American River Watershed
Mercury Total Maximum Daily Load

Stakeholder Meeting

Auburn – April 13, 2011

Agenda

- Mercury Reduction Strategy
- Scientific Background
- Allocation Strategy
- Implementation Program
- Next Steps

TMDL Definition

- The amount of a specific pollutant that a water body can receive and still meet water quality standards.

Also called assimilative (or loading) capacity

TMDL = wasteload allocations + load allocations

(point sources) (nonpoint sources)

TMDL must have a “margin of safety” to account for uncertainty.

ARW Assimilative Capacity:

~40-90% lower than existing conditions, depending on the fish tissue target

- 40-50% reduction will protect wildlife and humans eating about 1 meal/week of mixed trophic level fish.
- 90% reduction will protect humans eating 4 to 5 meals/week of fish.

Translate fish to water with bioaccumulation factor (BAF)

$$BAF = \frac{[MeHg]_{fish}}{[MeHg]_{water}}$$

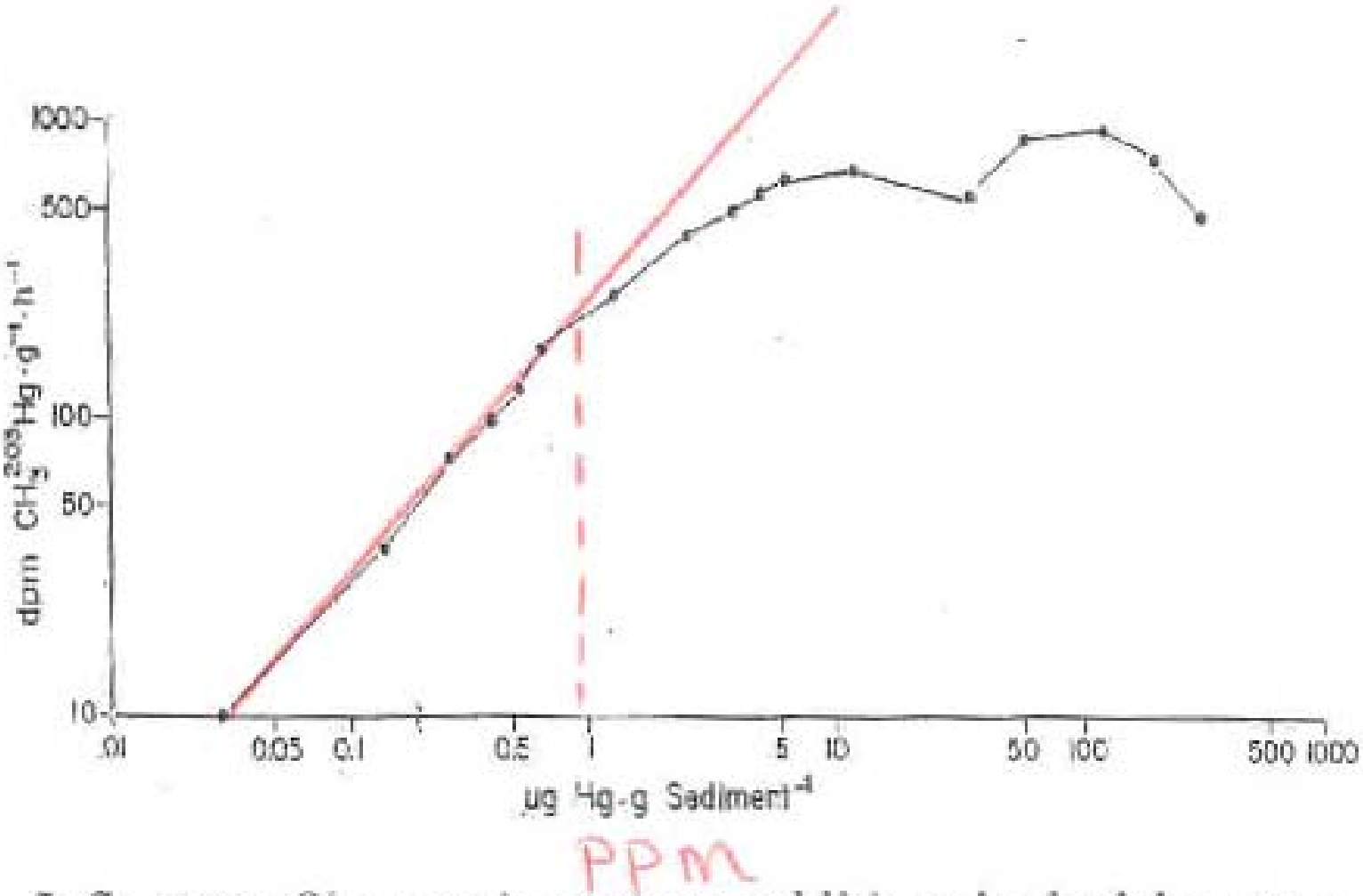
- Ratio of concentrations of MeHg in fish to water
- Use available AR fish and water data or other local and regional BAF values

$$\frac{\text{Fish Target}}{BAF} = [MeHg]_{water}\ \text{Goal}$$

Mercury Reduction Strategy

- Reduce concentrations of methylmercury in water column to reduce fish tissue mercury concentrations.
  - Reduce discharges of MeHg
  - Reduce methylation
    - Adjust factors that control the rate of methylation production or bioaccumulation
    - Promote methylmercury loss
  - Reduce concentrations of THg in sediment (one factor controlling MeHg)

Scientific Background



Influence of inorganic mercury additions in the laboratory on methylmercury production rates in sediment.

From Rudd *et al.*, 1983

Scientific Background

Fish Tissue Mercury Concentration Reductions After Mercury Source Controls

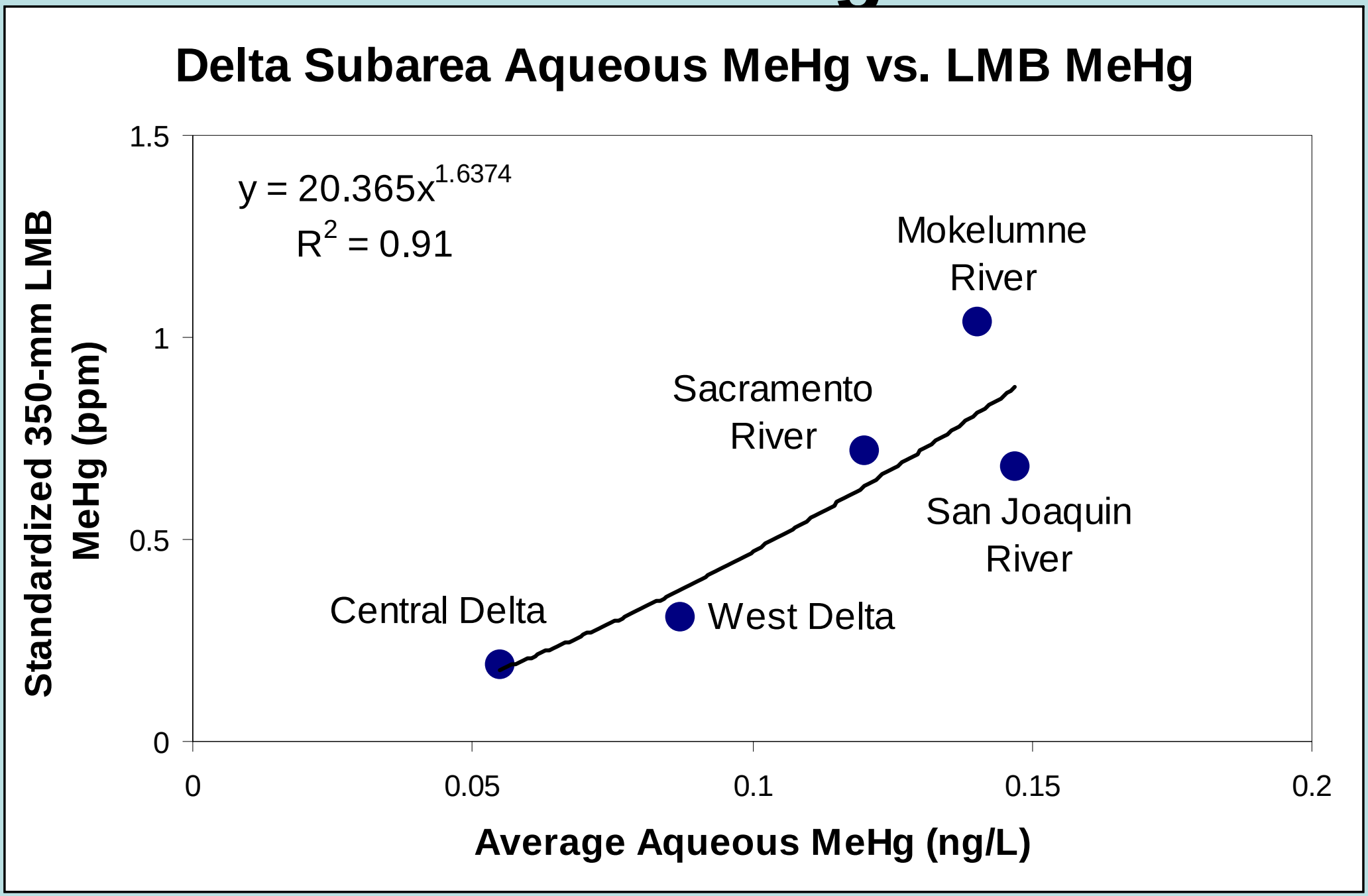
Mercury Source	Control Measures	Biotic Change
Municipal and industrial discharge	Reduced or Eliminated discharge	22 to 96% reductions in fish tissue
	Natural burial or dredging of contaminated sediments	
	Treated groundwater or pond discharge	
	River bank erosion controls	
Atmospheric deposition	Reduced atmospheric mercury input by 60%.	30% reduction in 6 years

Summary of Delta TMDL Table 3.2.

Scientific Background

- Lake bioaccumulation study.
- Data suggest that:
  - Total mercury in sediment was the largest predictor of LMB tissue mercury.
  - Other predictors of LMB tissue mercury:
    - Positive: THg in soil, % forested area, aqueous [MeHg]
    - Negative: specific conductivity
  - Aqueous [MeHg] was driven by degree of O_2 stratification in Sierra Nevada lakes.

Scientific Background



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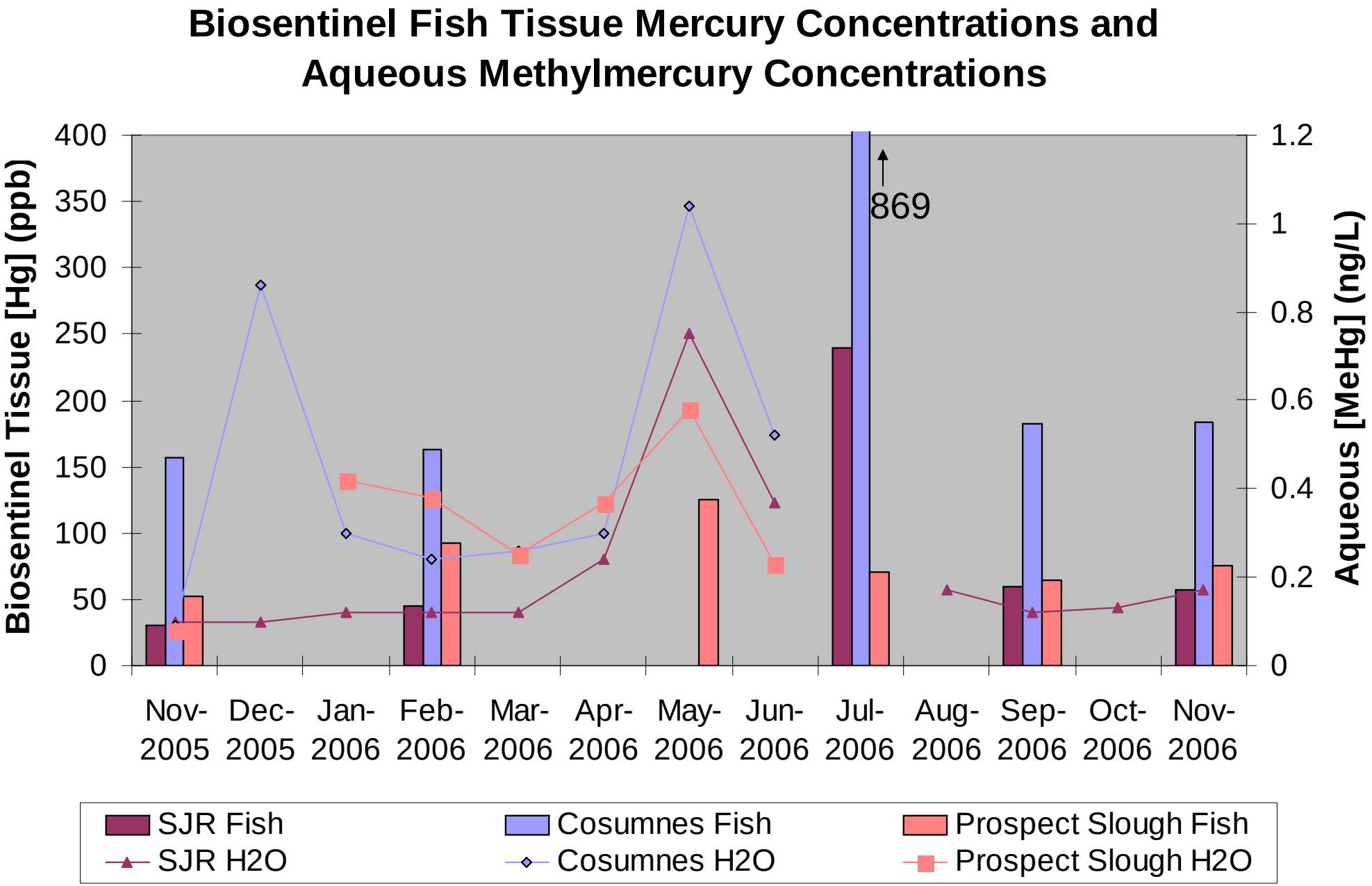

Summarized from: Foe, 2008; SFEI, 2007; and Slotton, 2008.

Allocation Strategy

Allocations

- Non-point sources: Assigned to 303d watershed(s) or source categories, not individual non-point sources. Concentration-based ~ [MeHg] in water.
- Point Sources (NPDES WWTPs and MS4s): Either mass or concentration-based MeHg concentration in effluent.

Allocation Strategy

Allocations

- Developed from aqueous methylmercury goals.
- % reductions needed to meet goal in each 303(d)-listed waterbody
- Allocations could be met by methylmercury and/or total mercury reductions
- Incorporate an evaluation of background conditions

Implementation

- Adaptive management approach
  - Review new information
  - Revise management plans
- Focus on controllable sources
- Develop long-term plans to meet allocations or targets
- Include short-term actions
- Consider current mandates & regulations

Possible Actions

- Develop management plans within 1-2 years. Implement plans in 5 yrs and periodically update plans.
  - Identify sources
  - Evaluate cleanup strategies
  - Provide schedules

Possible Actions

- Inorganic mercury removal or sequestration
  - Cleanup mines that still discharge to surface waters
  - Erosion control for contaminated soil/sediment
    - Stabilize banks
    - Construct settling basins below highly erosive areas
  - Cleanup of mine tailings adjacent to the American River or its tributaries
  - Cleanup or cap contaminated sediment in lakes and river bottoms

Possible Actions

- Evaluate lake and reservoir management
  - Flows, water depth, diurnal fluctuation, aeration
  - Dredge depositional areas
  - Improve primary productivity to reduce methylmercury accumulation
  - Example: Guadalupe River Watershed Mercury TMDL

Possible Actions

- Land development-
  - Develop plans to minimize or reduce mercury impacts from land use changes
  - Low Impact Development
- NPDES point sources
  - Cap on mercury discharges
  - Implement mercury minimization programs
  - Mercury recovery programs
- Storm water
  - Redundant BMPs for sediment
  - Evaluate storm water collection system operations to reduce MeHg production
  - Implementation of or increase pre-treatment activities

Possible Actions

- Conduct studies
  - Identify mercury hot spots
  - Understand local bioaccumulation, food web dynamics
  - Develop feasible control actions for total and methylmercury

- Fisheries management
  - Adjust stocking practices
  - Promote anadromous species
  - Fishing practices

Possible Actions

- Education
  - Fish consumption advisories
  - Landowners
  - Industries
- Other non-point sources
  - Sediment BMPs
- Air Deposition
  - Minimize transfer from land to water.
  - Regional Board and State Board to work with CA ARB to develop a statewide Hg reduction program
  - US EPA working on greatly reducing US emissions

Potential agencies and entities responsible for TMDL activities

- Water and land management agencies
- NPDES WWTPs
- NPDES Storm water agencies
- Other NDPES Permitees
- Fisheries management agencies
- Landowners of mines
- Other non-point dischargers to surface waters

Next Steps

- Cancellation of May 18 Meeting
- CEQA Scoping Meeting ~July 2011
- Revision of Straw Proposal