

American River Watershed Mercury Total Maximum Daily Load

Stakeholder Meeting
Placerville – February 17, 2011



Outline

- Development of mercury targets
- Alternatives for fish tissue objectives
 - Fish consumption
- Fisheries management
- TMDL approach
- Mercury source and loss estimation methods
- Future TMDLs & project scope



Today's goals

- Identify a range of fish tissue targets/objectives that should be evaluated as part of the final TMDL staff report.
- Brainstorm ideas for fisheries management
- TMDL approaches

Targets vs. Objectives

Target: numeric endpoint for TMDL

- protects beneficial uses.
- sets level of reduction for pollutant loads.
- Use existing standard or develop new for TMDL.



Objective: State term for water quality standard.

- Water Board required to establish; Basin Plan Chapter 3.
- Staff report will give Board alternatives for TMDL target.
- Board will adopt target as water quality objective and place in Basin Plan.

Beneficial Use

↑ High mercury levels



- Fish consumption advisories for human consumption
- Wildlife habitat

Basic Target Formula

Beneficial uses to be protected: fisheries that are safe for people and wildlife to eat.

Target is methylmercury concentration in fish.

$$\text{Acceptable level of Hg in fish} = \frac{\text{Safe daily intake x body wt.}}{\text{consumption rate}}$$

Consumption patterns- human

- Studies
- Creel surveys
- Observations
- Accessibility- remote areas
- Do people catch and eat the large brown trout?

Consumption patterns- wildlife

- T&E
- Most sensitive
- Availability - are there predators for the large brown trout in Hell Hole?

Preliminary ideas for fish tissue objectives (FTO)

- Determine values protective of wildlife
- Evaluate corresponding safe level for humans consuming local fish (#meals/week)
- Evaluate range of consumption rates
- Single objective for high elevation lakes
 - Applies to large fish, available species
- TL3 & TL4 FTO for Folsom & downstream
 - Specific species and size range

**Safe Levels of Methylmercury in Fish (mg/kg)
to Protect Wildlife,
by trophic level and prey size (millimeters total length)**

	<150 mm	150-350 mm		>150 mm	
Species	Small fish	TL 3	TL 4	TL 3	TL 4
Mink	0.08				
River otter	0.11				
Forster's tern	0.05				
Kingfisher	0.05				
Merganser		0.09			
Western grebe		0.08			
Osprey		0.11			
Bald eagle				0.16	

Mercury Target Options in Large Fish to Protect Humans

Target Option	Intake of mercury, local fish (ug/kg bwt-day)	Total Consumption Rate, local fish (g/day)	Target in All Large Fish (mg/kg Hg in fish)	Targets in Large Fish by Trophic Level (mg/kg Hg in fish)	
				TL3	TL4
A	0.073	17.5	0.30	0.14	0.44
B	0.073	32	0.16	0.08	0.24
C	0.073	64	0.08	0.04	0.12
D	0.1	142.4	0.05	0.02	0.07

Mercury in Fish > 6 in.

Avg. in TL3 & 4 fish, mg/kg

<i>Safe level, one meal/wk</i>	<i>0.16</i>
<i>safe level, 2 meal/wk</i>	<i>0.08</i>
French Meadows Res.	0.14
Hell Hole Res.	0.55
Loon Lake	0.31
Oxbow Res.	0.10
North Fork American	0.41
Middle Fork American	0.09
Slab Creek Res.	0.35
South Fork American	0.52
Ice House Res.	0.03



Mercury in fish > 6 inches

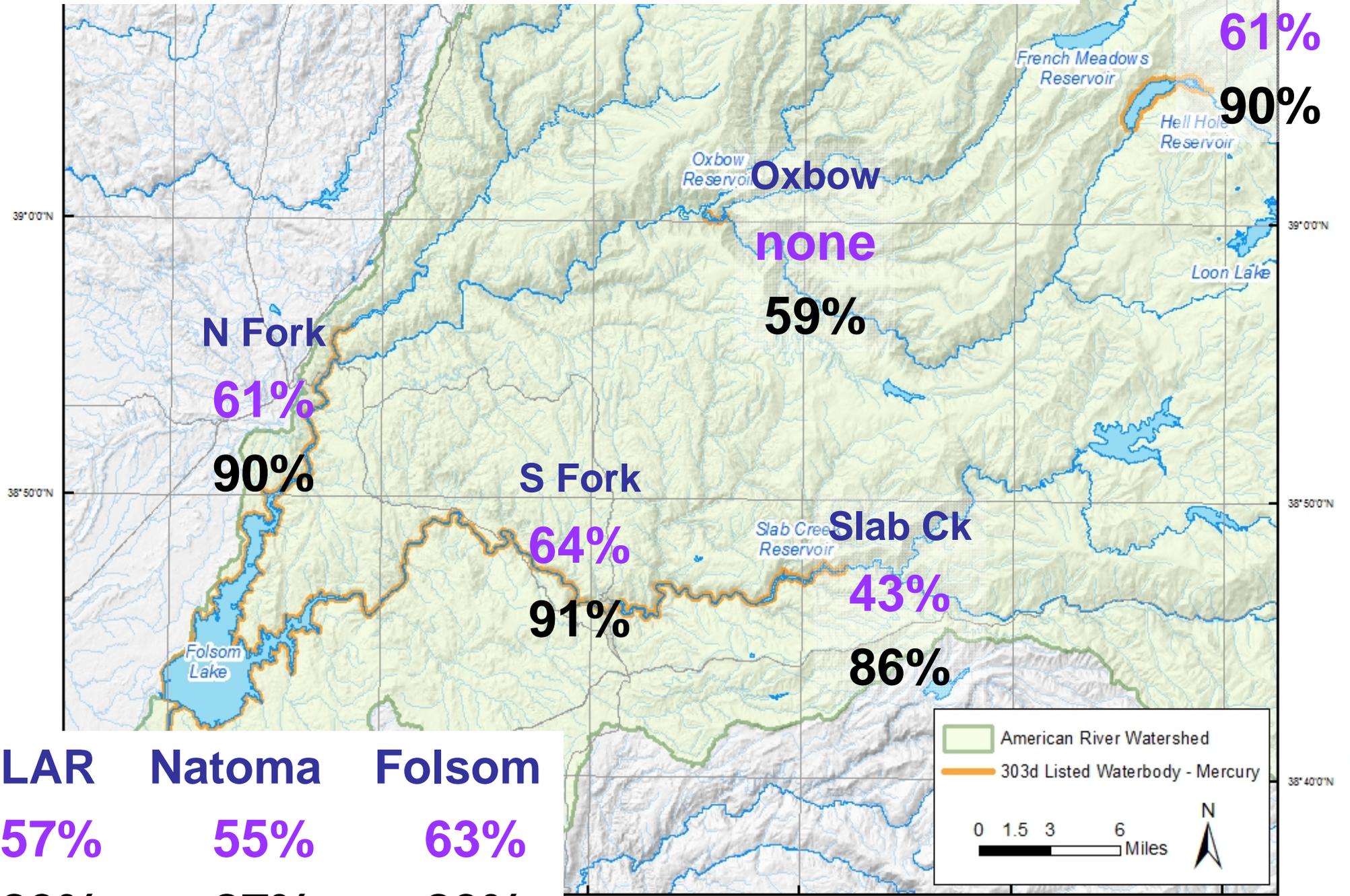
Avg. in top trophic level (TL4), mg/kg

<i>Safe level, one meal/wk</i>	<i>0.24</i>
<i>Safe level, 2 meals/wk</i>	<i>0.12</i>
Folsom Lake	0.64
Lake Natoma	0.53
Lower American R.	0.49



Reduction in fish mercury to eat one meal/week

Reduction in fish mercury to eat 4 meals/week



LAR	Natoma	Folsom
57%	55%	63%
89%	87%	89%

120°50'0"W 120°40'0"W 120°30'0"W 120°20'0"W

Fisheries management options

- Signage
- Stocking patterns
- Catch and release
- Seasonal closures
- Size and bag limits
- Prohibitions
- Promote anadromous fish

Health Advisory for Striped Bass and Sturgeon

STRIPED BASS **STURGEON**

Women age 18 - 45, breastfeeding or pregnant women, children, and teens

1 MEAL A MONTH and **NO OTHER FISH**

NO Striped Bass over 27 inches

Other adults

2 MEALS A MONTH and **NO OTHER FISH**

NO Striped Bass over 35 inches

CAUTION

Catfish Carp Pikeminnow Crappie Largemouth Bass

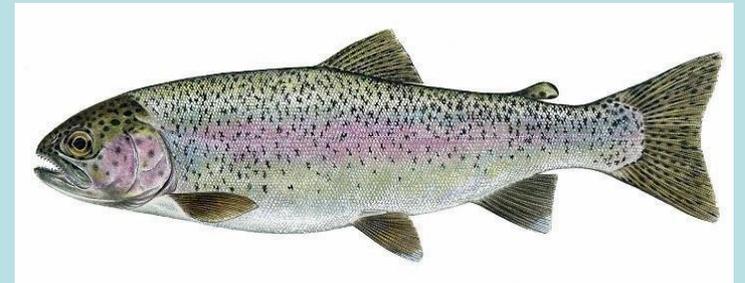
BEST CHOICES

Salmon Sunfish Trout Bluegill

The infographic provides consumption guidelines for Striped Bass and Sturgeon. For women age 18-45, breastfeeding or pregnant women, children, and teens, the recommendation is 1 meal a month of no other fish, with no Striped Bass over 27 inches. For other adults, the recommendation is 2 meals a month of no other fish, with no Striped Bass over 35 inches. A caution section lists Catfish, Carp, Pikeminnow, Crappie, and Largemouth Bass. The best choices section lists Salmon, Sunfish, Trout, and Bluegill. Each section includes icons of the fish and a calendar grid showing the recommended consumption schedule.

Fisheries management options

- Different management options for upper and lower watersheds?
- Different management options for rivers & reservoirs?



Implementation

- DFG, state agencies, and reservoir operators develop and implement a fisheries management plan

TMDL Approach

- How can we develop a watershed TMDL based on available information and other TMDLs?
- Opportunities for your ideas
- Here's one approach.....



Proposal - TMDL strategy

Allocations

- Non-point sources: Assigned to 303d watershed(s), 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.

Proposal - TMDL strategy

Implementation

- % reduction to meet fish targets (site-specific fish/water ratio or assume 1:1 linkage)
- Water & reservoirs goal : [MeHg] ng/l
- Mine and contaminated soil and sediment goal: [Hg] mg/kg
- Watershed goal: [Hg/SSC] mg/kg

Proposal -TMDL strategy

Adaptive: refine cleanup priorities, Hg and MeHg reduction projects. Report to Board in 6+ years

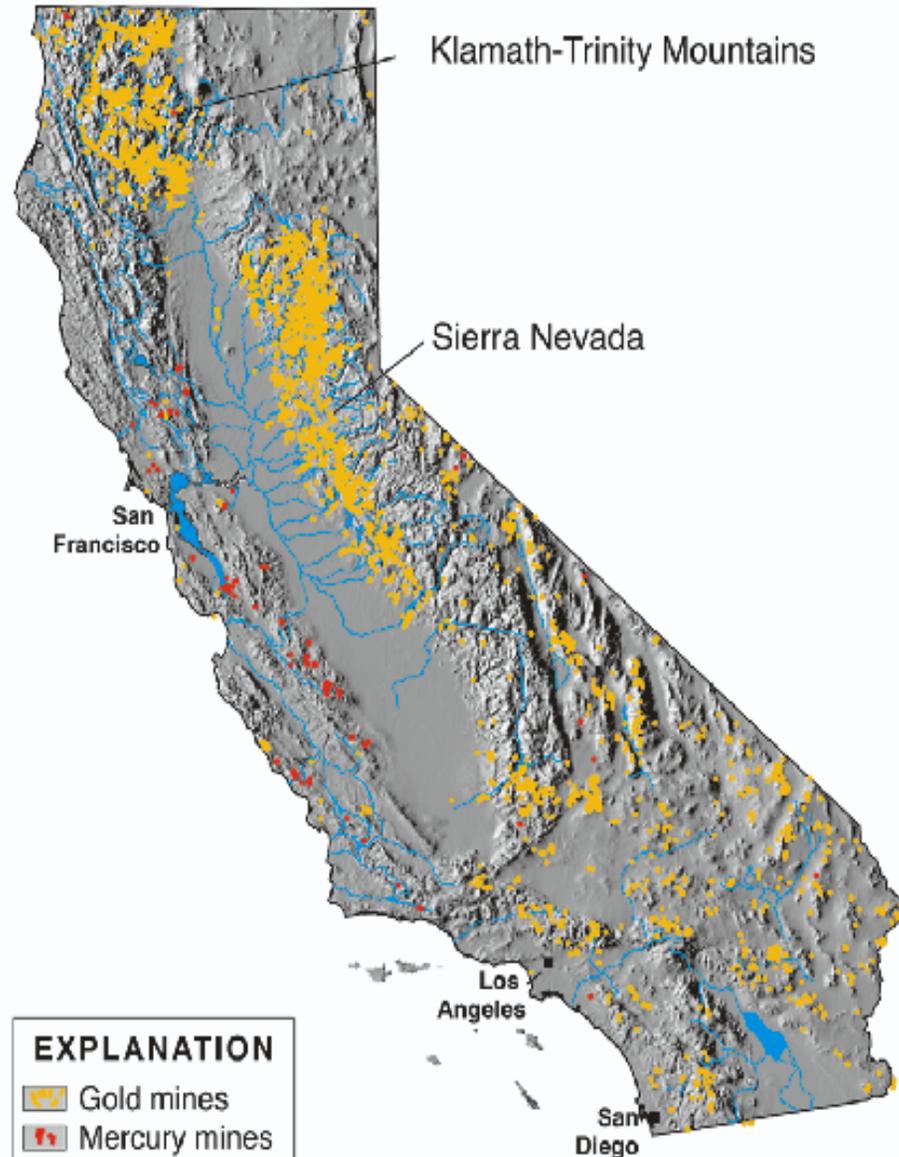
Early actions for some sources:

- Cleanup mines that discharge to surface waters
- Other priority sources or contaminated areas?
- Best management practices for erosion control

Develop management plans (agencies w/watershed groups?)

- Identify sources, evaluate cleanup strategies, provide schedules
- Evaluate management of: water, sediment, land use, fisheries

Merge into a larger project?



(from USGS fact sheet 2005-3014)

Contact Information

- American River Watershed TMDL/BPA
Webpage:
http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/american_river_hg/index.shtml
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