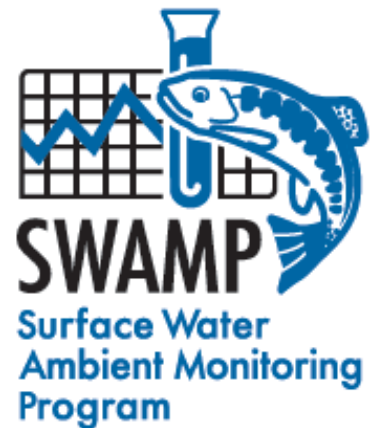




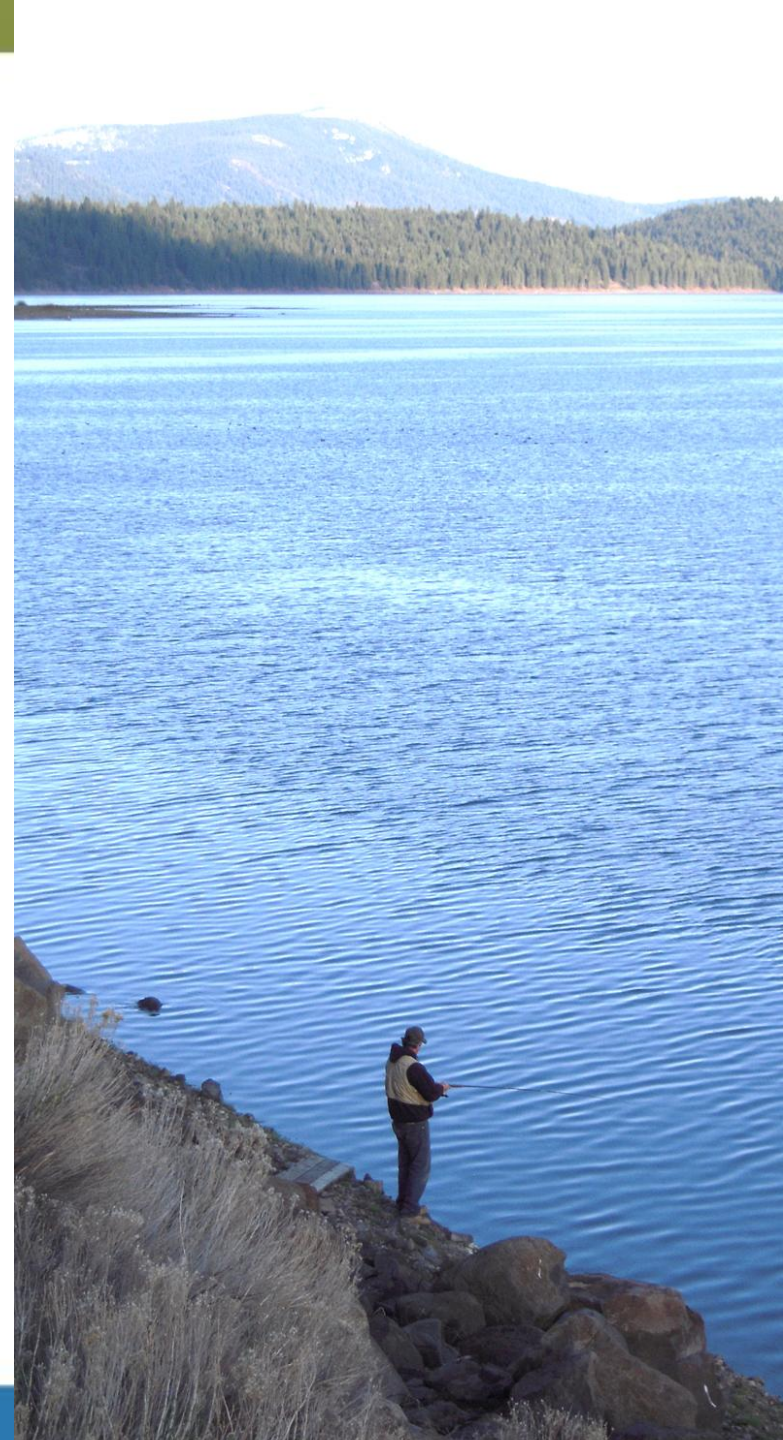
# Contaminants in California Fish

Jay Davis, SFEI  
Bioaccumulation Symposium  
December 2012



# 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
- \$500,000 to \$1 million per year
- Significant partnerships and matching funds
- Five-year cycle to cover all water body types, beginning with lakes
- Initial focus on sport fish



# Part One: The Coast





Photos by Michael Short / Special to The Chronicle

Angella Miller of Chicago walks out into the water to skip rocks at Baker Beach, one of two beaches in San Francisco that received top honors in the annual water-quality survey. The other is Ocean Beach.

**By Carolyn Jones**

Dry weather and stricter regulations have boosted water quality at Bay Area beaches to their cleanest level in years, a report released Thursday found.

Nearly every beach in the Bay Area, and throughout the state, had dramatically lower levels of bacteria and pollution than last year, according to an annual survey of 650 West Coast beaches by Heal the Bay, a Santa Monica environmental group.



Water quality is also better at popular Candlestick Point in S.F.

"This is one of our best years yet," said Amanda Griesbach, a water-quality scientist at Heal the Bay, which compiled its data from weekly water-quality checks throughout the year along the California coast. "Especially with summer coming, people should be happy that beaches in California are clean."

Six local beaches earned top honors, including four in San Mateo County and two in San Francisco: Sharp Park and Rockaway

*Water continues on A12*

# Species of fish dictates level of mercury

**By Demian Bulwa**

A sweeping state survey of contaminants in sport fish that were hooked, netted or speared in 68 spots on the California coast underscores a lesson for seafood lovers: Choose well your next fillet.

In general, mercury levels in the fish — caught during 2009 and 2010 — were of "high concern," particularly along the North and Central

### Fish reports

▶ The state study on contaminants in California sport fish is at [links.sfgate.com/ZLKL](http://links.sfgate.com/ZLKL)

▶ The state provides advisories and guidelines on safe fish consumption at [links.sfgate.com/ZLKM](http://links.sfgate.com/ZLKM)

coasts, said a report released Thursday by the State Water Resources Control Board.

But while San Francisco Bay and other urban spots showed higher mercury pollution, the key driver of the contamination wasn't location but type of fish.

Long-living predators such as sharks and some forms of rockfish were found to have the highest levels of methylmercury, the type that becomes concentrated in fish tissue, wherever they were caught.

*Fish continues on A12*

### STATE STUDY

# High levels of mercury found in some state sport fish

By AARON KINNEY  
*Bay Area News Group*

A new report by California's water quality agency shows that certain fish species tend to contain moderate to high levels of methylmercury, a toxin that damages the nervous system of humans, no matter where they are caught off the coast.

The findings reflect the global spread of mercury pollution and yield new information for anglers and consumers on which wild-caught species tend to accumulate the substance, the study's chief scientist said. Overall, the data show that methylmercury and polychlorinated biphenyls, or PCBs, continue to be a concern in fish caught in California waters.

The report identifies seven species of



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SEE FISH ON A2

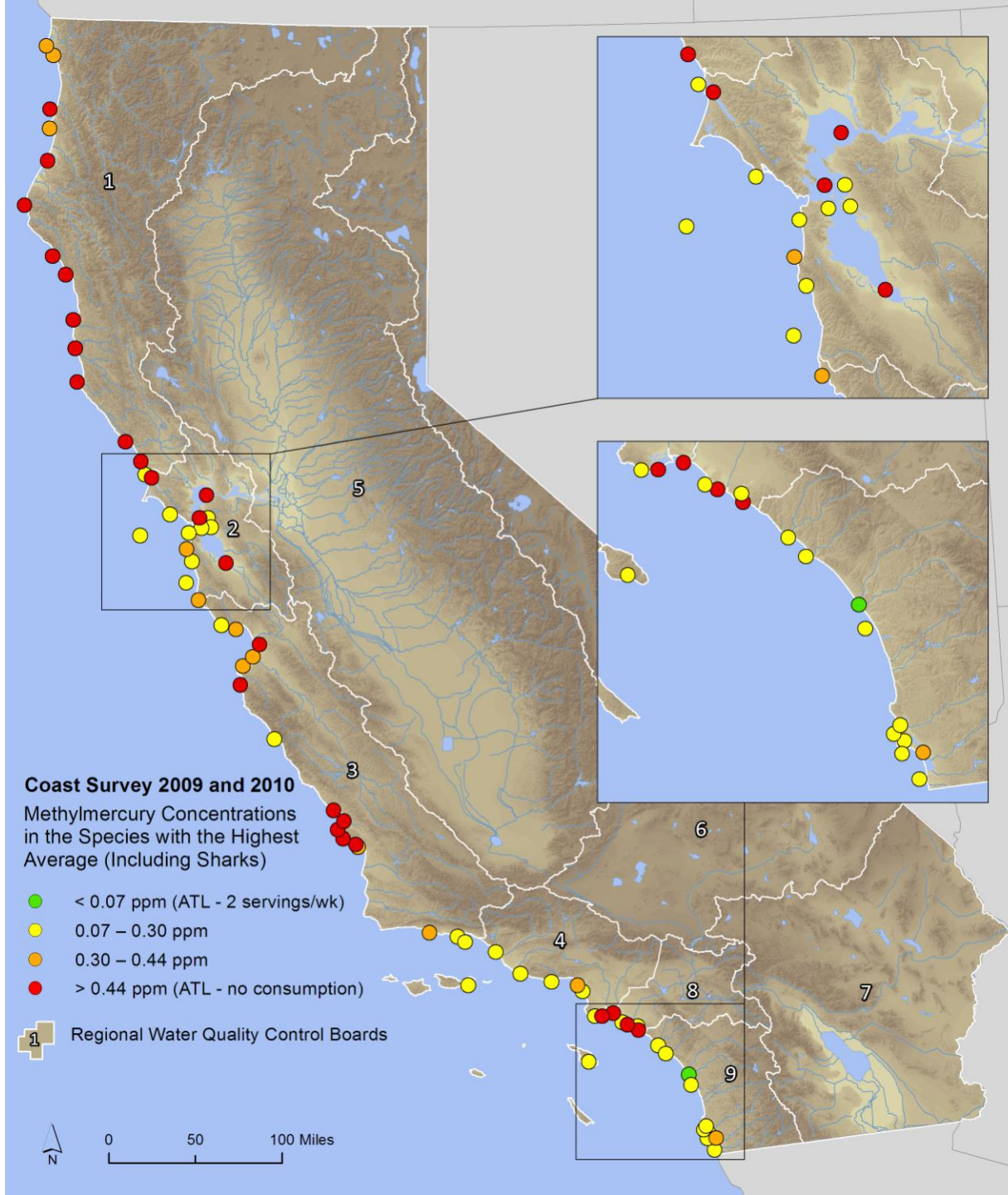
# Sampling Design

- 68 locations
- 3483 fish
- 46 species
- Screening survey: 5 species per location, no replication
- Unprecedented coordination: SWAMP, RMP, Bight Program, Region 4



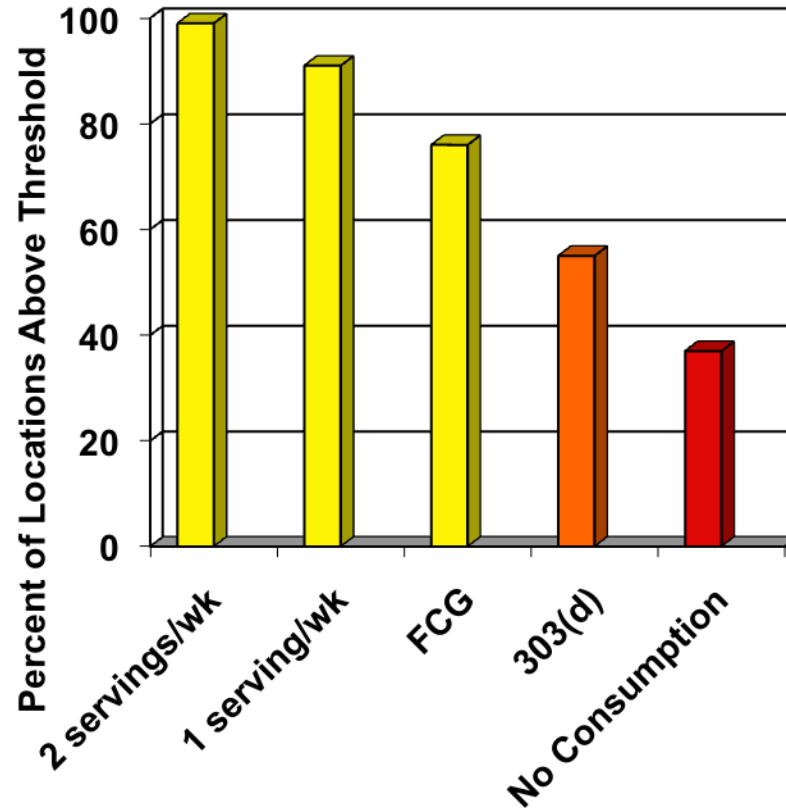
# Methylmercury

- 2009-2010
- High concentrations across much of the coast, especially North and Central

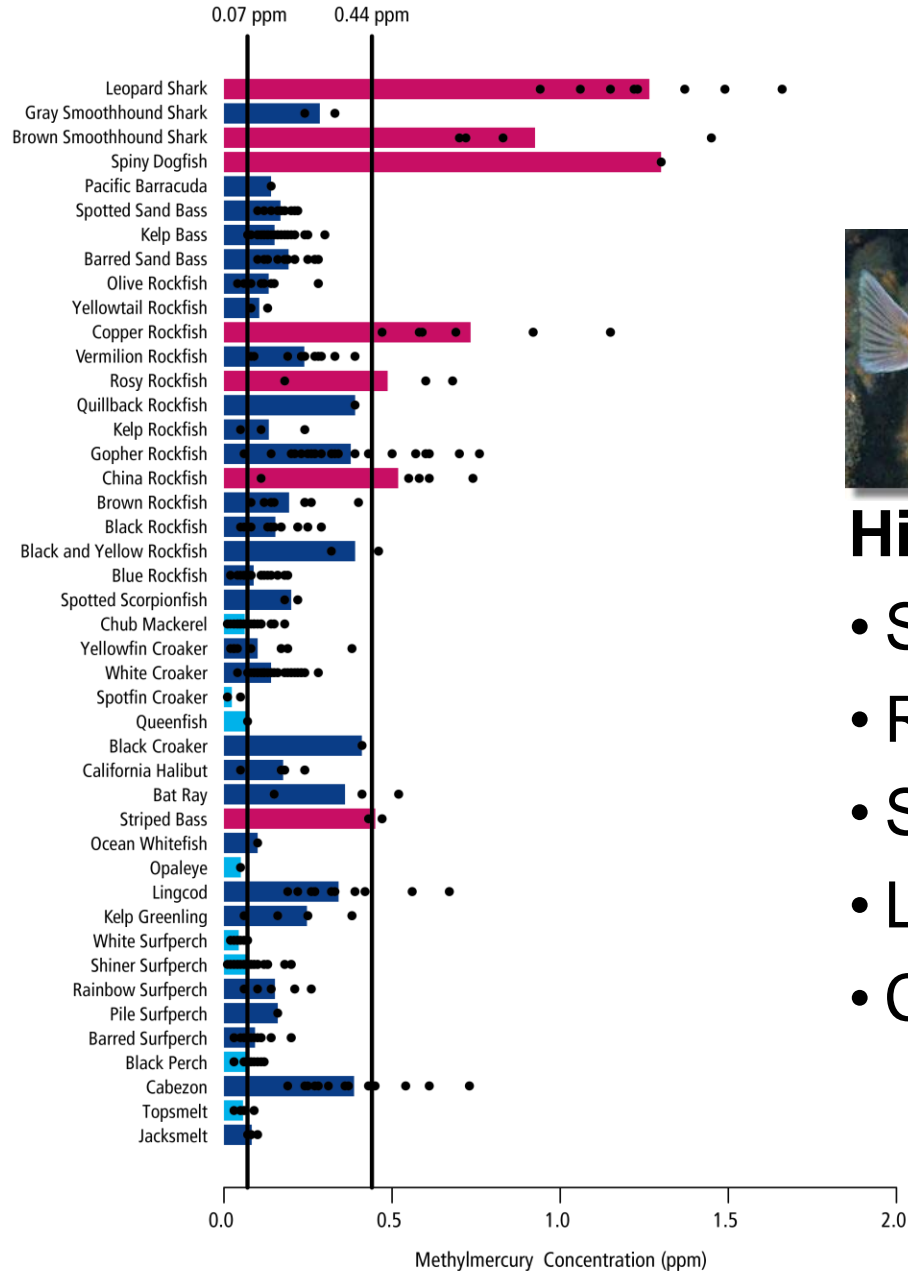


# Methylmercury

California Coast



# Methylmercury (ppm)

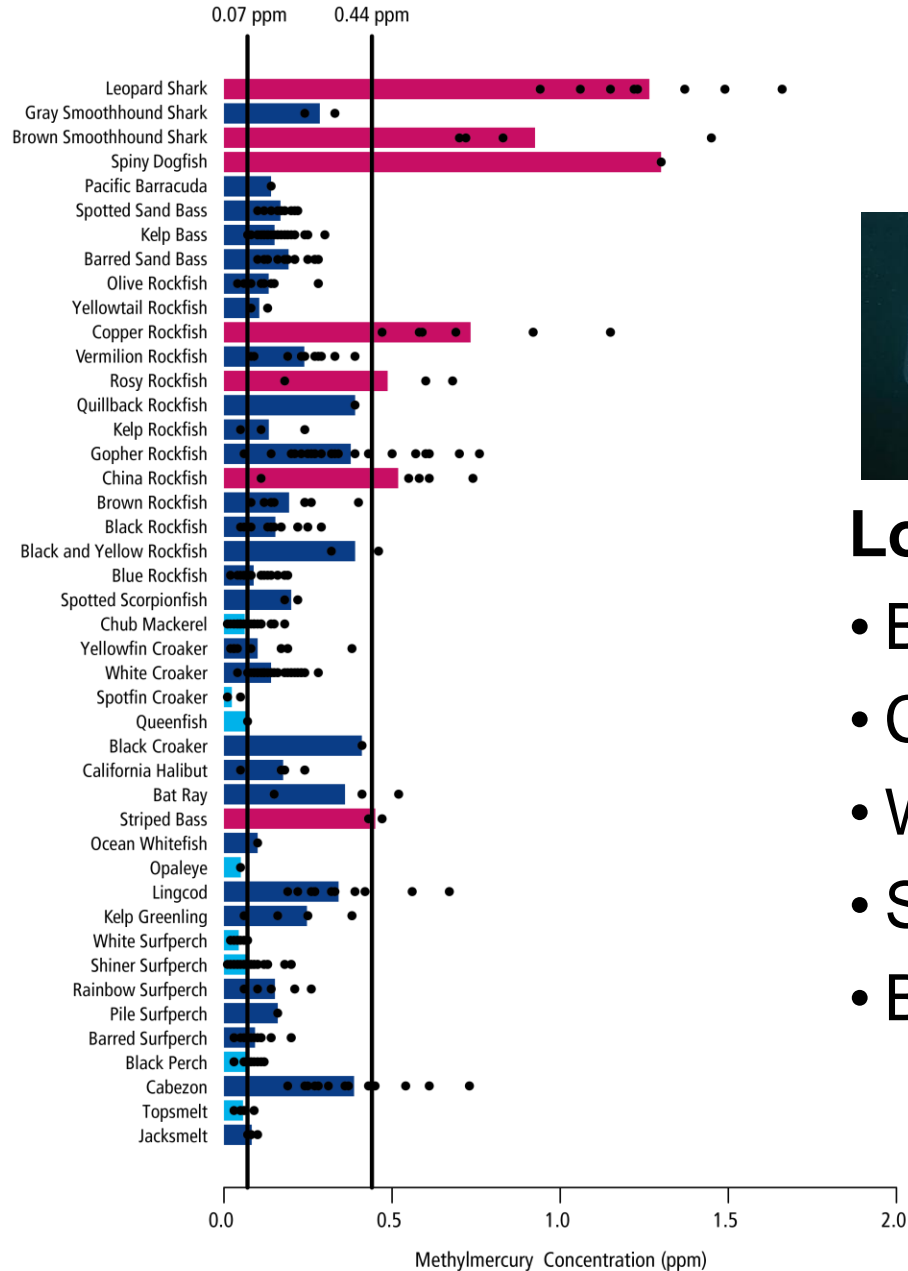


## High Species

- Sharks
- Rockfish
- Striped bass
- Lingcod
- Cabezon



# Methylmercury (ppm)



## Low Species

- Blue Rockfish
- Chub Mackerel
- White Surfperch
- Shiner Surfperch
- Black Perch

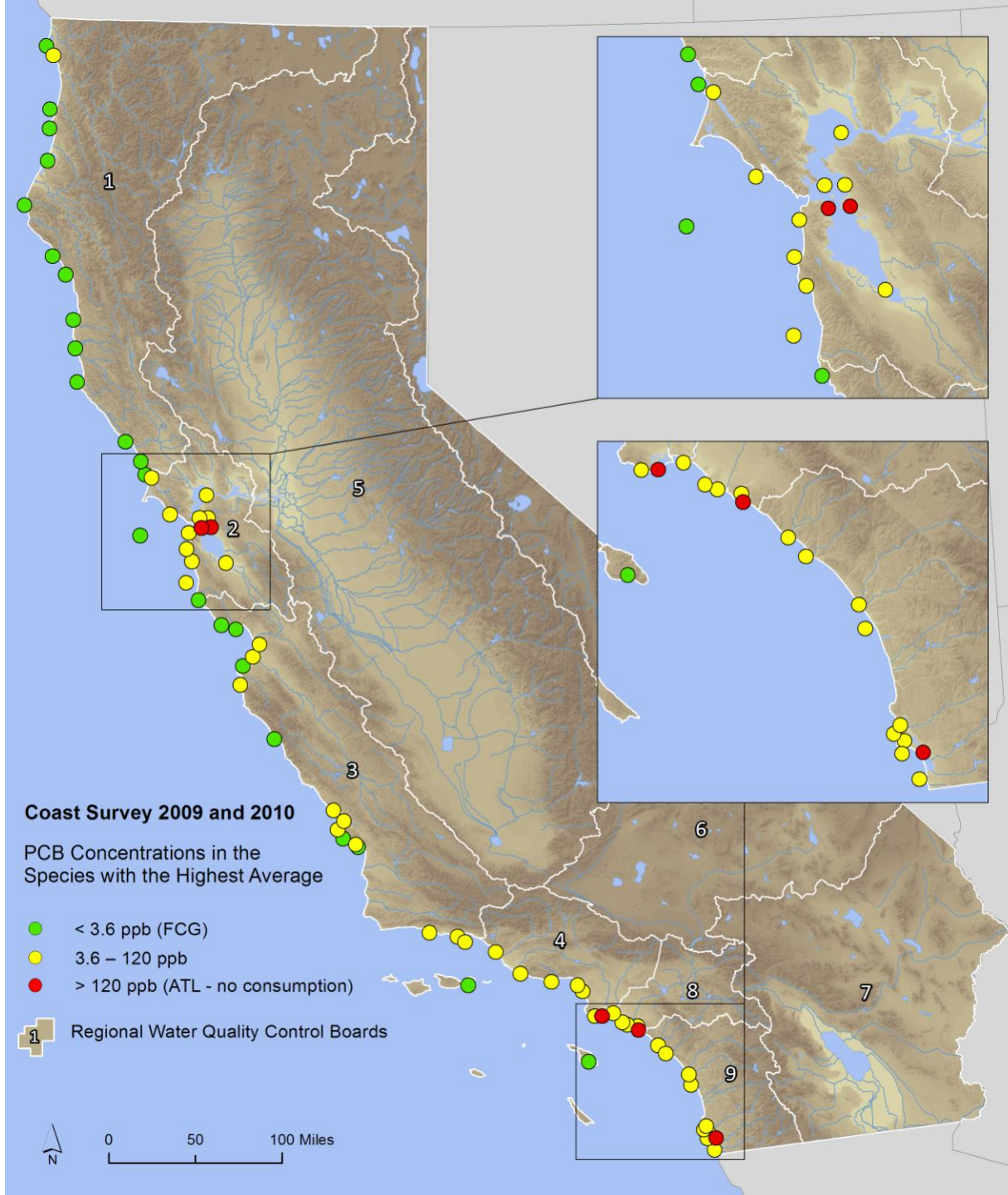
# Methylmercury Spatial Patterns

- Concentrations clearly elevated in San Francisco Bay
  - Shiner surfperch
  - Striped bass
- No clear differences among regions in this screening effort

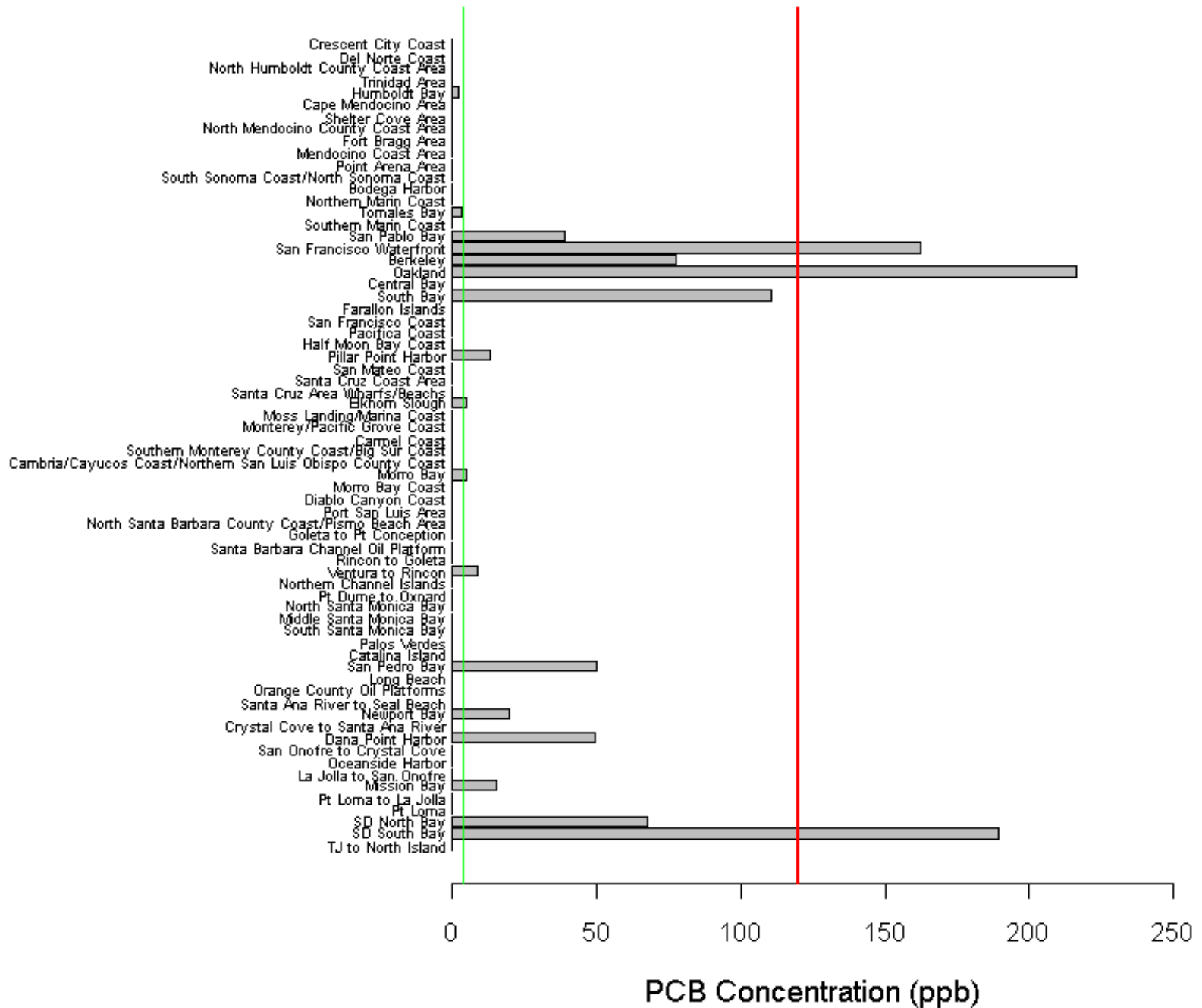


# PCBs

- 2009-2010
- Widespread moderate contamination in Central and South
- A few hotspots
- Clear pattern consistent with urban areas



# Shiner Surfperch



# Overall Summary

- No locations with all species below all thresholds
- 26 locations with at least one “clean” species (below all thresholds)

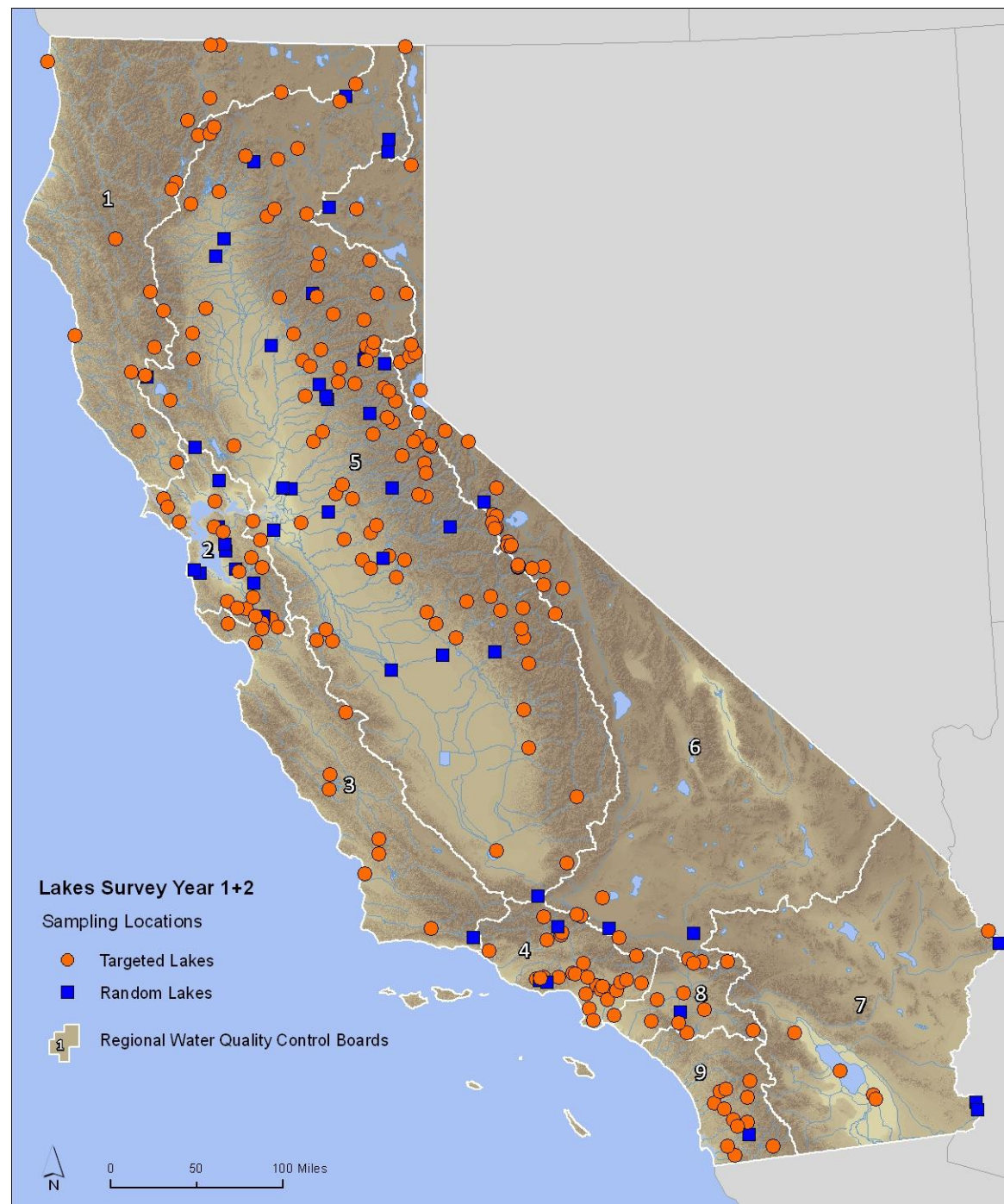


# Part Two: Lakes and Reservoirs



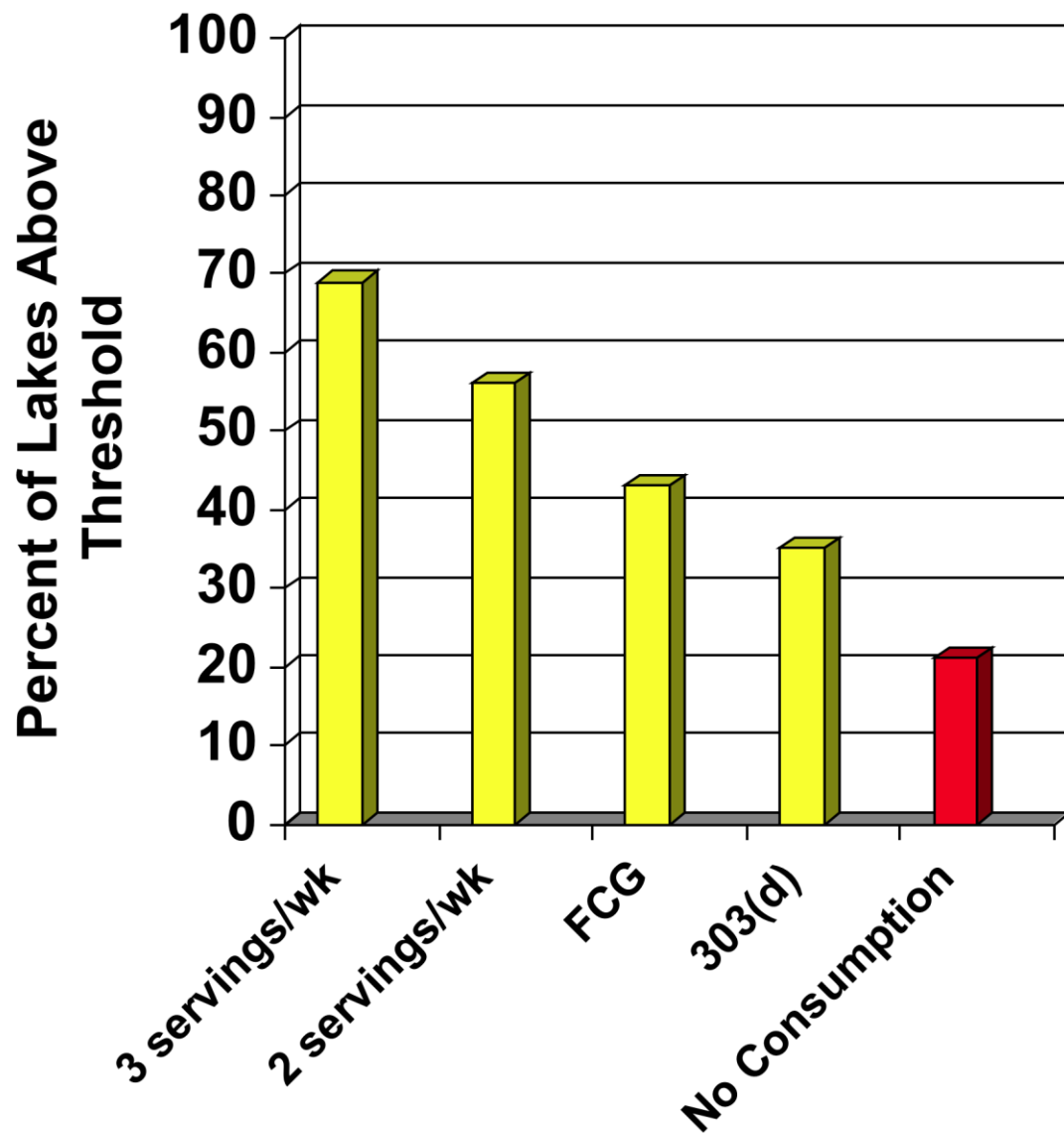
# Sampling Design

- 272 lakes sampled
  - 50 random
  - 222 popular
    - 22 extra in Region 4
- Indicators for mercury and organics
- Replication



# Methylmercury: Severity of the Problem

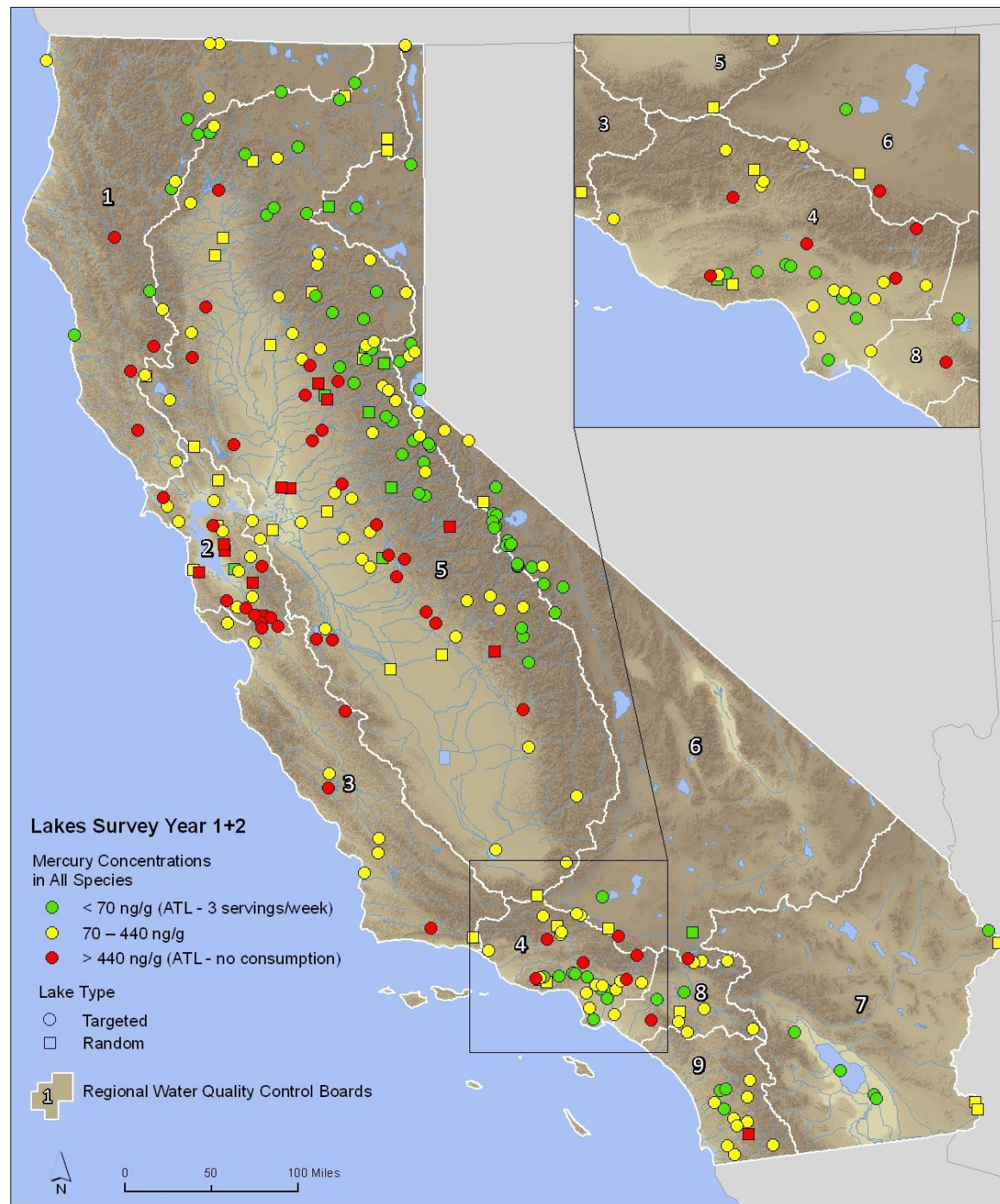
- Based on highest species average at each lake
- 21% in no consumption range (> 440 ppb)
- 69% above 3 serving/wk ATL (70 ppb)





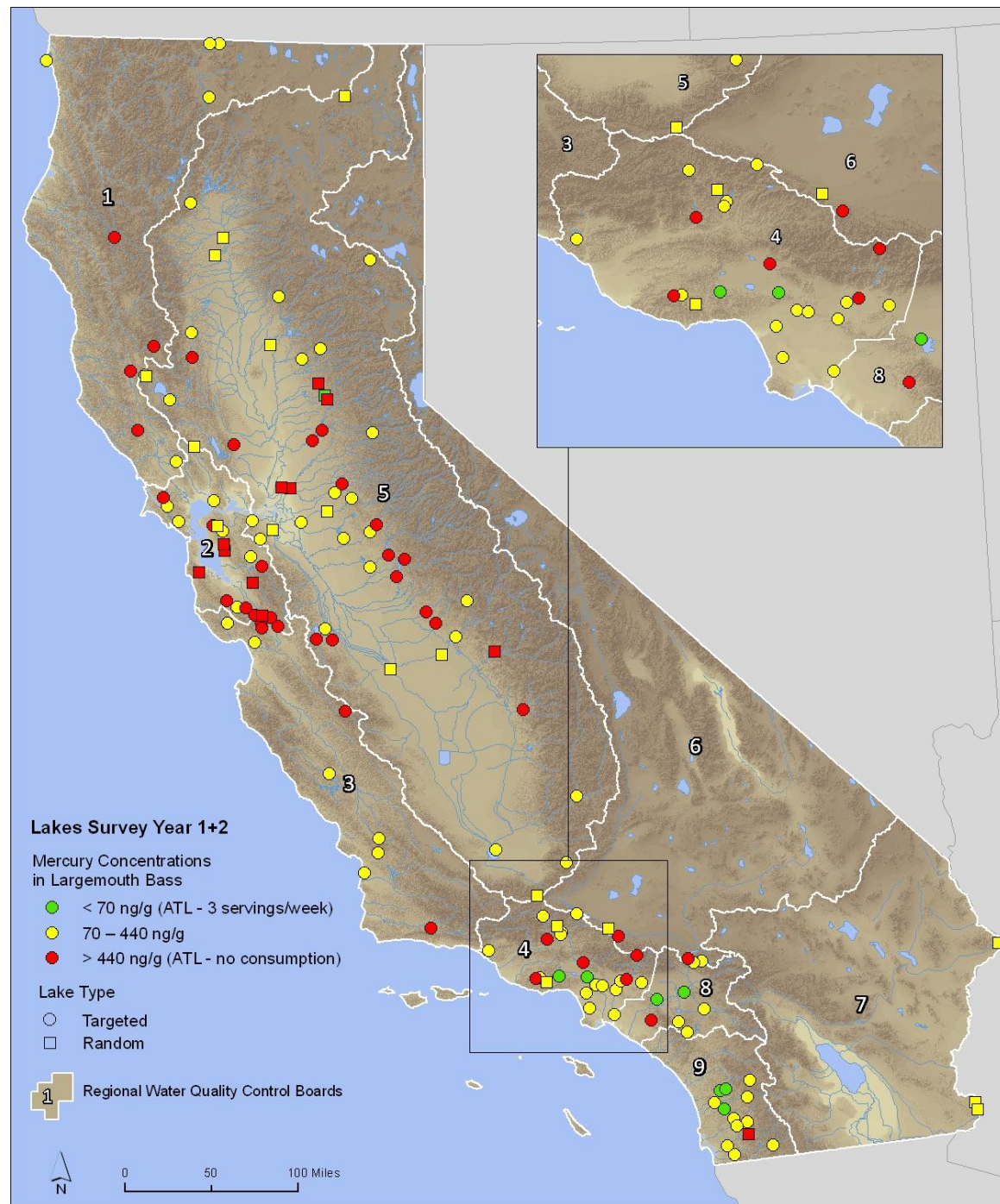
# Methylmercury: Spatial Distribution

- Based on highest species average 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



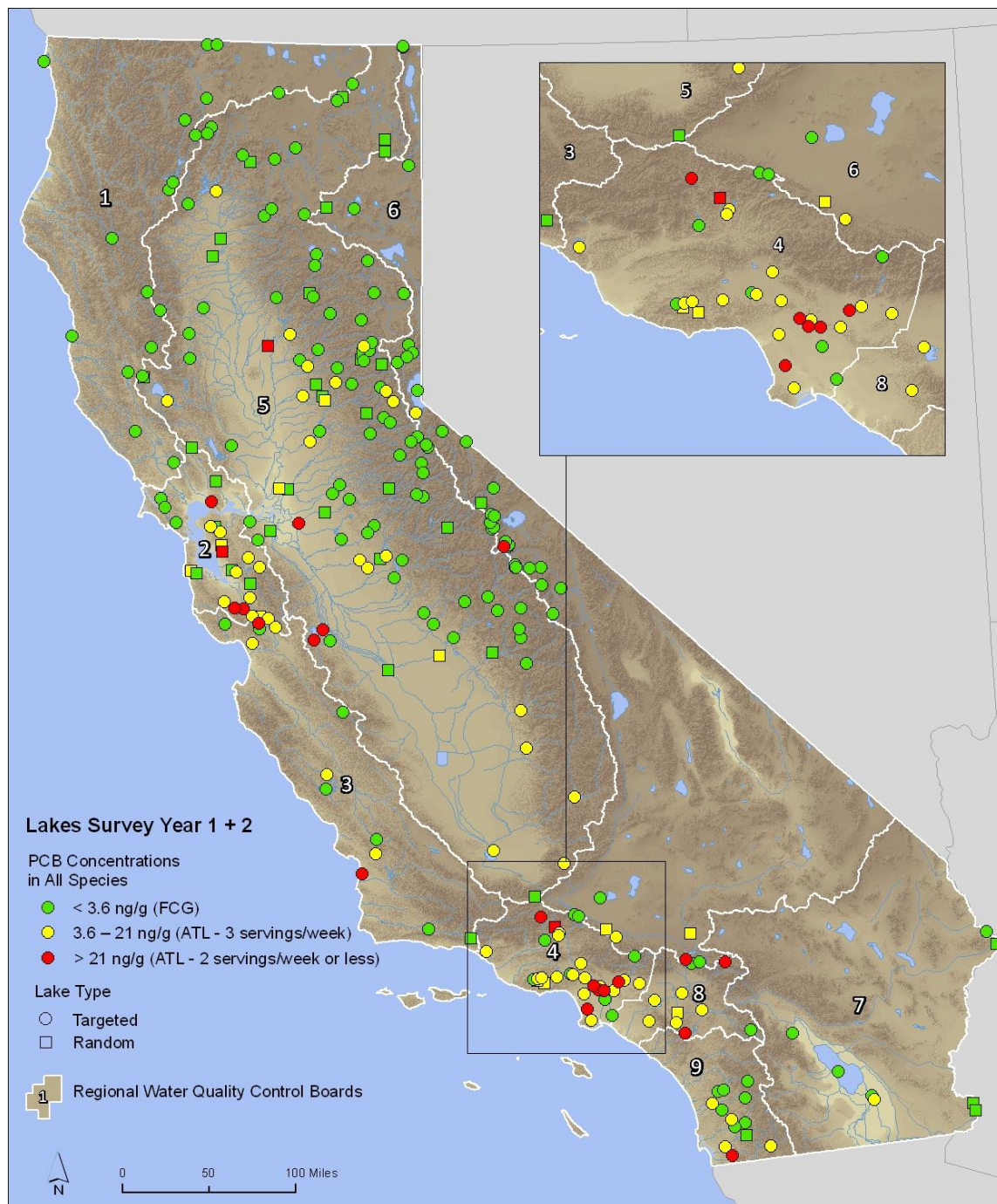
# Methylmercury: Spatial Distribution

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



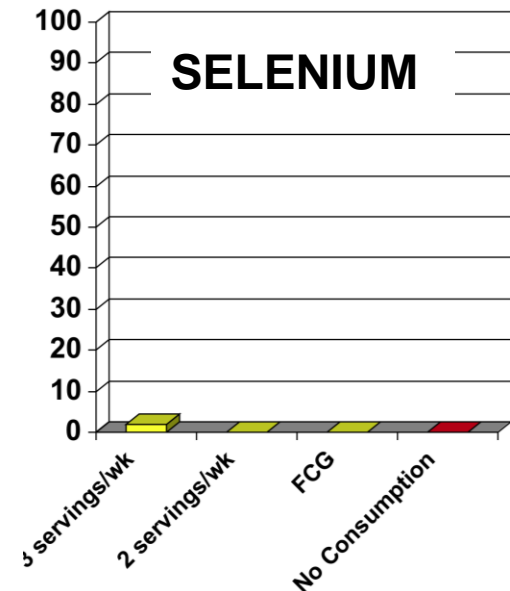
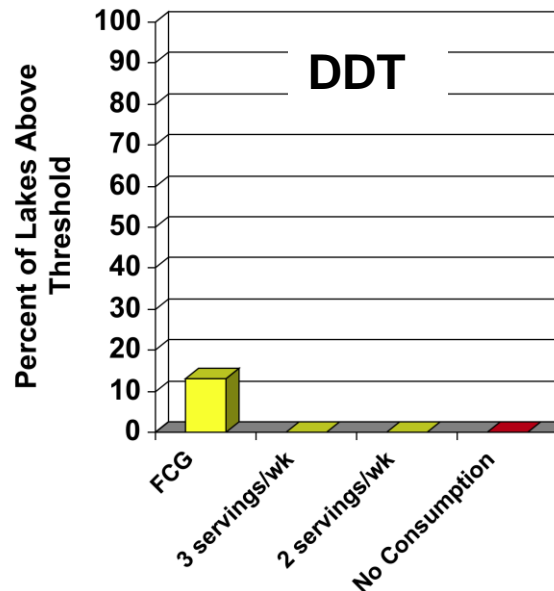
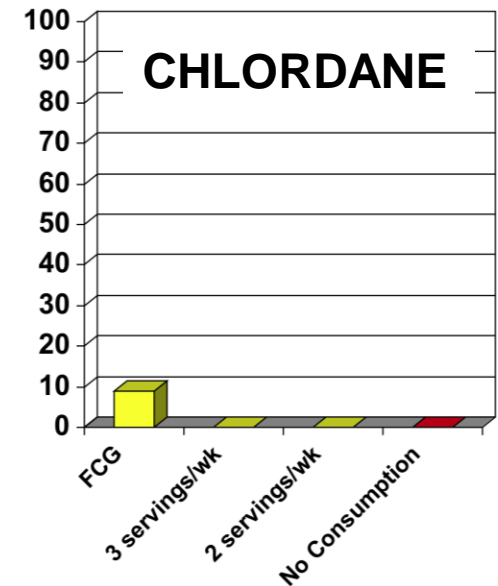
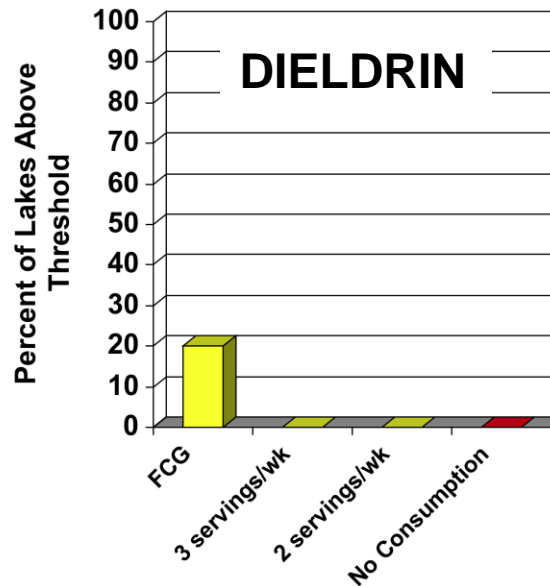
# PCBs: Spatial Distribution

- 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



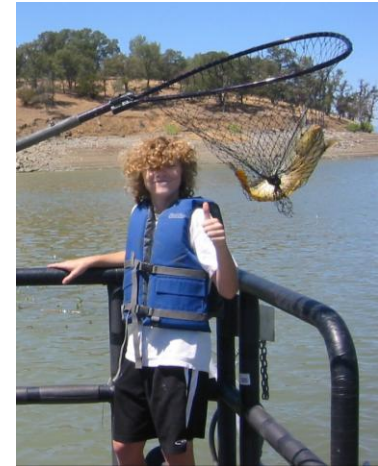
# Other Contaminants: Severity of the Problem

- Dieldrin: <1% above no consumption ATL, 20% above Fish Contaminant Goal (0.46 ppb)
- DDT: <1% above no consumption ATL, 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)



# Summary of Results

- California now has one of the best datasets and has made substantial progress in defining the problem
- As in many other states, the problem is widespread
- Methylmercury poses the greatest concern
- Significant variation among locations and among species



# Summary (continued)

- Supply of mercury appears sufficient to lead to significant food web contamination and risks to humans wherever long-lived predator fish are caught and consumed
- Mining legacy and atmospheric deposition both have a role in methylmercury contamination, lake and watershed factors that control MeHg cycling have a strong influence
- Predominant PCB sources are urban/industrial and hydroelectric facilities



# Next Steps

- **Rivers and Streams (2011)**
  - Report coming in May 2013
- **Wildlife Study (2012-2013)**
  - Methylmercury exposure and risks in birds on lakes
- **Other Priority Topics to Consider**
  - Biotoxins
  - CECs
- **Strategy Implementation**
- **New Cycle of Sport Fish Surveys in 2017**



# More information:

Google “Bioaccumulation Oversight Group” or “My Water Quality”

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