

# Statewide Monitoring of Contaminants in Sport Fish: Update on Lakes Study and Coastal Sampling

Aroon Melwani, Shira Bezalel, and Jay Davis  
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**SAN FRANCISCO ESTUARY INSTITUTE**

7770 Pardee Lane, Second floor, Oakland, CA 94621

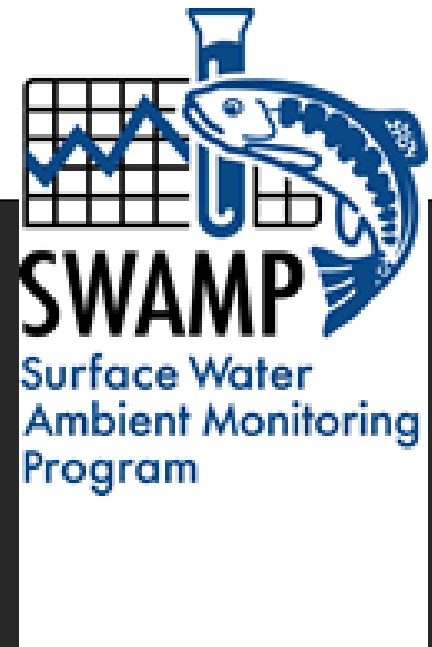
p: 510-746-7334 (SFEI), f: 510-746-7300, [www.sfei.org](http://www.sfei.org)

# Outline

- Background on SWAMP / BOG
- Two year Lakes survey
  - Lake study design
  - Combined results
  - Statistical model development
  - Web Portal
- Two year Coastal study in 2009/10
  - Coastal study design
  - 2009 Catch summary
  - Plans for 2010 sampling



# Background



- Surface Water Ambient Monitoring Program
- New statewide comprehensive bioaccumulation monitoring program under SWAMP began in 2007
- \$750K per year
- Five-year cycle to cover all water body types
- Initial focus on sport fish
- 2007-8 : lakes
- 2009-10 : coast

# Lakes Survey

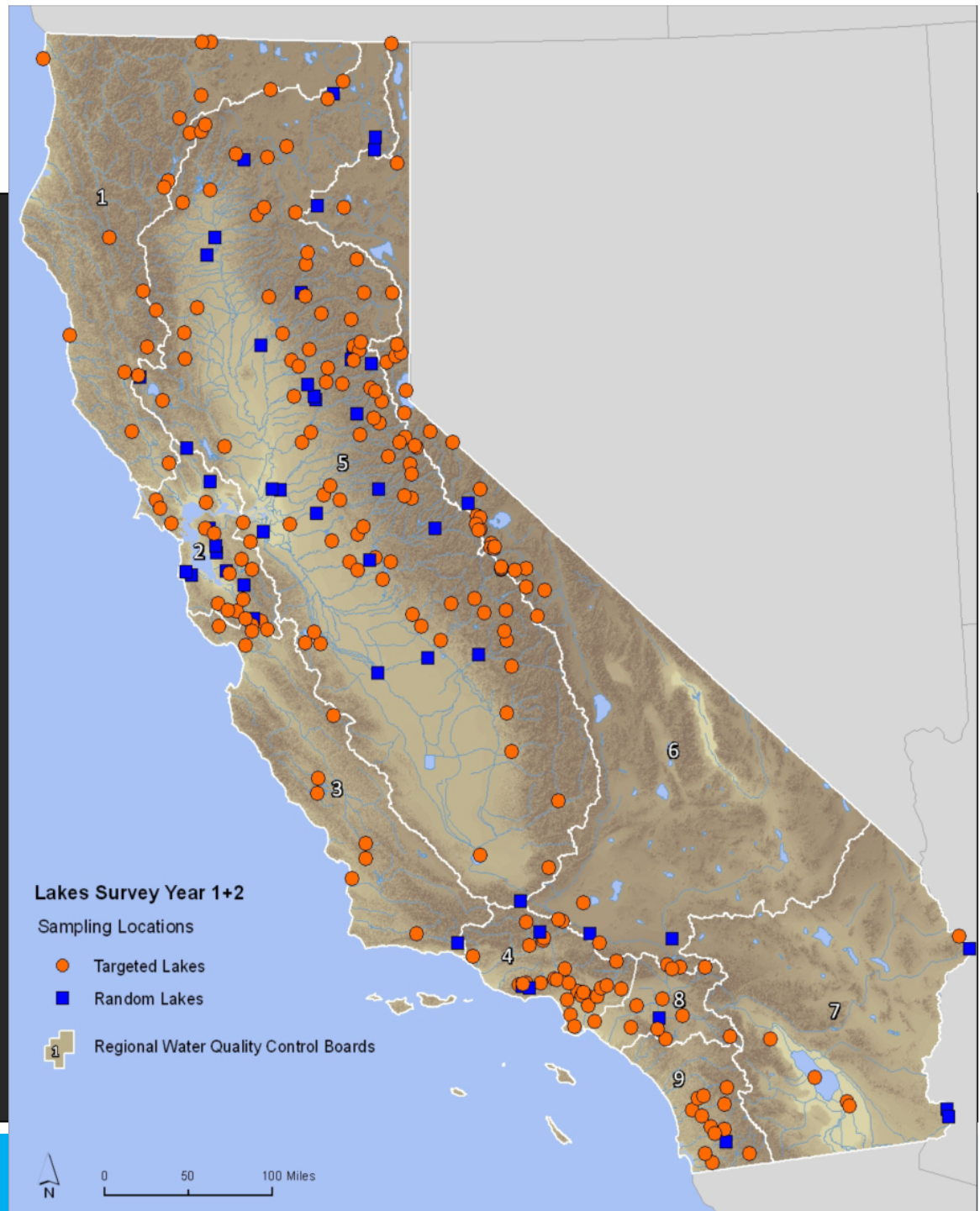


- 2007 - 2008
- Screening survey of > 200 lakes
- Management Questions
  - Condition of California lakes?
  - Candidates for 303(d) listing?
  - Candidates for additional sampling?
- Focus on indicator species
  - Particularly largemouth bass (mercury) and carp (orgs)
- Multiple samples and species in each lake

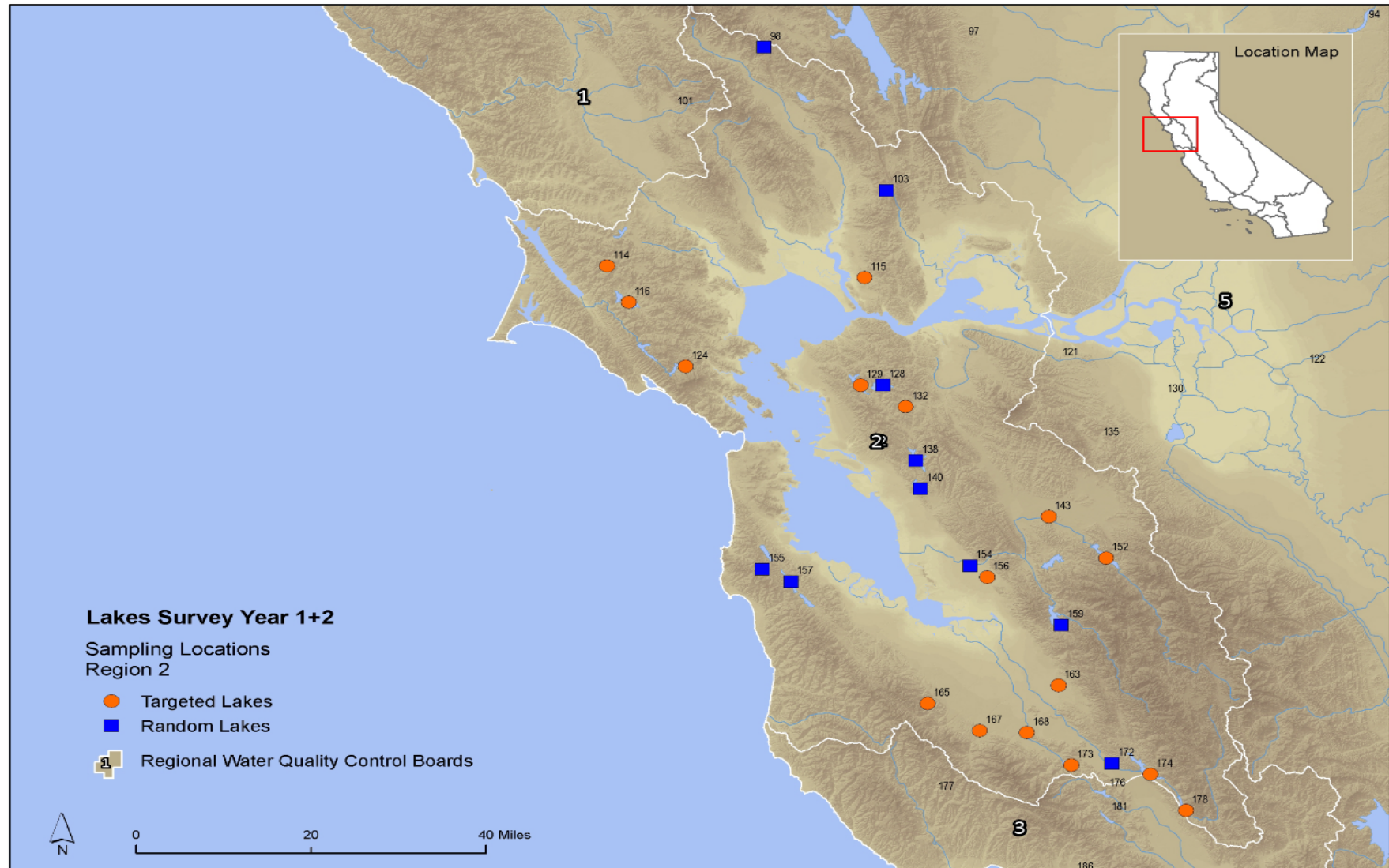


# Sampling Locations

- 2007-8
- 272 total lakes sampled
- 50 random
- 200 popular
- 22 extra in Region 4
- 26 lakes in Region 2 (SFB)



# SF Bay Region





# Target Species

## Largemouth bass

- Hg indicator
- 144 of 272 lakes
- 157 – 623 mm



## Common carp

- Organics indicator
- 78 of 272 lakes
- 290 – 886 mm



## Rainbow trout

- 79 of 272 lakes
- 140 – 598 mm

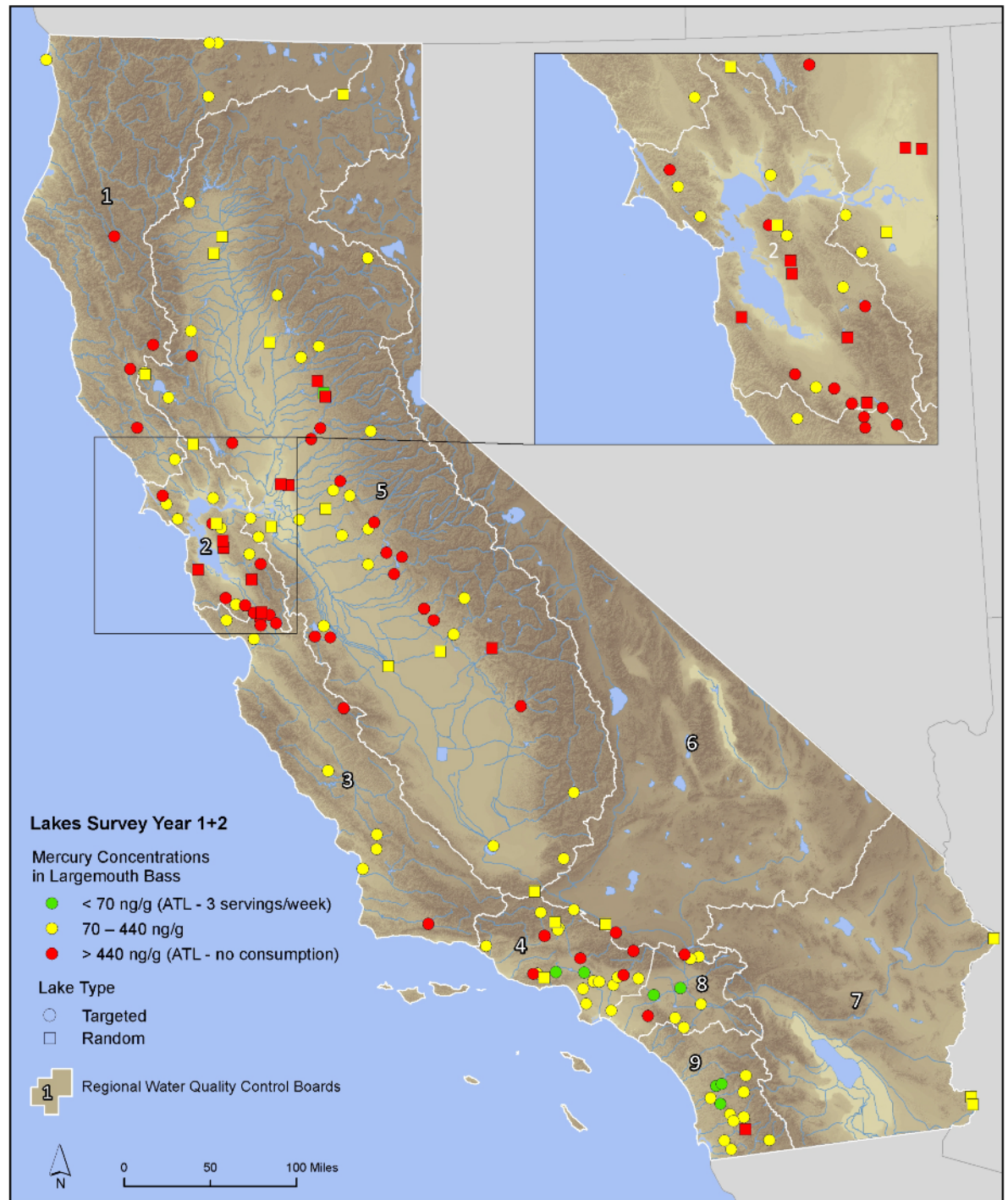


# Mercury in Largemouth Bass

Assessment  
thresholds adopted  
from Klasing and  
Brodberg (2008)

- 8 lakes < 0.07 ppm
- 86 lakes 0.07-0.44
- 49 lakes > 0.44 ppm

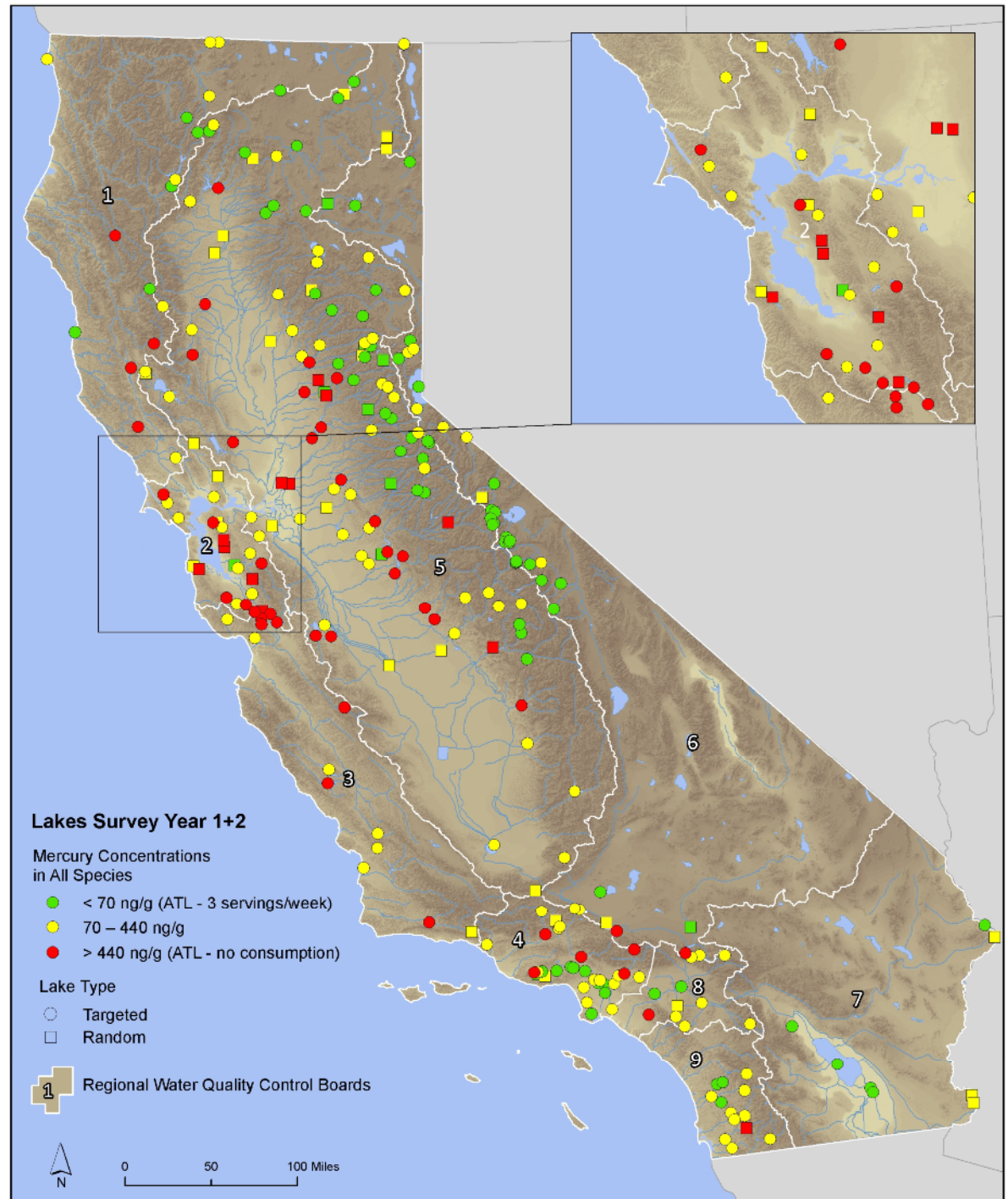
- 13/21 (62%) lakes in  
Region 2 > 0.44 ppm



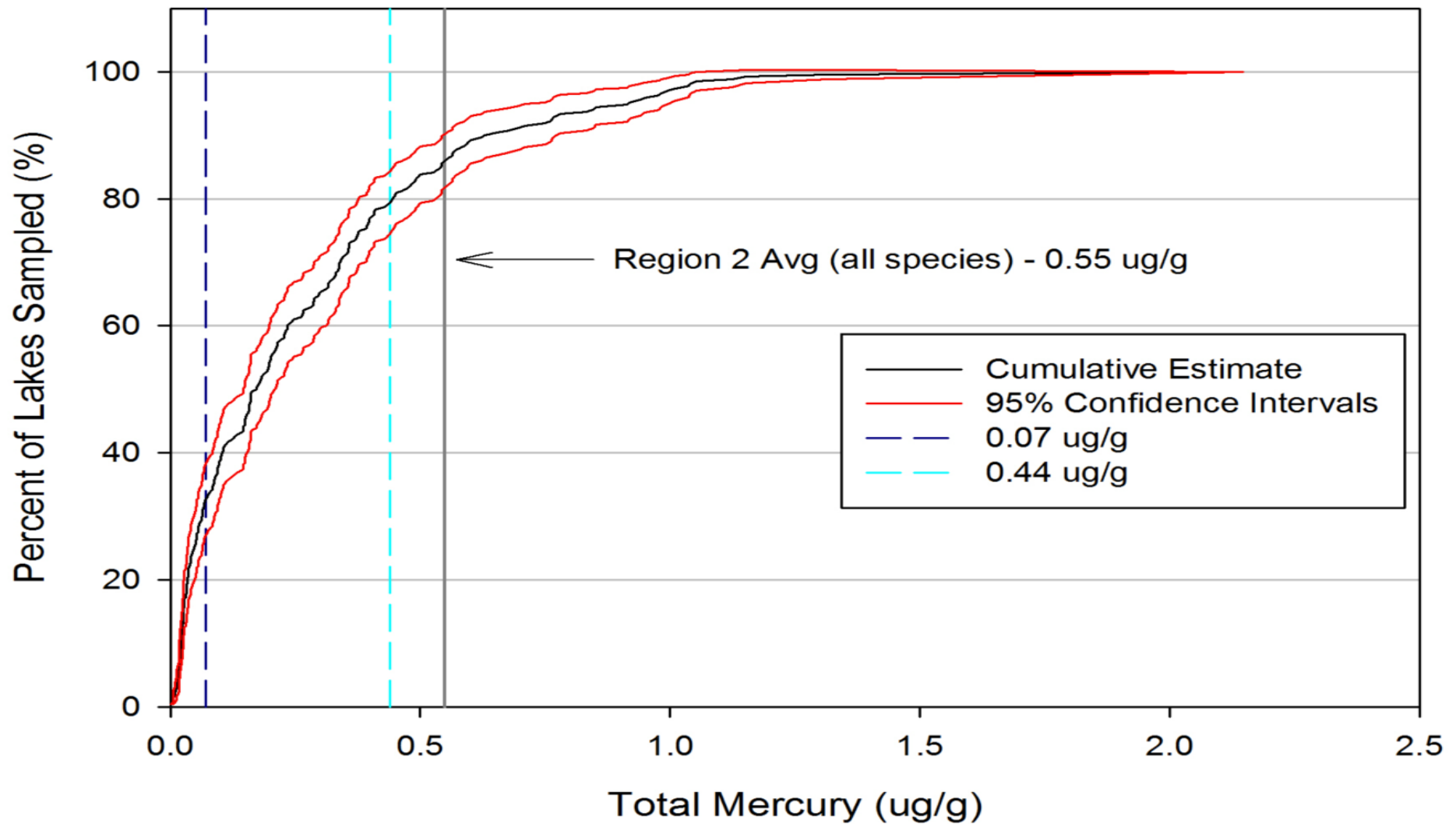


# Mercury in All Species

- 88 lakes 0.07 ppm
- 128 lakes 0.07-0.44
- 56 lakes > 0.44 ppm
- One low Hg lake in Region 2 = Lago Los Osos (Channel cat)
- 13/26 (50%) lakes in Region 2 > 0.44 ppm
- Almaden Lake  
350mm LMB = 2.1 ppm

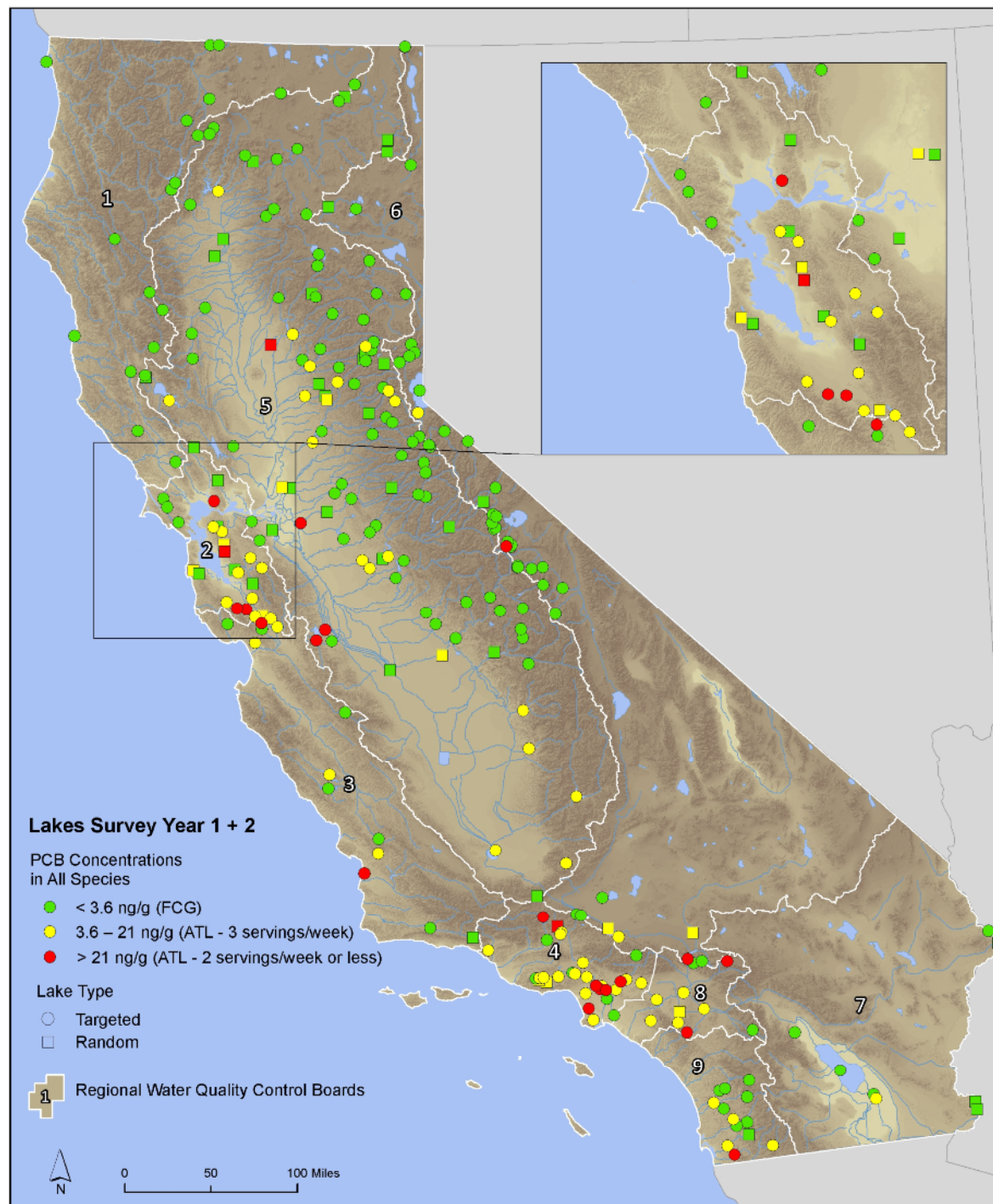


# Lake Condition: Mercury



# PCBs in All Species

- 181 lakes < 3.6 ppb
- 69 lakes 3.6 - 21 ppb
- 22 lakes > 21 ppb
- 4/26 (15%) lakes in Region 2 > 21 ppb
- Lake Vasona = 147 ppb (Carp)

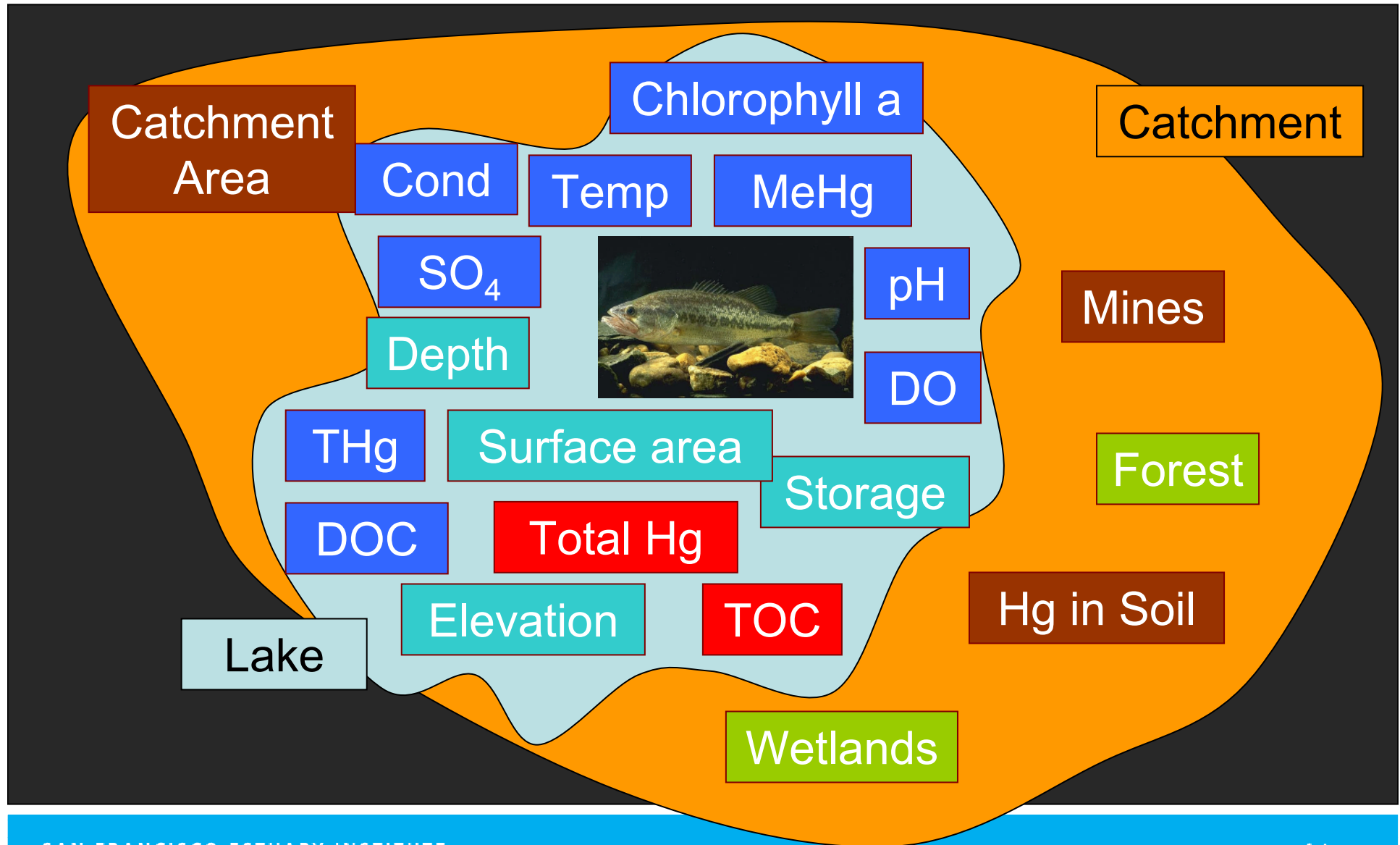


# Statistical Model of Mercury in Largemouth Bass

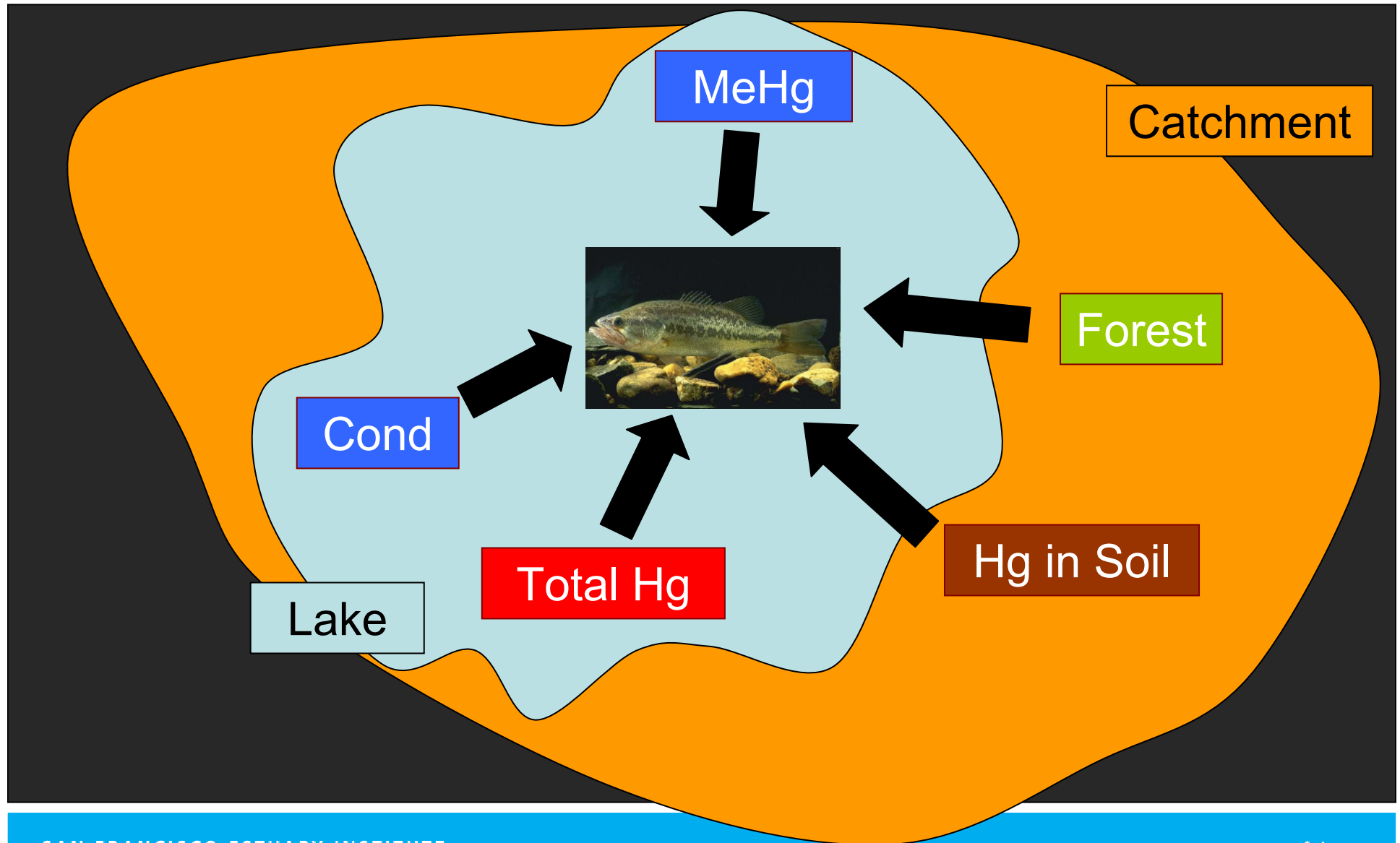
- Empirical model to predict MeHg concentrations in largemouth bass
- 350mm LMB - bioaccumulation indicator that can be measured consistently across the state (except high elevation lakes)
- Lake morphometry obtained from agency staff, lake managers, online sources
- Watershed attributes determined from USGS, NHD, NWI, CalVeg
- Water chemistry from a BAF study by MLML (John Negrey)



# Lake and Watershed Variables



# Significant Model Parameters



# Lakes Data - Web Portal

State of California  
ENVIRONMENTAL PROTECTION AGENCY  
RESOURCES AGENCY  
CALIFORNIA WATER QUALITY MONITORING COUNCIL

Home | Safe to Drink | Safe to Swim | Safe to Eat Fish | Ecosystem Health | Stressors & Processes | Contact Us

Consumption Advisories | Recent Conditions | Data & Trends | Impaired Waters | Improvements

GOVERNOR SCHWARZENEGGER  
Visit his Website

Home → Safe To Eat → Data And Trends

### What are the Levels and Long-Term Trends in My Lake, Stream, or Ocean Location?

Select location from list:

Zoom to county:

☐ Show counties

Mercury in Species With Highest Avg Concentration (ppm)  
Year: 2007

- >0.44
- 0.07 - 0.44
- <0.07

[Change Thresholds](#)

Map data ©2007 Google - [Terms of Use](#)

#### Contaminant Data

This interactive map allows you to explore fish contaminant data for your fishing locations.

- Select parameters of interest from the menus below and click on the "Go" button. The map will display average concentrations for the selected water bodies.
- To view data for all species at your water body, trends, or comparisons with nearby water bodies, click on a map location or select a water body from the menu above the map.
- Thresholds displayed on the map can be modified by clicking the Change Thresholds link in the map legend.

Select Species:  
Species With Highest Avg Concentration

Select Contaminant:  
Mercury

Select Start Date:  
2007

Select End Date:  
2007

#### More Information

- [Monitoring programs and reports](#)
- [Access to Data from SWAMP](#)
- [Assessment thresholds](#)

This map shows data generated by:

Downloads: [BOG Lakes Report...](#)

[www.swrcb.ca.gov/mywaterquality/safe\\_to\\_eat/index.shtml](http://www.swrcb.ca.gov/mywaterquality/safe_to_eat/index.shtml)

# Coastal Study Design

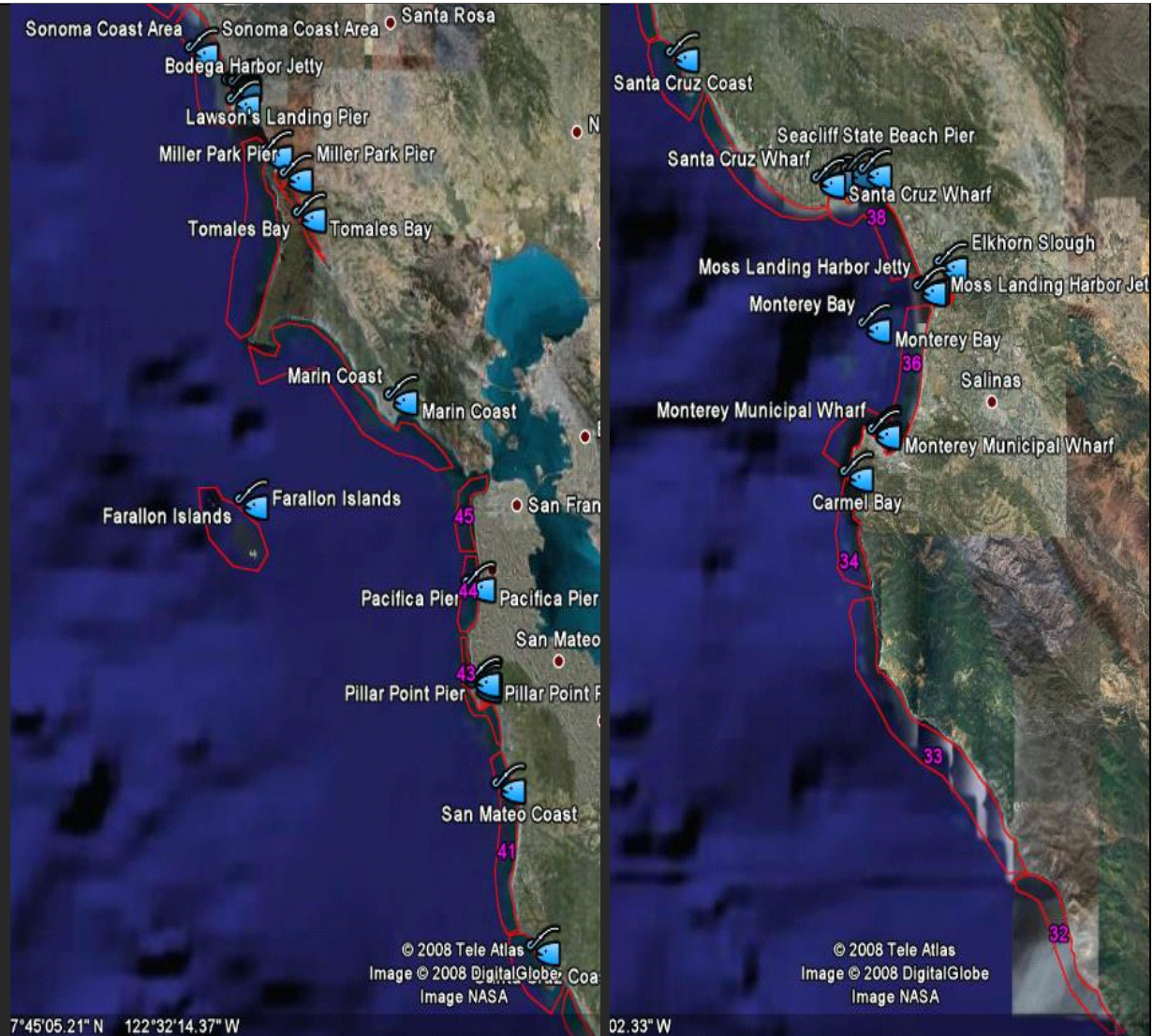
- Coastal waters next priority for SWAMP
- Management Questions
  - Status
  - Regional distribution
- Coordination
  - RMP (coordinated Bay sampling effort, combined reporting)
  - Bight Program (coordinated lab analysis)
  - Region 4 (additional funds)





# Coastal Sampling

- Two-year study
- 65-70 sampling zones
- Target species vary by region
- Some taxa in guilds
- 5 species per zone
- One comp per species, except in SFB and Region 4

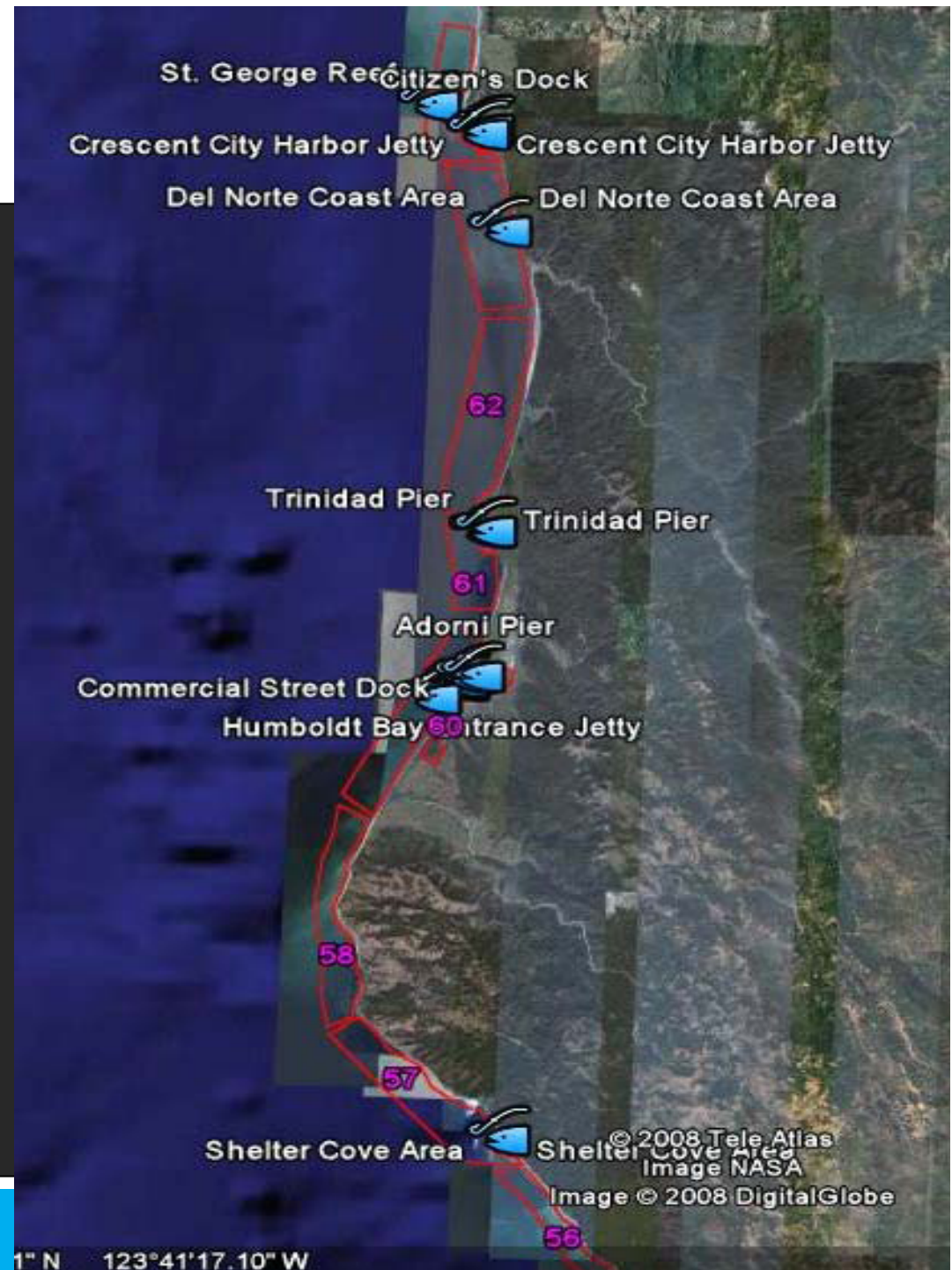


# 2009 Coastal Sampling

- Sampling focused on San Francisco Bay and Southern California Bight (May - September)
- 36 Zones were sampled
  - 9 in Region 2
  - 27 in So. California (Regions 4, 8, 9)
- > 2400 fish were collected
  - So. California Bight - chub mackerel, white croaker, kelp bass
  - So. California Harbors - rockfish spp, white croaker
  - SF Bay Coast - rockfish spp, white croaker
  - SF Bay Harbors - shiner perch, white croaker

# 2010 Sampling

- 29 zones left to sample
- central coast and northern Ca.
- Target species are:
  - rockfish
  - lingcod
  - sharks
- Mercury indicators: kelp bass, rockfish, and shiner perch





# Acknowledgements

## The BOG

- Terry Fleming
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  - Billy Jakl
  - Jennifer Doherty
  - Autumn Bonnema
- Peer Review Panel
- Jim Wiener
  - Ross Norstrom
  - Chris Schmitt
- SFEI
- Jennifer Hunt
  - Shira Bezalel
- Email: [aron@sfei.org](mailto:aron@sfei.org)

[http://www.waterboards.ca.gov/water\\_issues/programs/monitoring\\_council/bioaccumulation\\_oversight\\_group/](http://www.waterboards.ca.gov/water_issues/programs/monitoring_council/bioaccumulation_oversight_group/)