California's Surface Water Ambient Monitoring Program

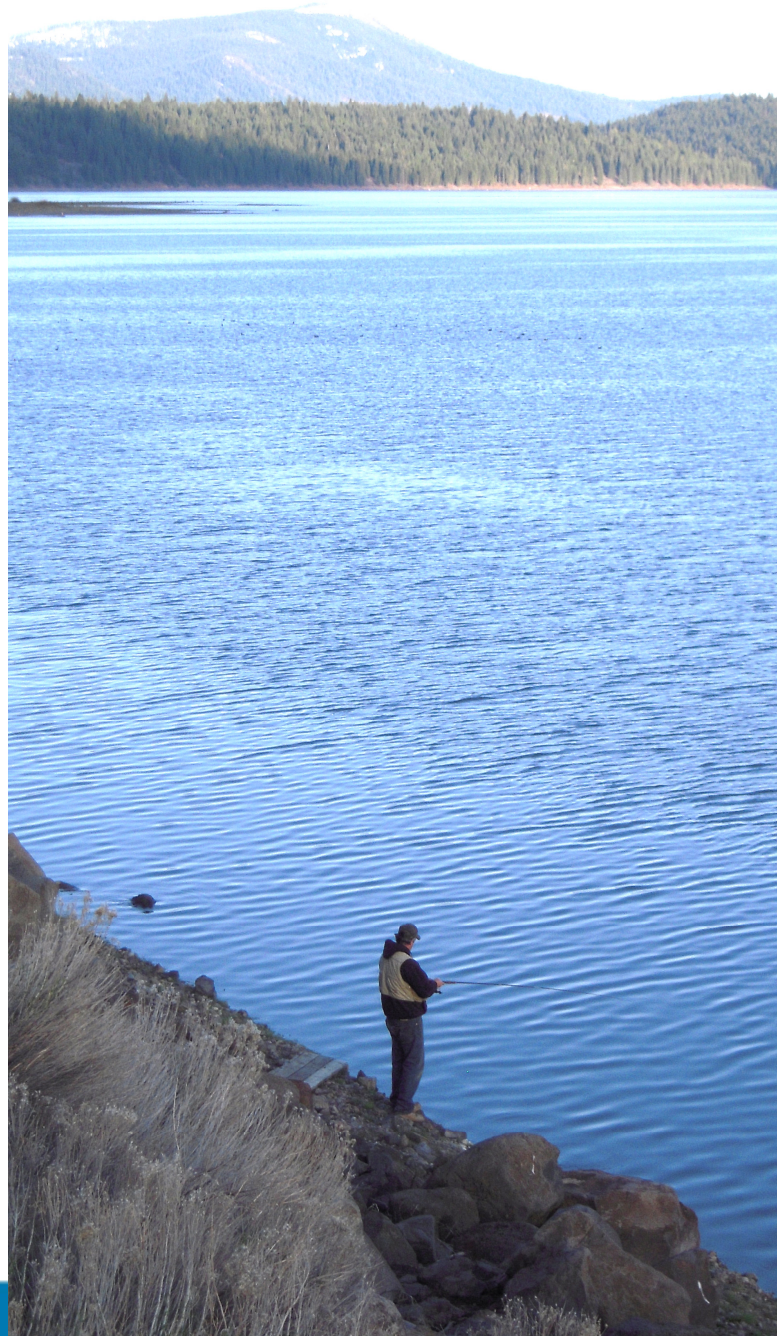
Contaminants in Fish from California Lakes and Reservoirs

California Water Boards

SWAMP Surface Water Ambient Monitoring Program

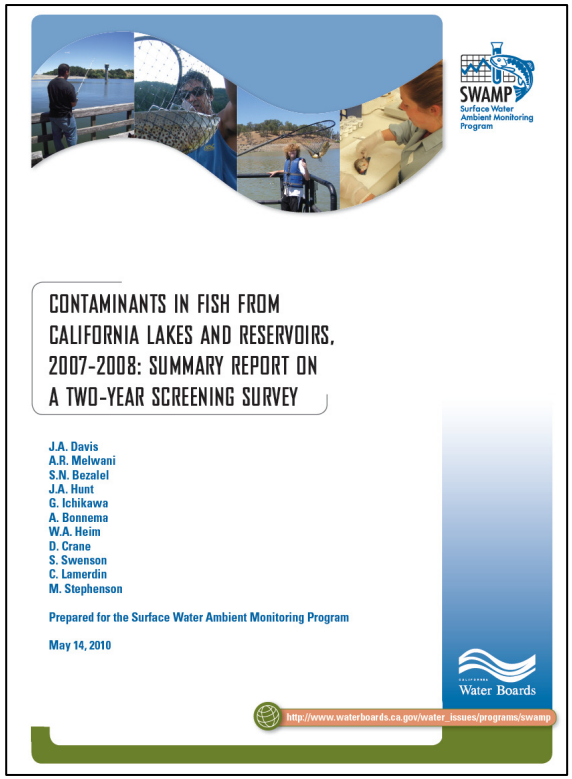
Background

- Problem
  - lack of statewide information on contaminant impacts on the fishing beneficial use
  - lack of safe eating guidelines
  - especially for lakes
- New SWAMP monitoring began in 2007
- $750,000 to $1 million per year
- Significant partnerships and matching funds
- Five-year effort to cover all water body types, beginning with lakes
- Initial focus on sport fish



Lakes Survey

- Questions
  1. Condition of California lakes?
  2. Candidates for 303(d) listing?
  3. Candidates for additional sampling?
- Focus on screening of indicator species
- 2007 – 2008



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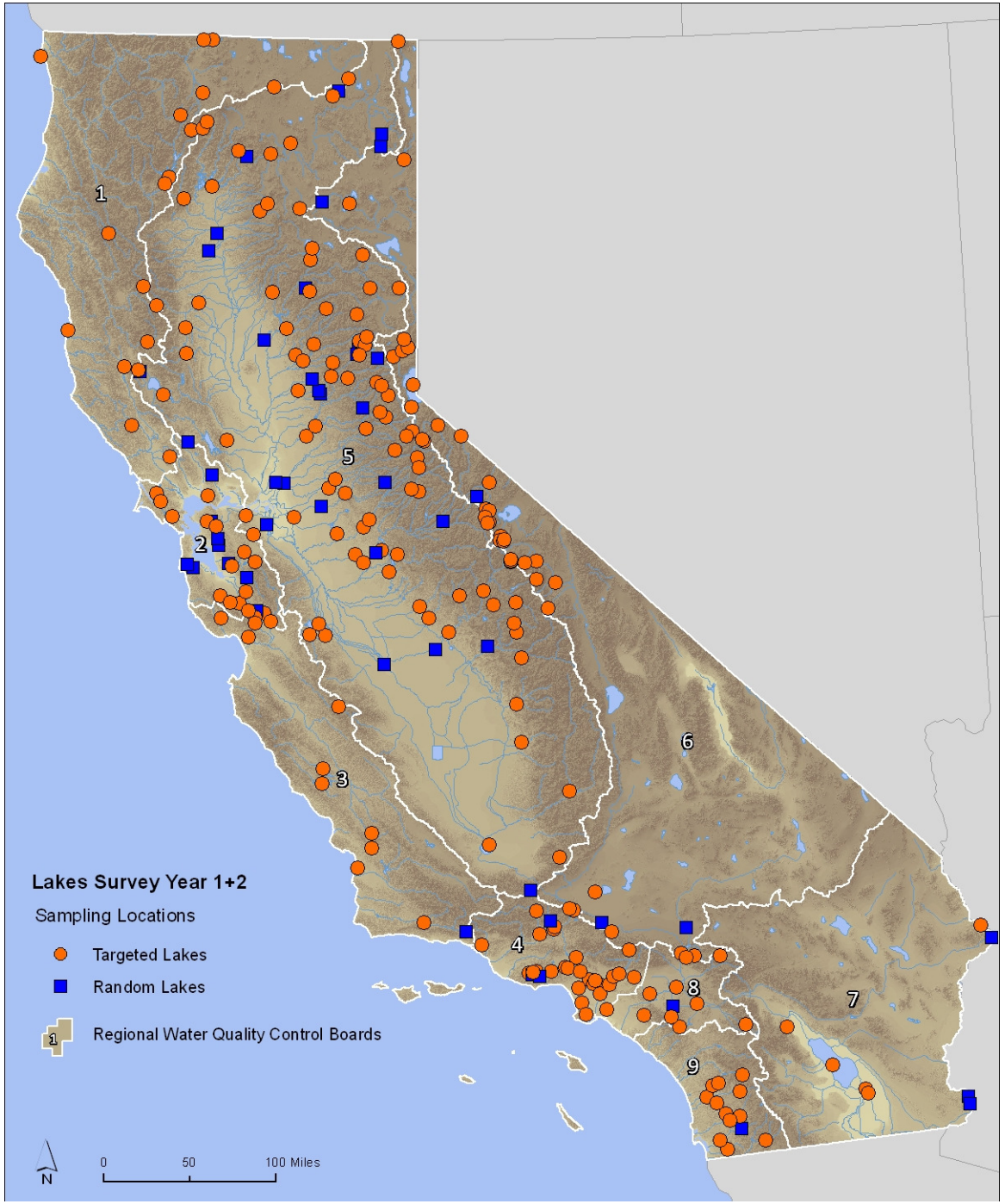
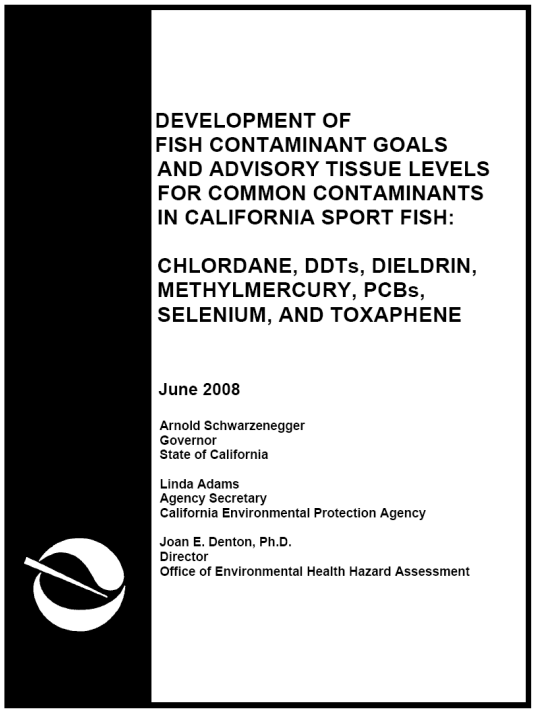
Sampling Locations

- 272 lakes sampled
- 50 random
- 222 popular
  - 22 extra in Region 4



Assessment Thresholds

- Fish Contaminant Goals (FCGs)
  - Purely risk-based
  - Useful goals for risk minimization or elimination
- Advisory Tissue Levels (ATLs)
  - Take benefits into account
  - For OEHHA use in advisories/safe eating guidelines
- State Board 303(d) Threshold


DEVELOPMENT OF
FISH CONTAMINANT GOALS
AND ADVISORY TISSUE LEVELS
FOR COMMON CONTAMINANTS
IN CALIFORNIA SPORT FISH:

CHLORDANE, DDTs, DIELDRIN,
METHYLMERCURY, PCBs,
SELENIUM, AND TOXAPHENE

June 2008

Arnold Schwarzenegger
Governor
State of California

Linda Adams
Agency Secretary
California Environmental Protection Agency

Joan E. Denton, Ph.D.
Director
Office of Environmental Health Hazard Assessment

Klasing and Brodberg, 2008

http://www.oehha.ca.gov/fish/gtlsv/index.html

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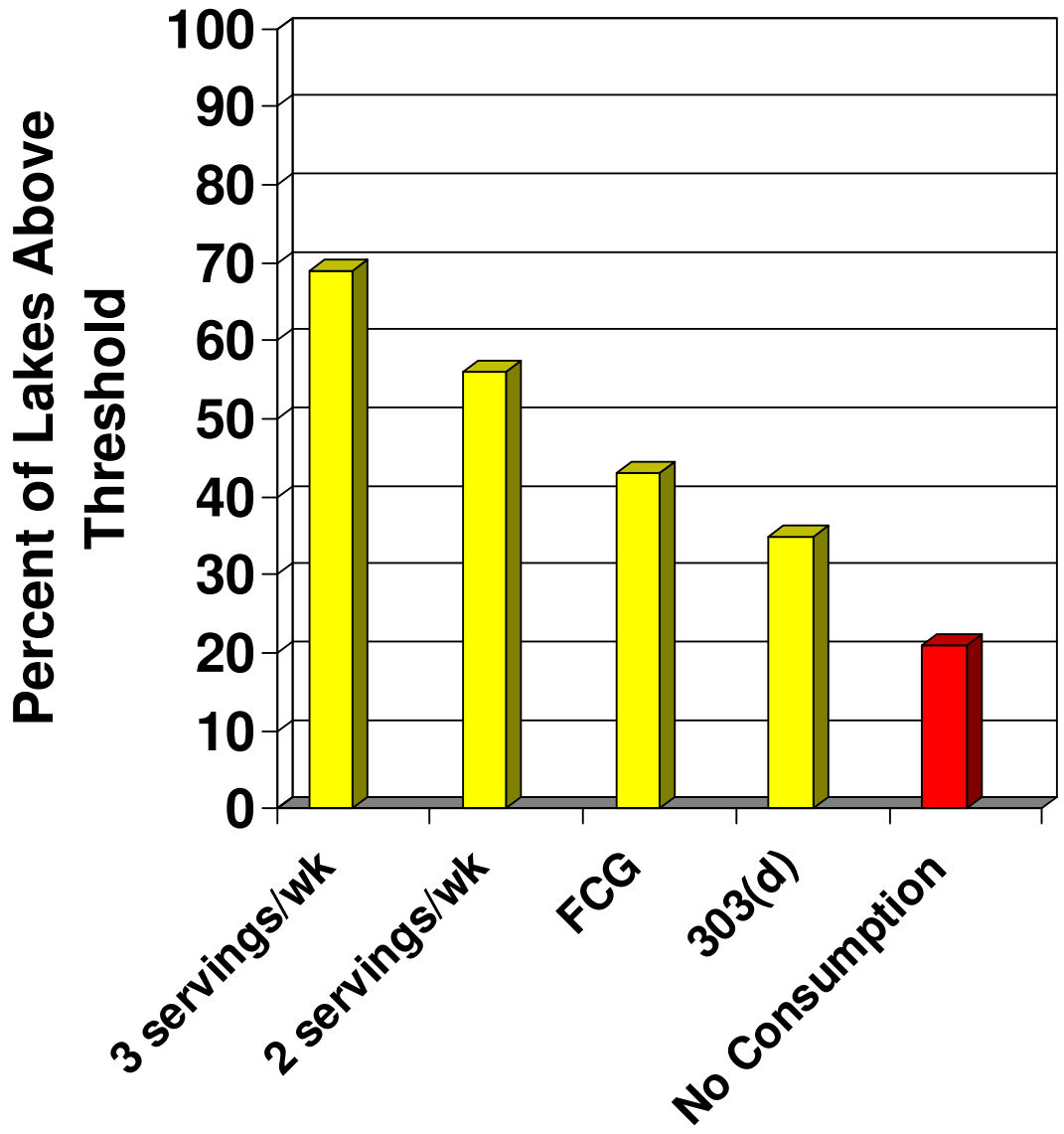
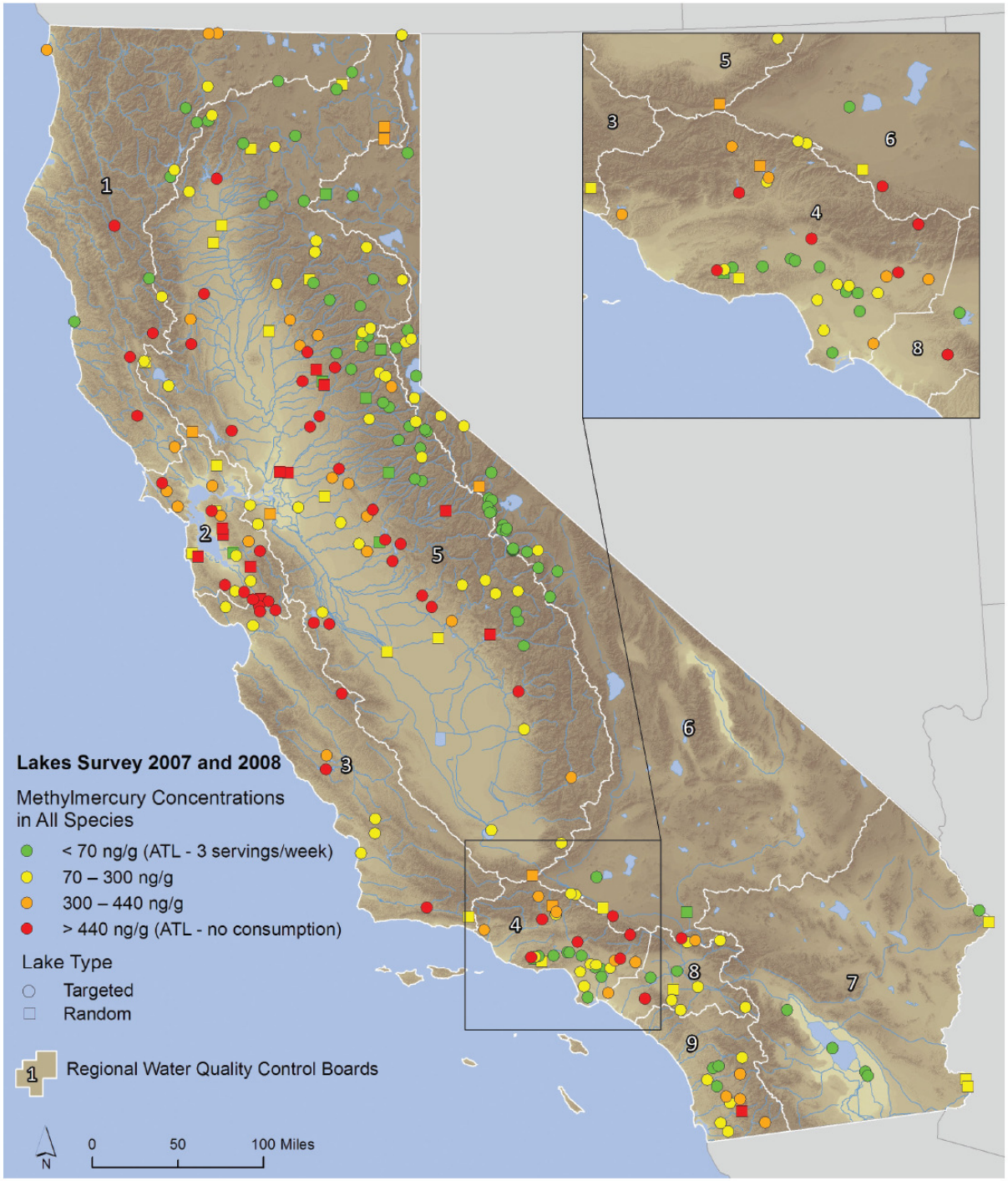
Methylmercury: Severity of the Problem

- Based on highest species in each lake
- 21% above 440 ppb
- 35% above 300 ppb
- 42% above 220 ppb
- 55% above 150 ppb
- 68% above 70 ppb



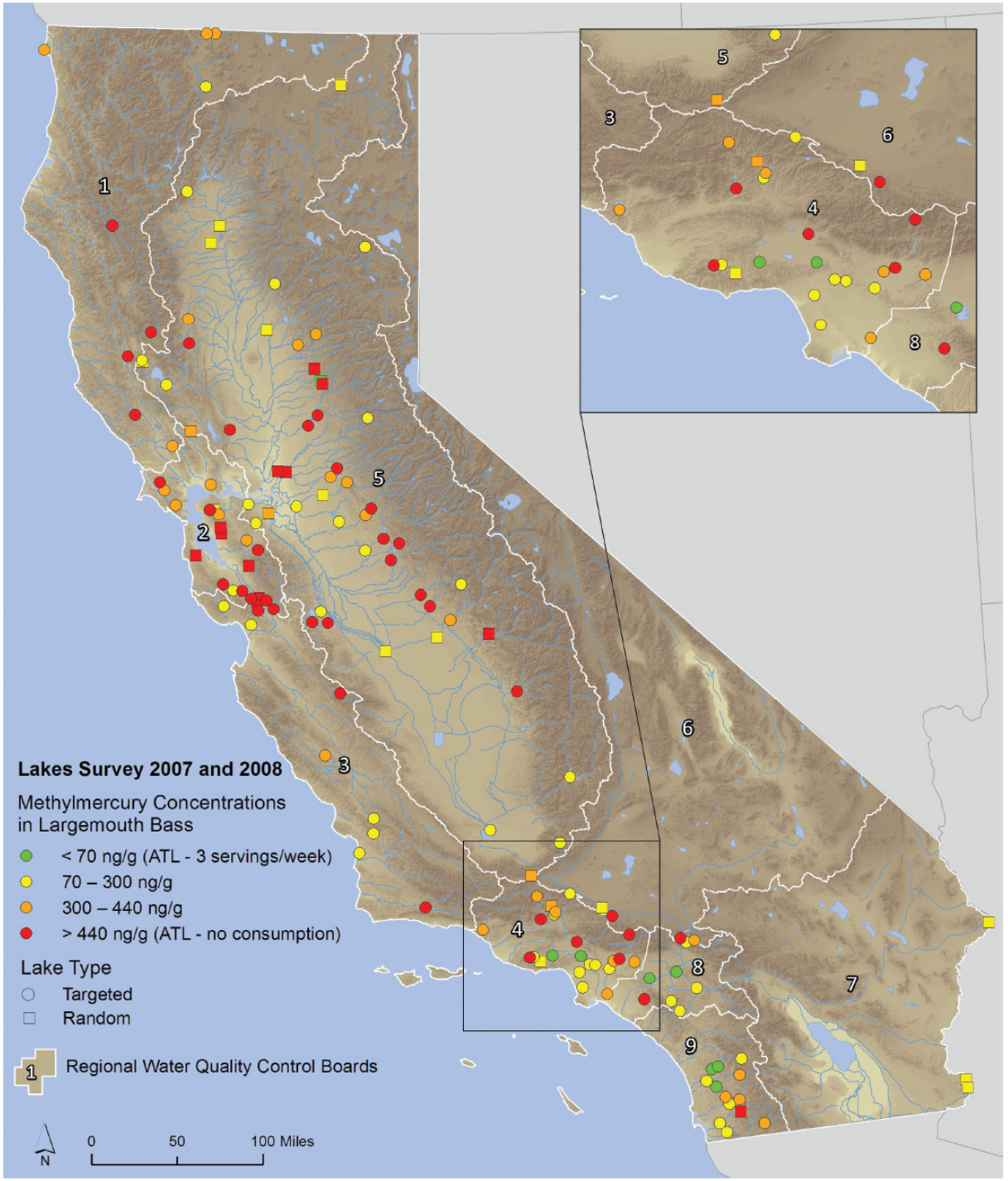
Methylmercury: Spatial Distribution

- Based on highest species at each lake
- Low concentrations in many Sierra Nevada and southern CA lakes
- Not just a northern CA problem
- Species distribution has a big influence
- Red lakes a high priority for followup

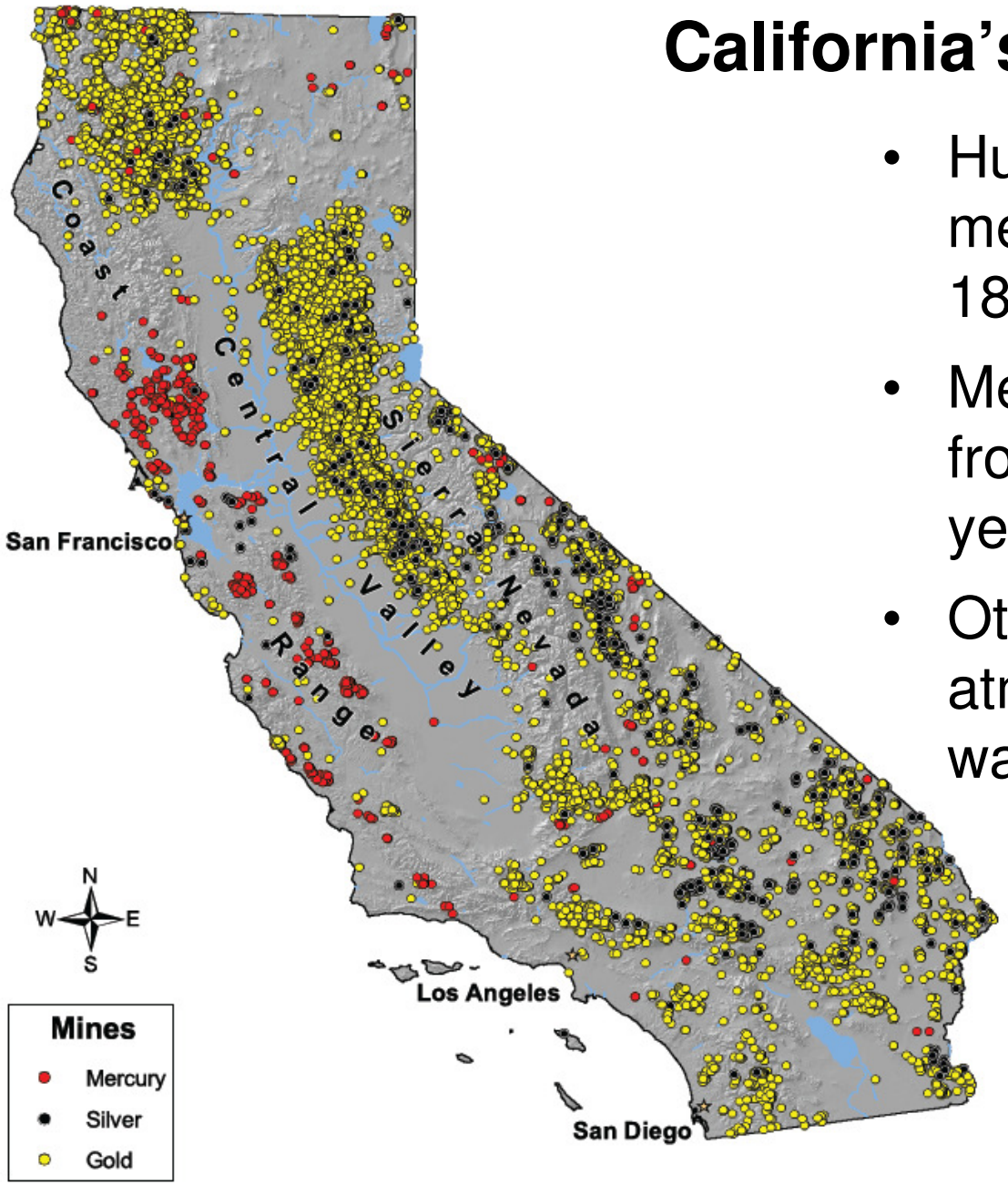


Methylmercury: Spatial Distribution

- Standard size largemouth bass: apples vs. apples
- One “clean” lake in northern California
- Seven clean lakes in southern California
- Sources: mining, what else?



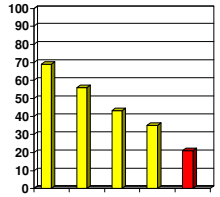
California's Mining Legacy



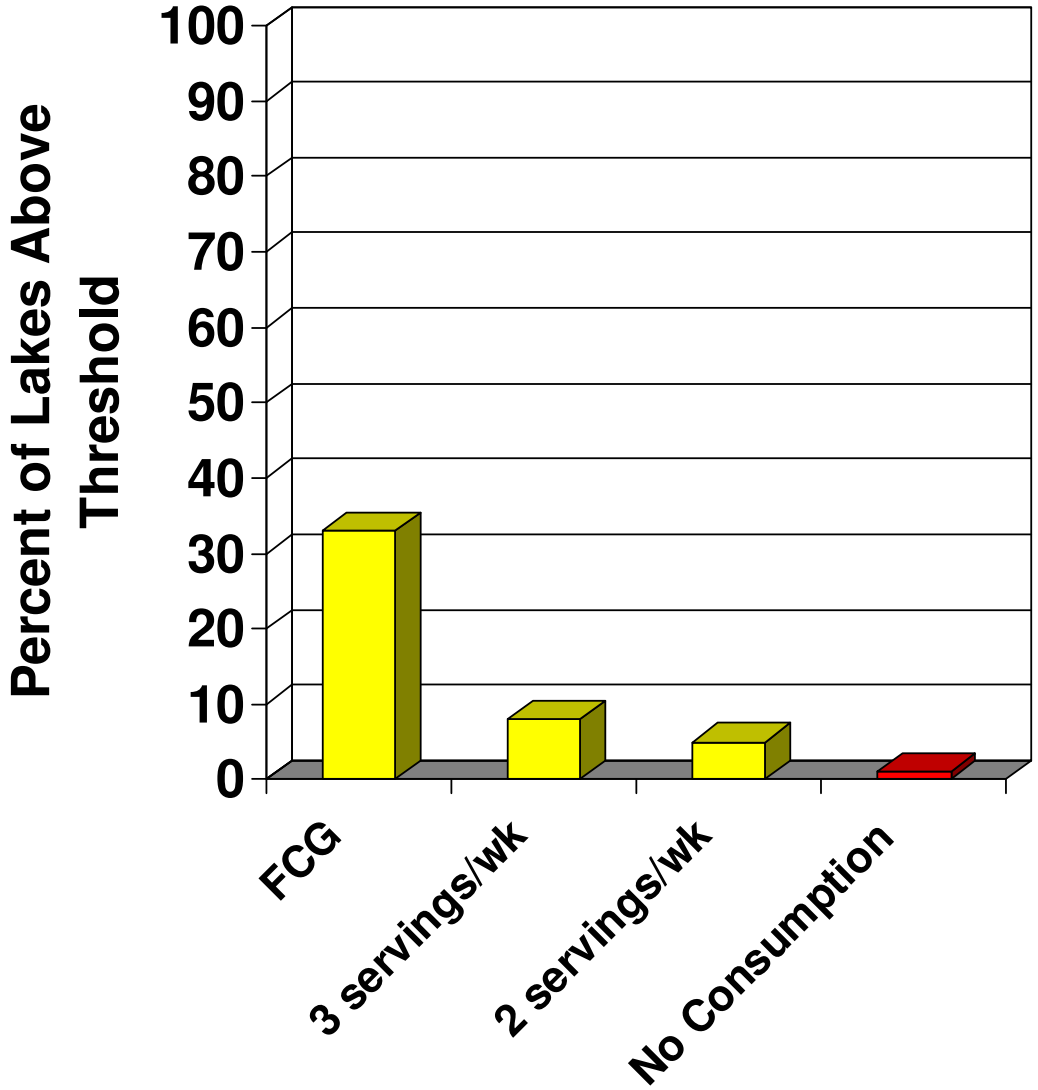
- Hundreds of gold and mercury mines from mid-1800s
- Mercury contamination from mining persists 150 years later
- Other sources: atmospheric deposition, wastewater, urban runoff

From Wiener and Suchanek (2009). Ecological Applications 18(8) Supplement: A3-A11.

PCBs: Severity of the Problem

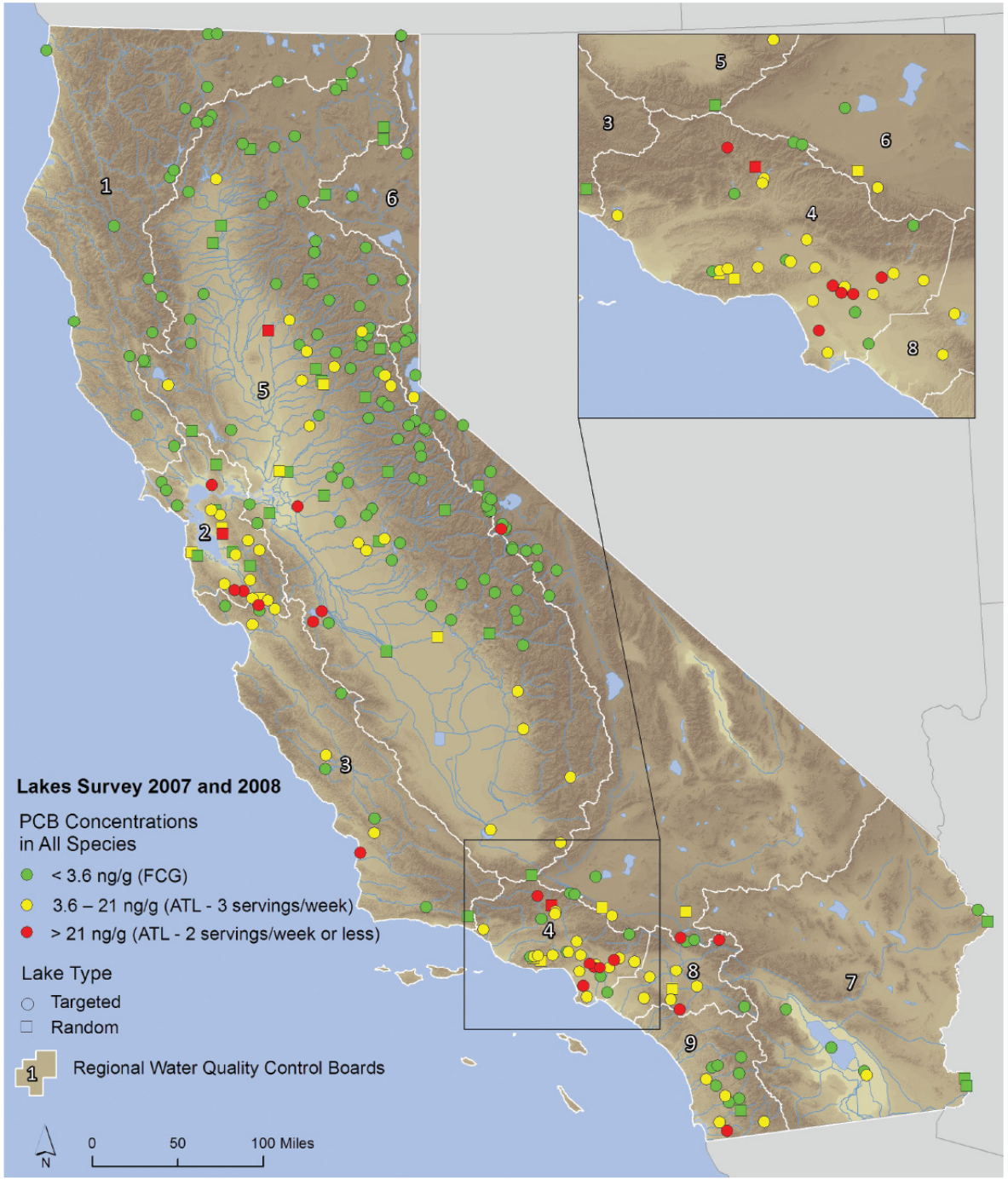


- Based on highest species at each lake
- 1% above 120 ppb
- 5% above 42 ppb
- 8% above 21 ppb
- 33% 3.6 ppb



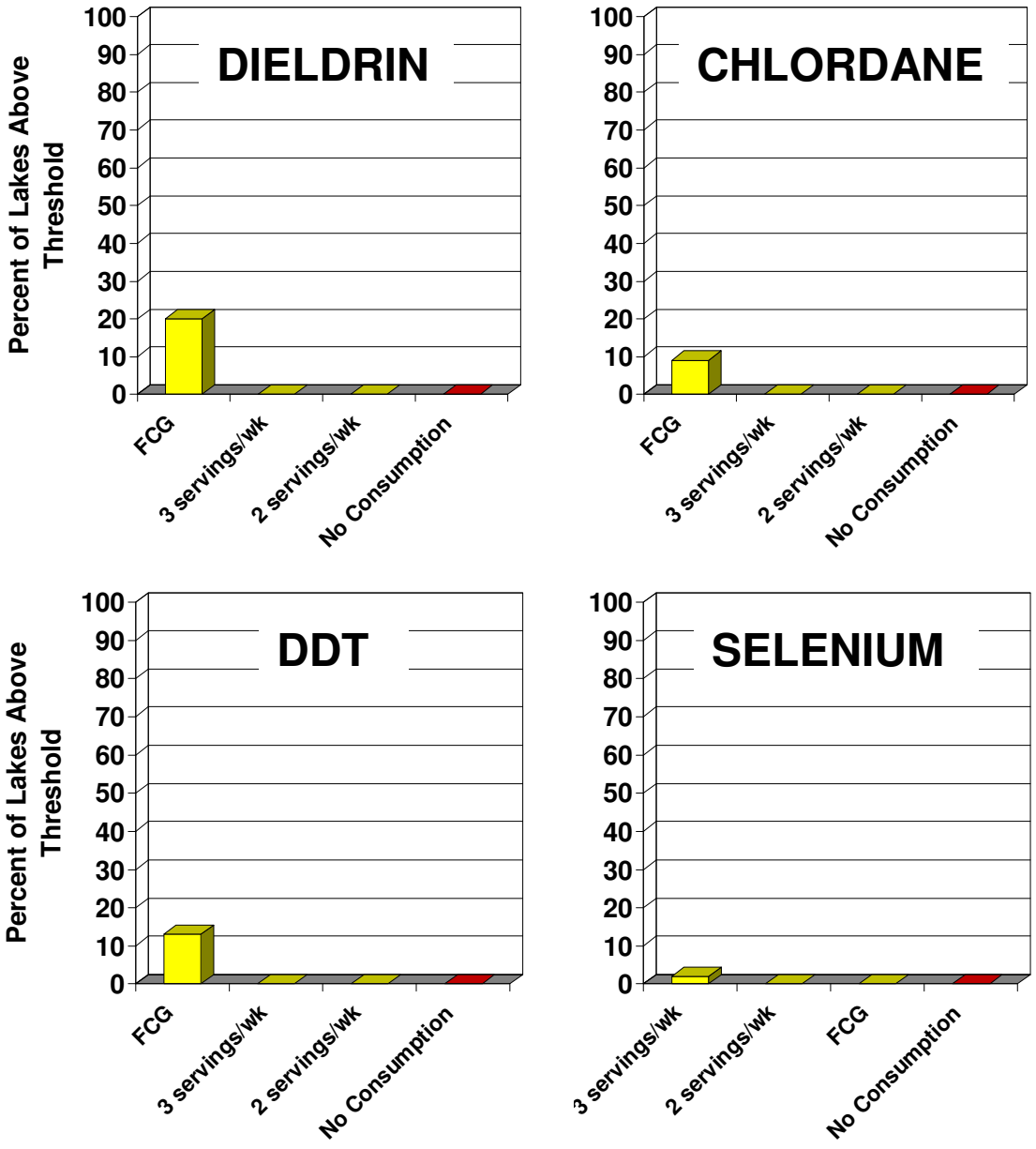
PCBs: Spatial Distribution

- Based on highest species average at each lake
- Note different scale from mercury
- Elevated concentrations in highly urbanized areas
- Other high lakes scattered in rural areas



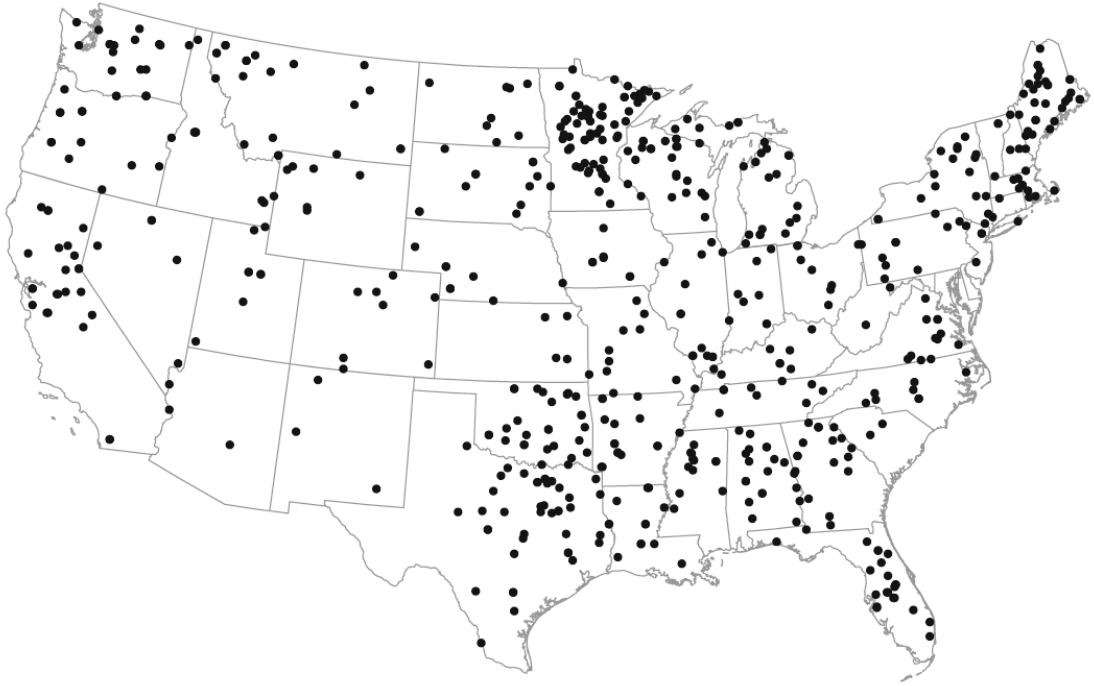
Other Contaminants: Severity of the Problem

- Each had <1% above no consumption ATLs
- Dieldrin: 20% above Fish Contaminant Goal (0.46 ppb)
- DDT: 13% above Fish Contaminant Goal (21 ppb)
- Chlordane: 9% above Fish Contaminant Goal (5.6 ppb)
- Selenium: 2% above 3 serving/wk ATL (2500 ppb)



Comparison to National Survey by USEPA (2009)

- 500 lakes
- 2000-2003
- MeHg: 49% of lakes had a predator above 0.3 ppm (35% of lakes in SWAMP* above 0.3 ppm)
- PCBs: 16.8% of lakes had a *predator* above 12 ppb (17% of lakes in SWAMP* above 12 ppb)



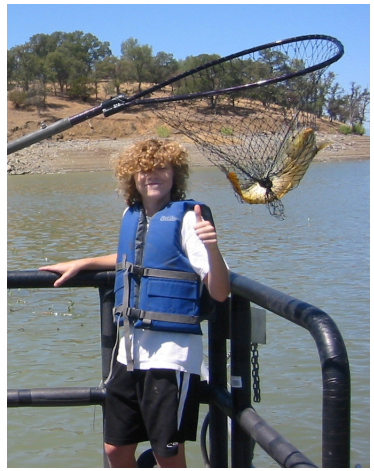
Stahl et al. 2009. Contaminants in fish tissue from US lakes and reservoirs: a national probabilistic study. Environmental Monitoring and Assessment 150: 3-19.

* Data shown for SWAMP are for highest species average in each lake, including predators and bottom-feeders.

Bottom Line: MeHg contamination is average, PCB contamination is below average

Summary Thoughts

- California now has one of the best datasets and has made substantial progress in defining the problem
- Data are proving valuable in setting priorities for developing TMDLs and safe eating guidelines



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What's Next?

- Lakes followup
- The coast
- Rivers and streams
- Repeat the cycle
- Aquatic life
- My Water Quality
  - Is It Safe to Eat Fish and Shellfish From Our Waters?

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That’s all folks!