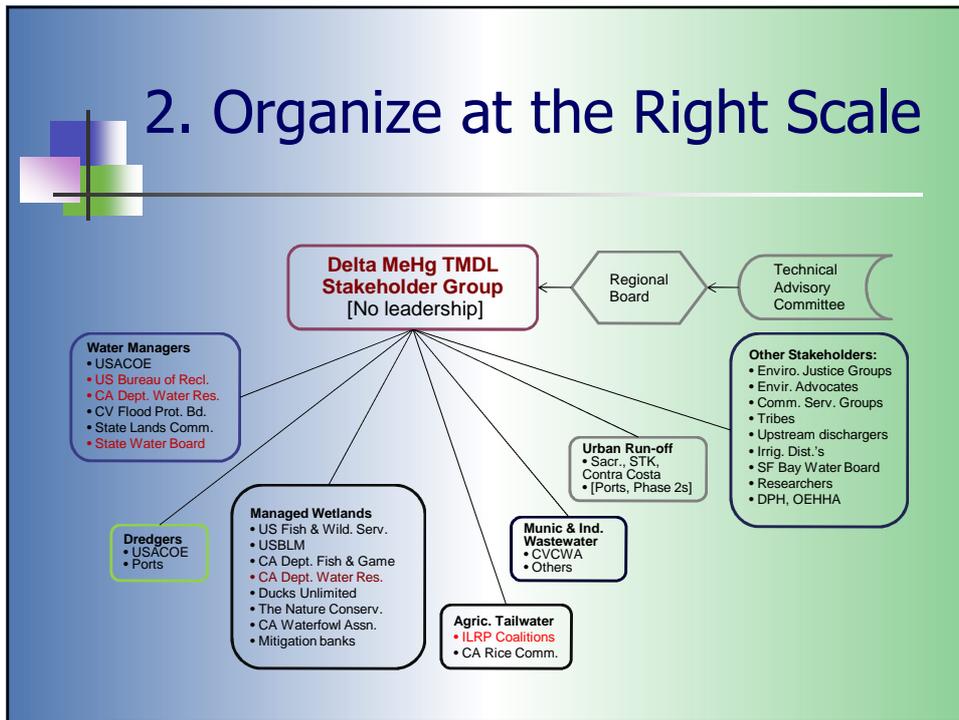


1. Integrate Regulatory Efforts

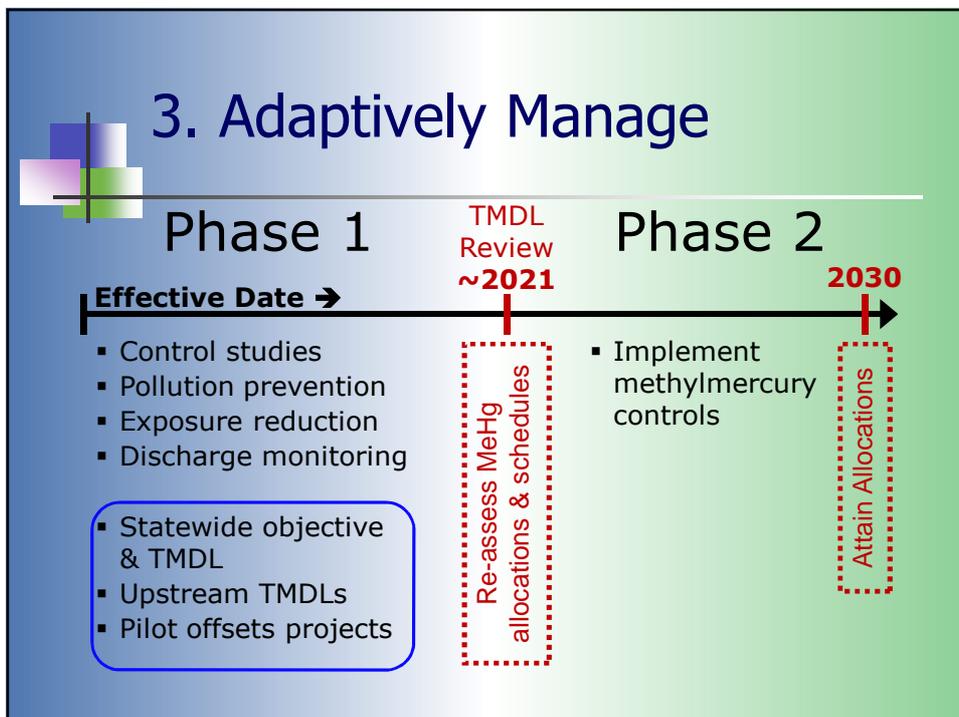
- Statewide Water Quality Objective (Hg_{fish})
- Statewide Reservoirs TMDL
- Regional Monitoring Programs →
- Regional Mercury Strategies
- Watershed Permits



2. Organize at the Right Scale



3. Adaptively Manage

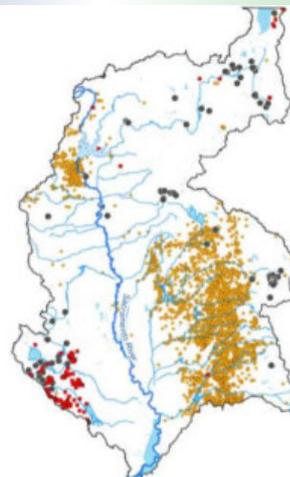


4. Conduct Applied Research

- A. Source Control
- B. Treatment Control
- C. Methylation Control

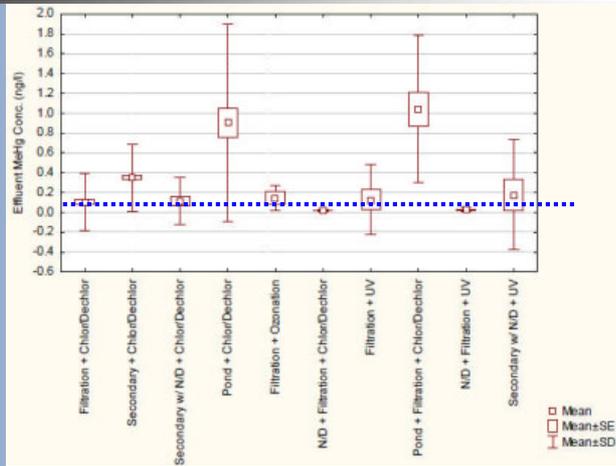


A. Source Control – Mine Site Remediation



be mercury free
A Regional Partnership for Mercury Pollution Reduction
www.BeMercuryFree.net

B. Treatment Control – Process Comparisons



Source: "A Review of Methylmercury and Inorganic Mercury Discharges from NPDES Facilities in California's Central Valley." RWQCB, 2010

C. Methylation Control – Wetlands Management

- Vegetation management
- Water management
- Permanent ponds

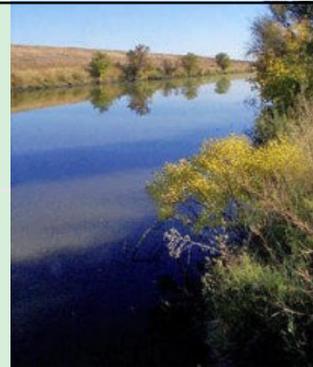
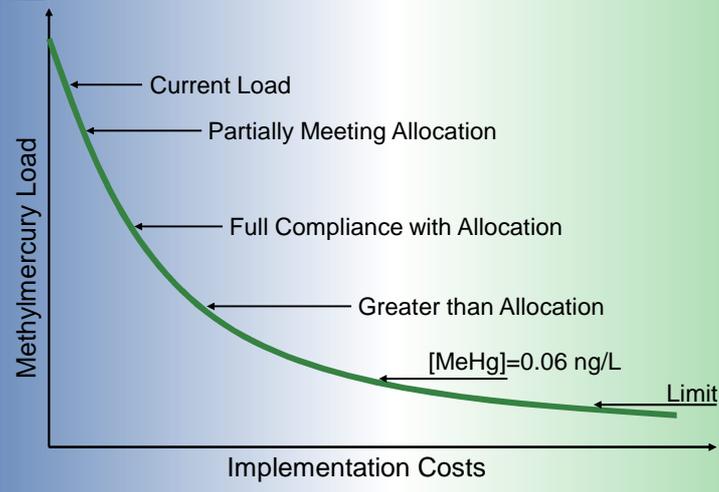


Photo courtesy of Josh Ackerman, USGS

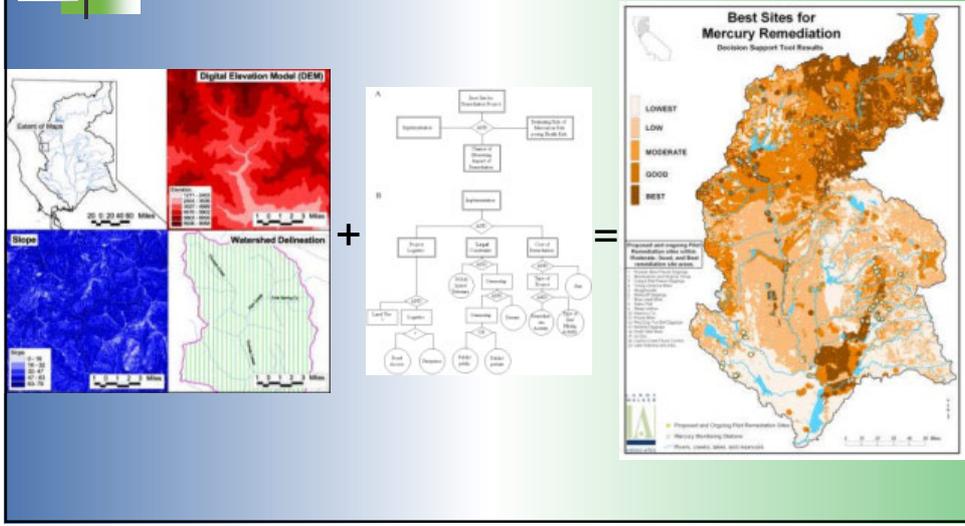


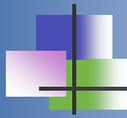
Photo courtesy of Mark Stephenson, CDFG

5. Pull It All Together – Feasibility Assessment



Decision Support Systems

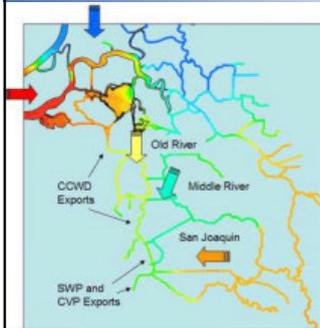




Numeric Models

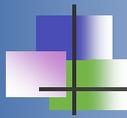
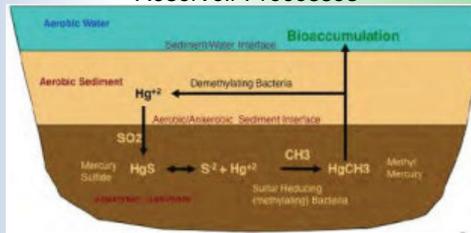
- Hydrology
 - Hydrodynamics
 - Sediment transport
 - Water quality
 - Ecosystem

Delta Processes



Watershed Processes

Reservoir Processes

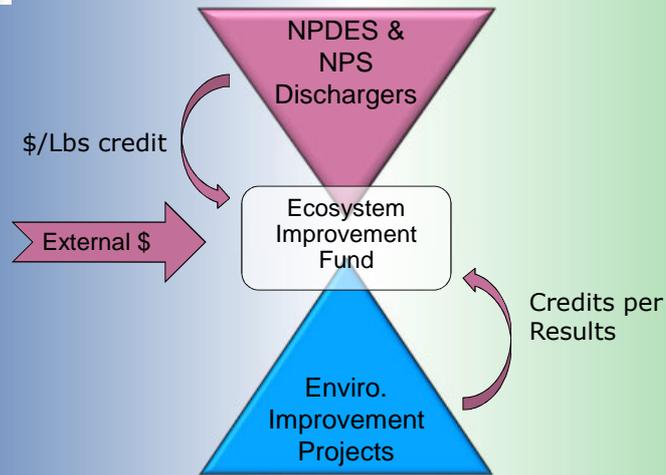


6. Get Creative!

- ◆ Reduce loads at plant: \$500M+
- ◆ Clean up abandoned mine for Hg credits: \$5-10M

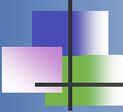


Trading / Prioritizing



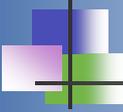
Delta MeHg TMDL vs Nine Key Elements

1. ID causes & sources
2. Estimate load reductions
3. ID BMPs
4. Provide tech & \$\$ assistance
5. Inform & educate
6. Schedule out requirements
7. Include milestones
8. Evaluate progress
9. Monitor



Mercury Strategy's Management-Level Questions

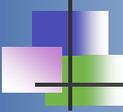
1. *What's the problem?*
 - Appropriate target
 - Level and extent of exceedances
2. *What do we know?*
 - Conceptual model
 - Linkage analysis
 - Controllability, certainty
3. *What to do?*
 - Pilot projects
 - Modeling
 - Monitoring
 - Research
 - Risk evaluation
 - Outreach
 - Adaptive management



Summary

- *It's complicated* – Organize appropriately & manage adaptively
- *It's everywhere* – Need many site- and source-specific solutions
- *It's costly* – Set priorities, be creative

Mercury: *A great opportunity disguised as an insoluble problem.*



For More Information

Stephen McCord
McCord Environmental, Inc.
sam@mccenv.com
530-220-3165
www.mccenv.com

Links

- DTMC Strategic Plan:
www.sacriver.org/files/documents/dtmc-documents/DTMCMercuryStrategyPlan.pdf
- Delta Methylmercury TMDL:
http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/