CALIFORNIA WATER QUALITY MONITORING COUNCIL

SWAMP Surface Water Ambient Monitoring Program

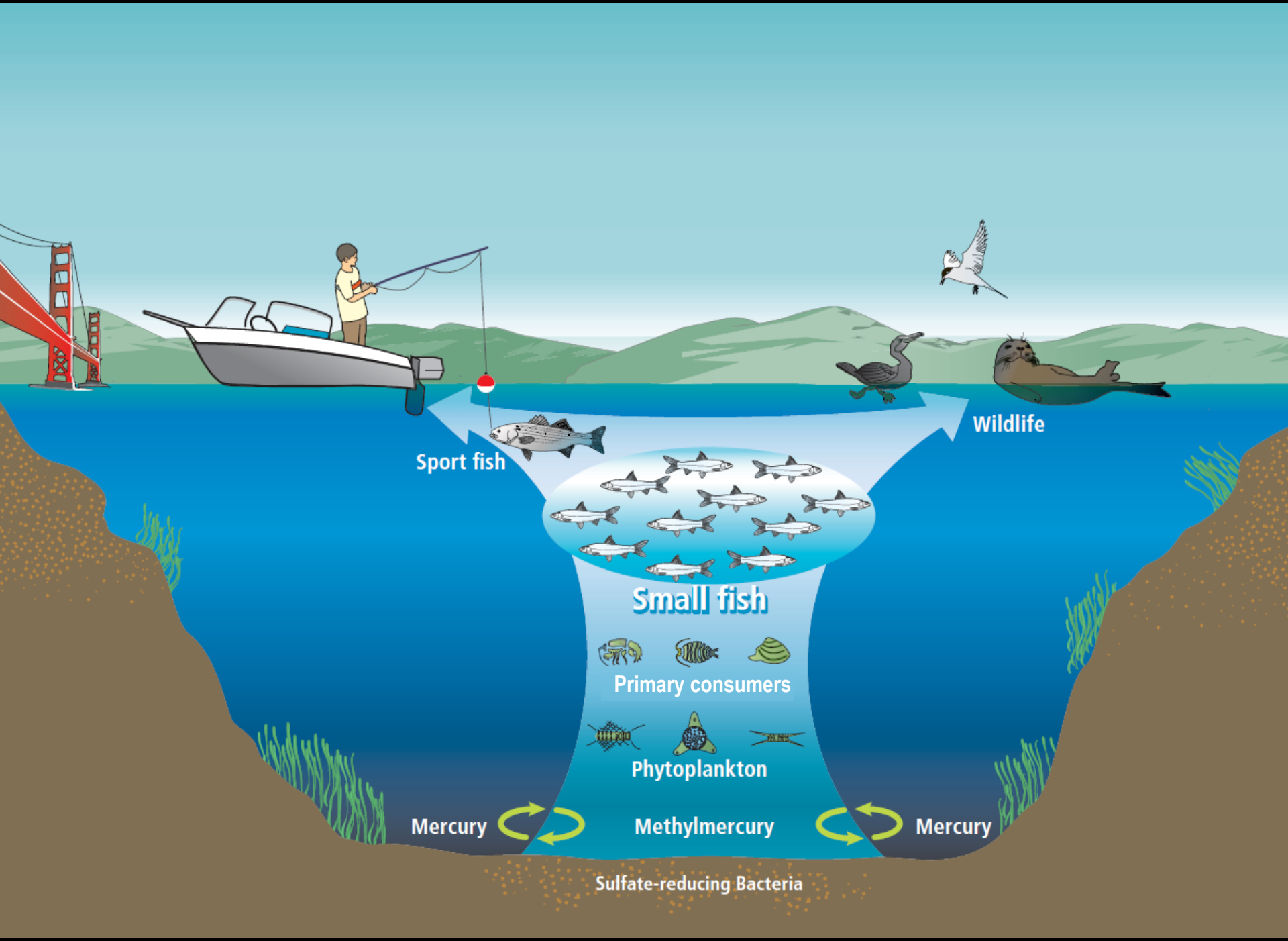
Symposium on Bioaccumulation in California

Jay Davis, SFEI

December 17, 2012

- What is bioaccumulation?
- Why is it a concern?
- What is the BOG?
- What can the BOG do for me?
- Why are we here today?

SWAMP
Surface Water
Ambient Monitoring
Program


Sport fish
Wildlife
Small fish
Primary consumers
Phytoplankton
Mercury
Methylmercury
Mercury
Sulfate-reducing Bacteria

Historical Perspective on Bioaccumulation in California

- 1920s
  - Paralytic shellfish poisoning identified in San Francisco Bay
- 1950s
  - Grebe die-off from DDE in Clear Lake
- 1960s
  - Organochlorines found in San Francisco Bay birds and fish (1965)
  - Montrose Chemical
- 1970s
  - Mercury surveyed in Bay-Delta striped bass (1970-71)
  - Toxic Substances Monitoring Program (1976)
  - State Mussel Watch (1977)
  - Metals in San Francisco Bay clams
- 1980s
  - Selenium impacts on birds at Kesterson
- 1990s
  - PBDEs in San Francisco Bay Area
- 2000s
  - SWAMP
  - California Biomonitoring Program
  - Microcystin in sea otters

SWAMP
Surface Water Ambient Monitoring Program

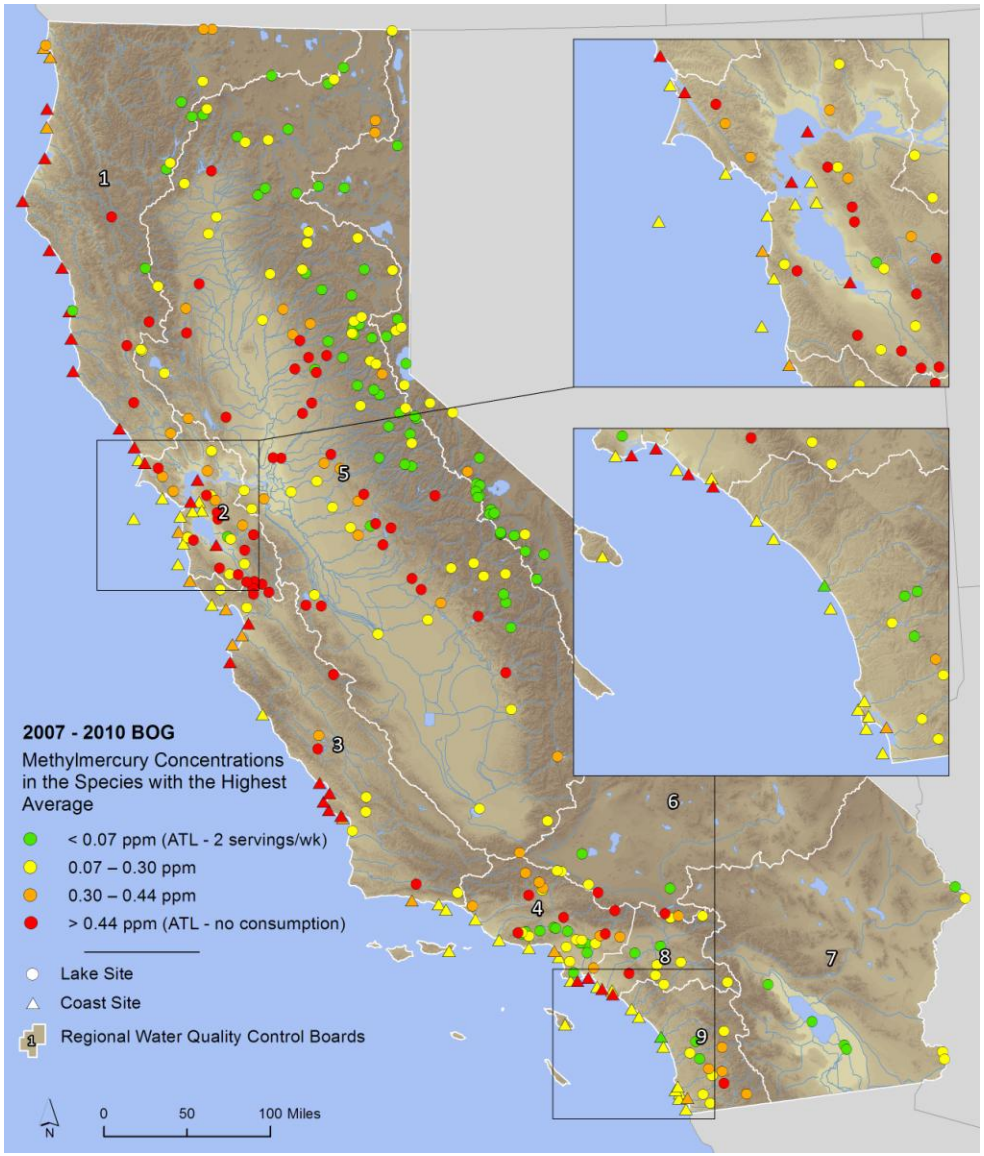
Safe for Fishing – Jay's Ranking

Tier I **Methylmercury**
High Concern

Tier II
Moderate Concern

Tier III
Low Concern

Tier IV
Unknown Concern



Safe for Fishing – Jay's Ranking

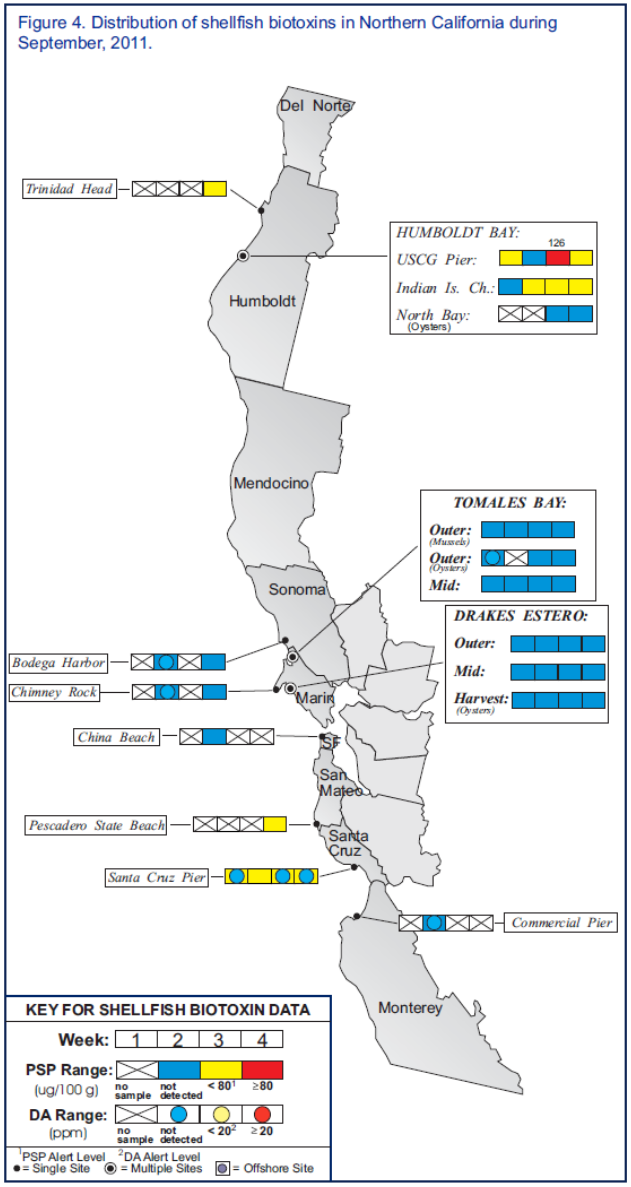
Tier I
High Concern

Methylmercury
Saxitoxin
Domoic Acid

Tier II
Moderate Concern

Tier III
Low Concern

Tier IV
Unknown Concern



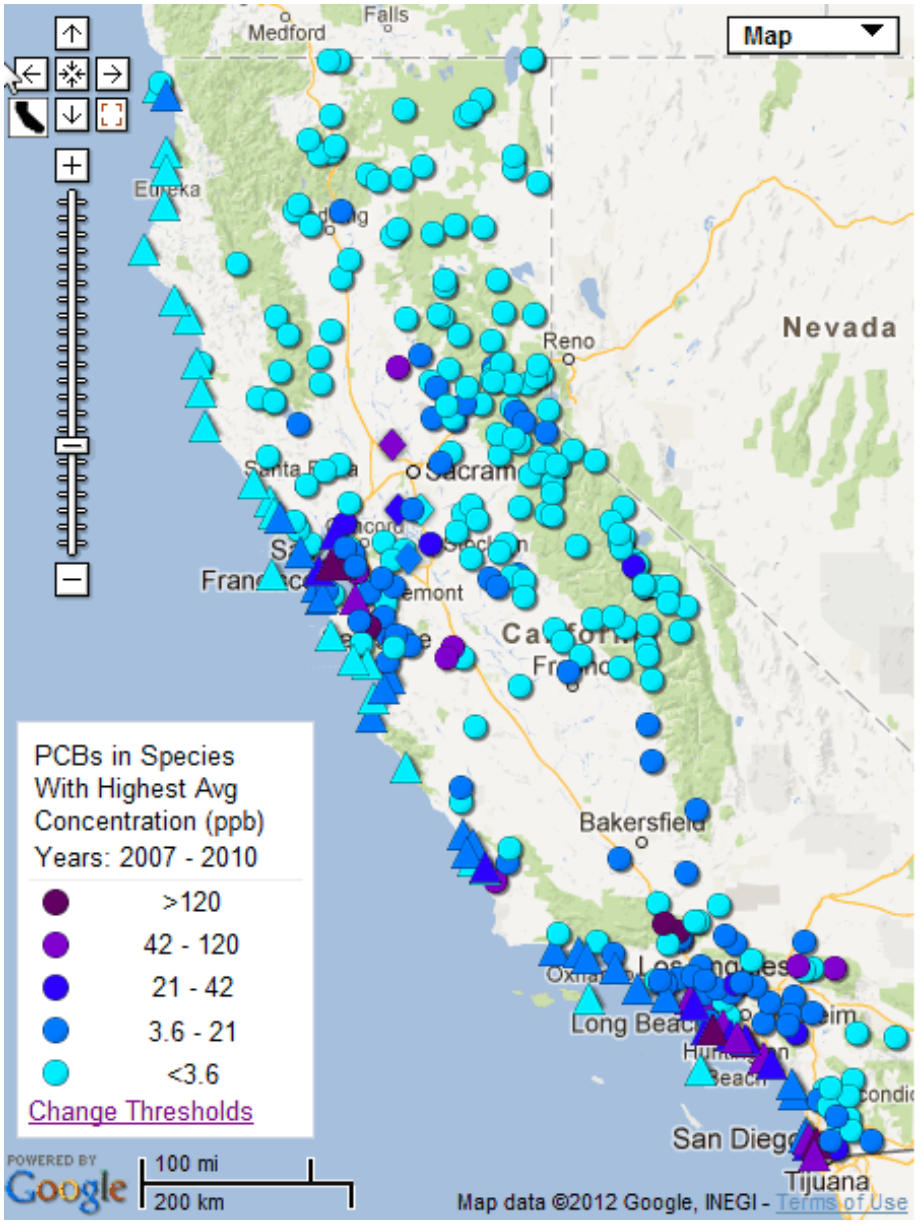
Safe for Fishing – Jay's Ranking

Tier I *High Concern*
Methylmercury
Saxitoxin
Domoic Acid

Tier II *Moderate Concern*
PCBs

Tier III *Low Concern*

Tier IV *Unknown Concern*



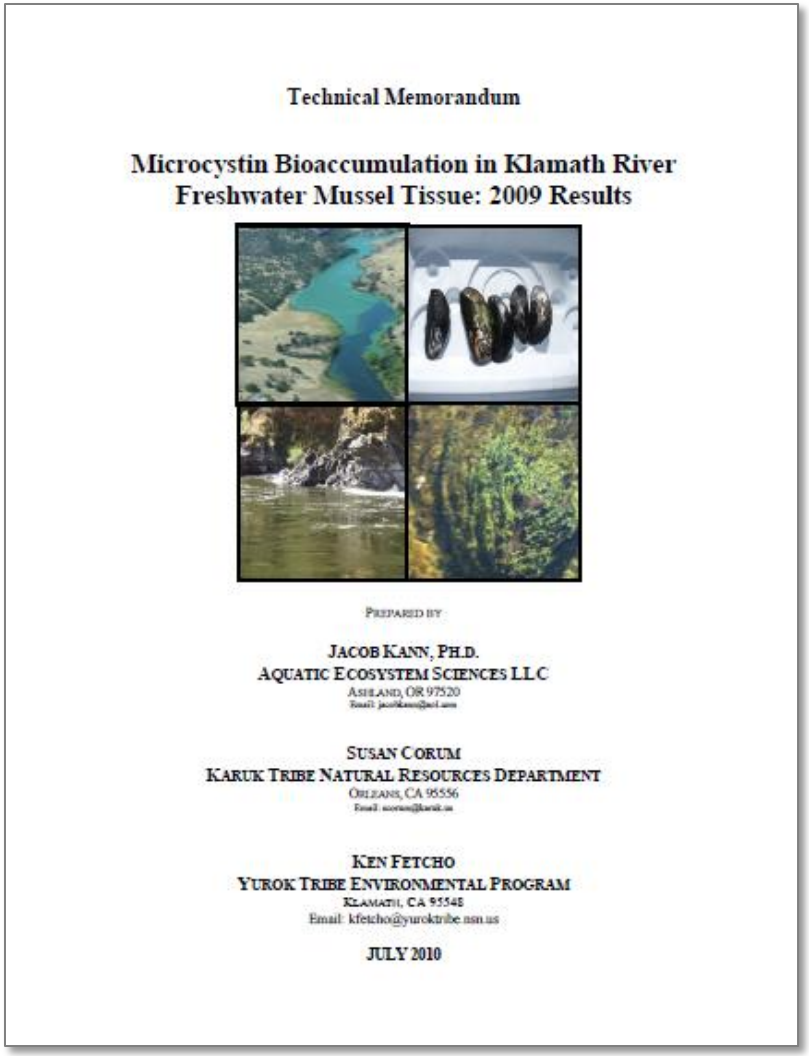
Safe for Fishing – Jay's Ranking

Tier I
High Concern
Methylmercury
Saxitoxin
Domoic Acid

Tier II
Moderate Concern
PCBs
Microcystin

Tier III
Low Concern

Tier IV
Unknown Concern



Technical Memorandum

Microcystin Bioaccumulation in Klamath River Freshwater Mussel Tissue: 2009 Results

PREPARED BY

JACOB KANN, PH.D.
AQUATIC ECOSYSTEM SCIENCES LLC
ASHLAND, OR 97520

SUSAN CORUM
KARUK TRIBE NATURAL RESOURCES DEPARTMENT
ORLEANS, CA 95556

KEN FETCHO
YUROK TRIBE ENVIRONMENTAL PROGRAM
KLAMATH, CA 95548
Email: kfetcho@yuroktribe.nsn.us

JULY 2010

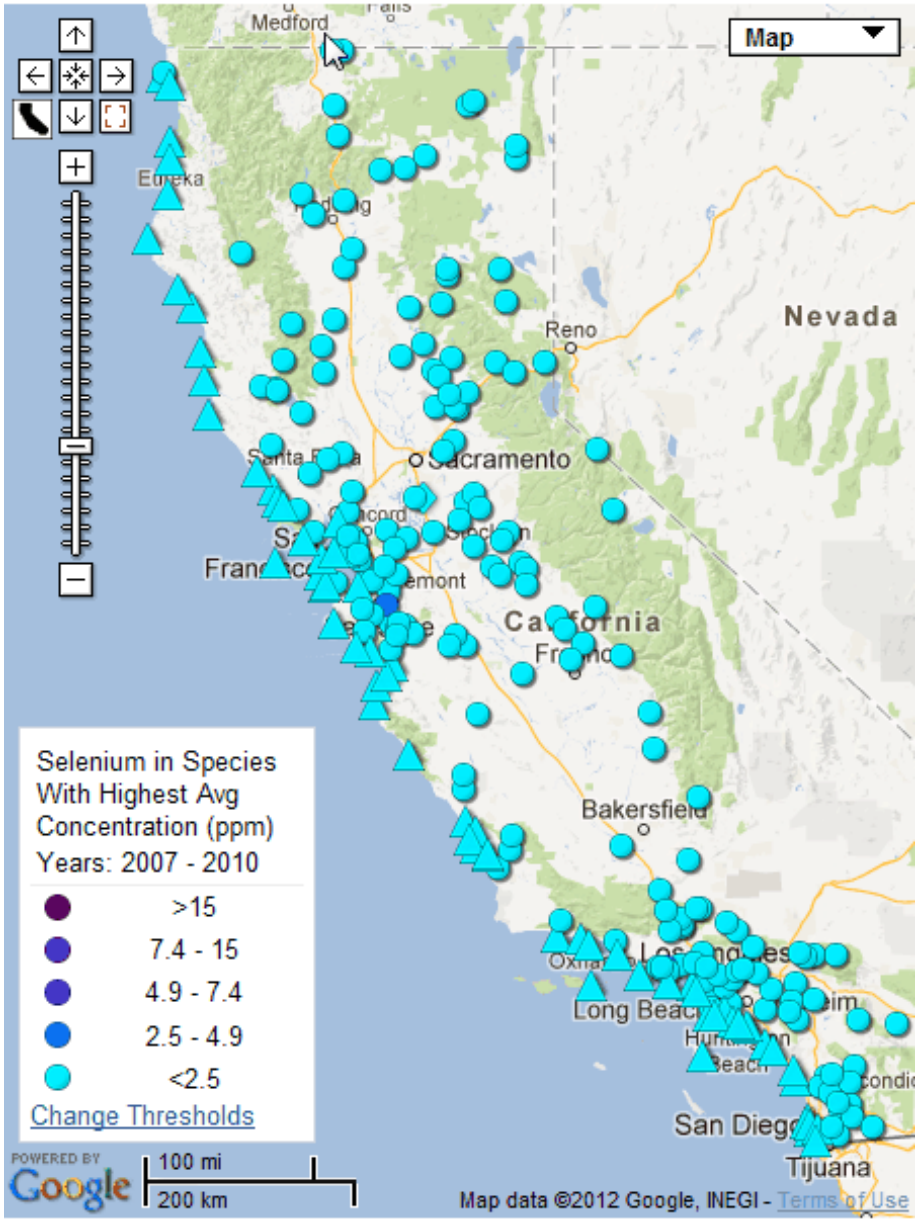
Safe for Fishing – Jay's Ranking

Tier I
High Concern
Methylmercury
Saxitoxin
Domoic Acid

Tier II
Moderate Concern
PCBs
Microcystin

Tier III
Low Concern
PBDEs DDTs
Dieldrin Chlordanes
Selenium
Many others

Tier IV
Unknown Concern



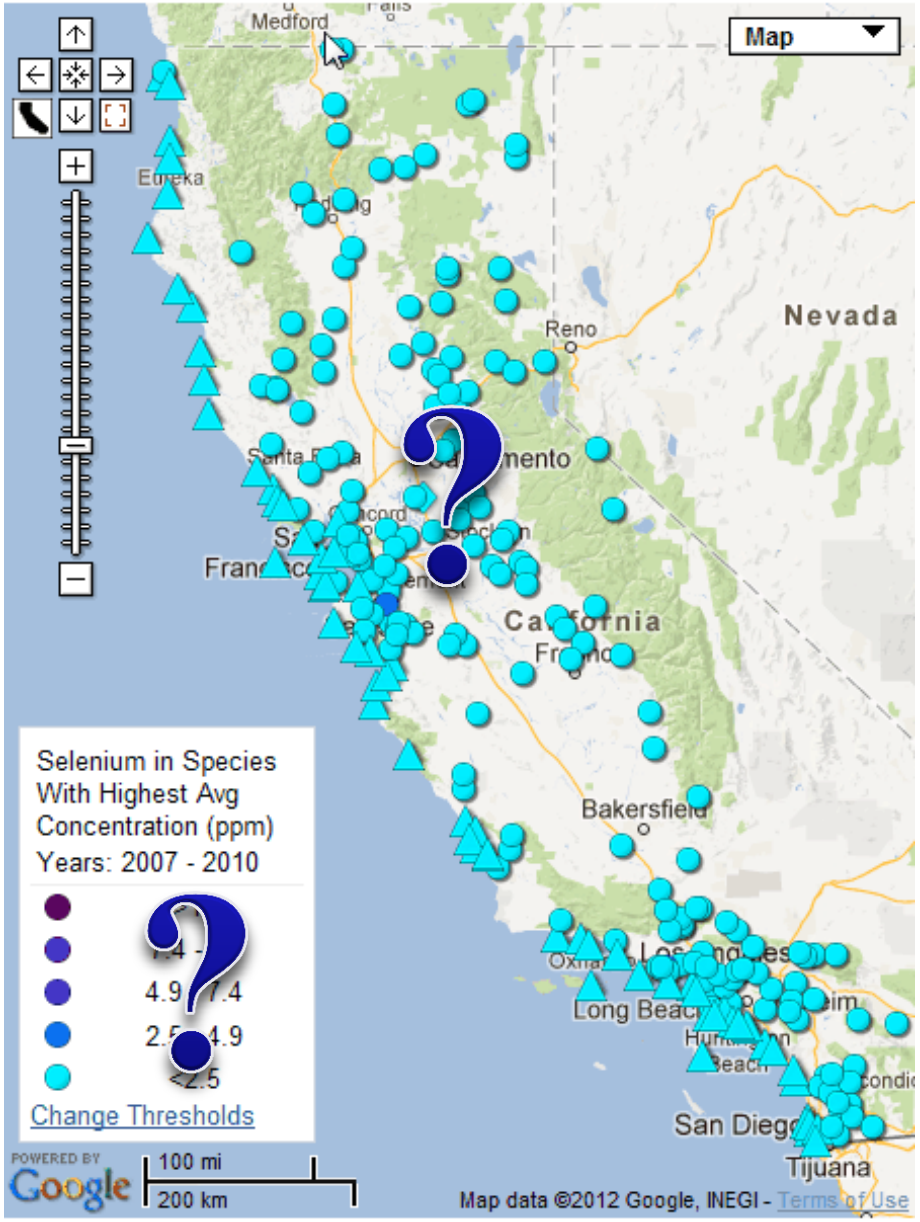
Safe for Fishing – Jay's Ranking

Tier I
High Concern
Methylmercury
Saxitoxin
Domoic Acid

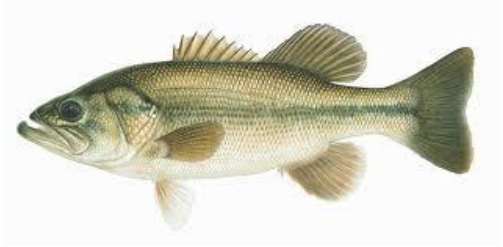
Tier II
Moderate Concern
PCBs
Microcystin

Tier III
Low Concern
PBDEs DDTs
Dieldrin Chlordanes
Selenium
Many others

Tier IV
Unknown Concern
PFCs
Dioxins
CECs



Safe for Aquatic Life – Jay's Ranking



Tier I **Methylmercury**
High Concern

Tier II
Moderate Concern

Tier III
Low Concern

Tier IV
Unknown Concern

Safe for Aquatic Life – Jay's Ranking

Tier I
High Concern

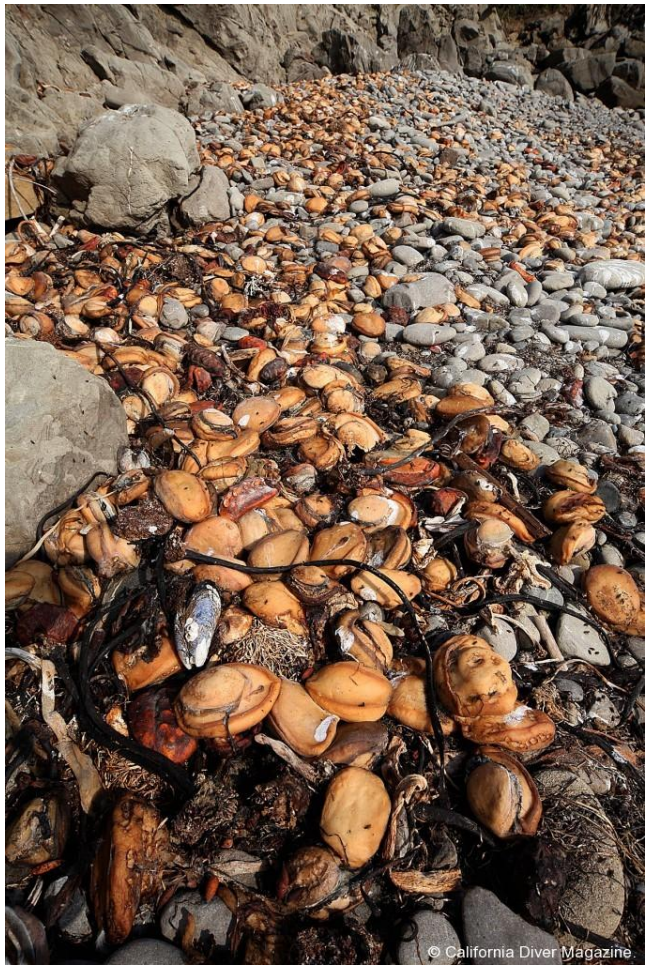
Methylmercury
Microcystin

Tier II
Moderate Concern

Tier III
Low Concern

Tier IV
Unknown Concern

Safe for Aquatic Life – Jay's Ranking



Tier I
High Concern

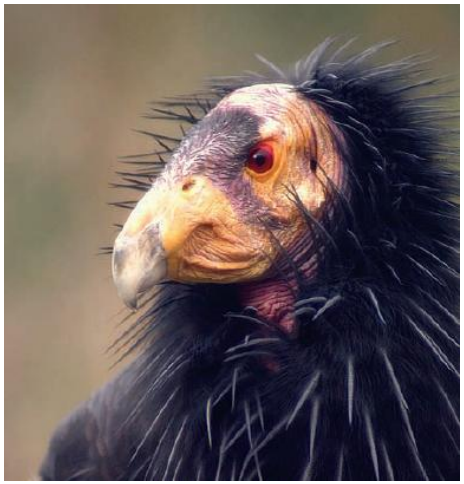
Methylmercury
Microcystin
Other biotoxins

Tier II
Moderate Concern

Tier III
Low Concern

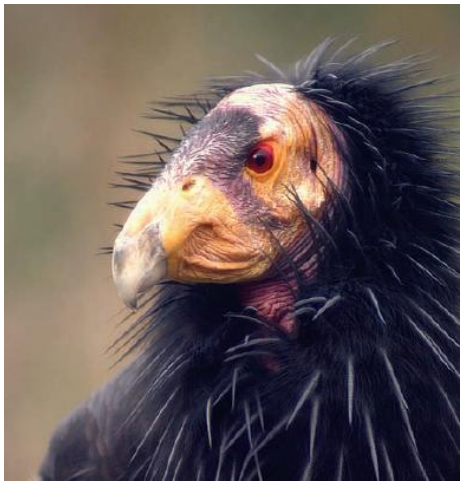
Tier IV
Unknown Concern

Safe for Aquatic Life – Jay's Ranking



Tier I *High Concern*	Methylmercury Microcystin Other biotoxins
Tier II *Moderate Concern*	**DDTs**
Tier III *Low Concern*	
Tier IV *Unknown Concern*	

Safe for Aquatic Life – Jay's Ranking



Tier I
High Concern

Methylmercury
Microcystin
Other biotoxins

Tier II
Moderate Concern

DDTs
PCBs

Tier III
Low Concern

Tier IV
Unknown Concern

Safe for Aquatic Life – Jay's Ranking

Tier I *High Concern*	Methylmercury Microcystin Other biotoxins
Tier II *Moderate Concern*	DDTs PCBs **Selenium**
Tier III *Low Concern*	
Tier IV *Unknown Concern*	

Safe for Aquatic Life – Jay's Ranking

Tier I *High Concern*	Methylmercury Microcystin Other biotoxins
Tier II *Moderate Concern*	DDTs PCBs Selenium
Tier III *Low Concern*	**PBDEs Dieldrin** **Chlordanes Dioxins** **Many others**
Tier IV *Unknown Concern*	

Safe for Aquatic Life – Jay's Ranking

Tier I *High Concern*	Methylmercury Microcystin Other biotoxins
Tier II *Moderate Concern*	DDTs PCBs Selenium
Tier III *Low Concern*	PBDEs Dieldrin Chlordanes Dioxins Many others
Tier IV *Unknown Concern*	**PFCs** **CECs**

Safe for Fishing

Tier I *High Concern*	Methylmercury Saxitoxin Domoic Acid
Tier II *Moderate Concern*	PCBs Microcystin
Tier III *Low Concern*	PBDEs DDTs Dieldrin Chlordanes Selenium Many others
Tier IV *Unknown Concern*	PFCs Dioxins CECs

Safe for Aquatic Life

Tier I *High Concern*	Methylmercury Microcystin Other biotoxins
Tier II *Moderate Concern*	DDTs PCBs Selenium
Tier III *Low Concern*	PBDEs Dieldrin Chlordanes Dioxins Many others
Tier IV *Unknown Concern*	PFCs CECs

BOG Origins

- Cal EPA
  - State Water Resources Control Board & 9 Regional Water Quality Control Boards
    - Surface Water Ambient Monitoring Program (SWAMP)
      - **Bioaccumulation Oversight Group (BOG) formed in 2006**

SWAMP
Surface Water Ambient Monitoring Program

BOG Evolves

- Interagency Efforts
  - California Water Quality Monitoring Council
    - Mission: promote coordination, integration, access
    - Members
      - Cal EPA, Resources Agency, Department of Public Health, Regulated Community, Public, Scientists, Water Supply Agencies
    - Workgroups
      - **BOG (2009)**, 9 others

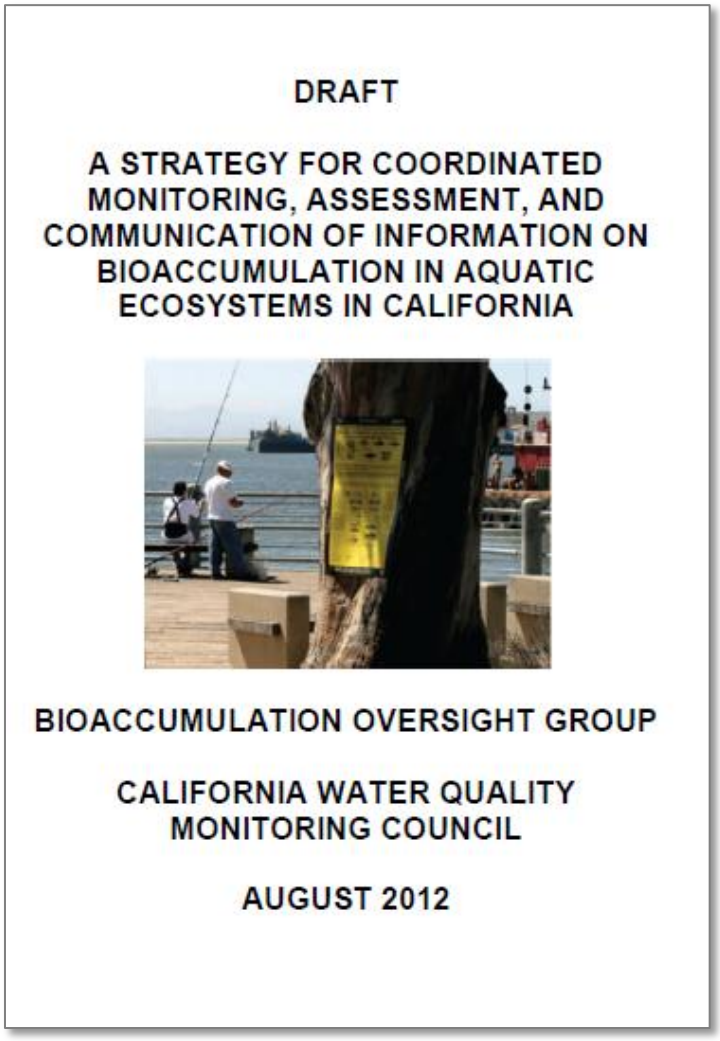
SWAMP
Surface Water Ambient Monitoring Program

Recent BOG Accomplishments

- Statewide sport fish surveys (2007-2011)
  - Annual reports
  - Safe eating guidelines
  - Statewide TMDL
- Centralized database
- “Safe to Eat?” web portal
- First statewide study on aquatic life impacts (2012-2013)
- Bioaccumulation Strategy

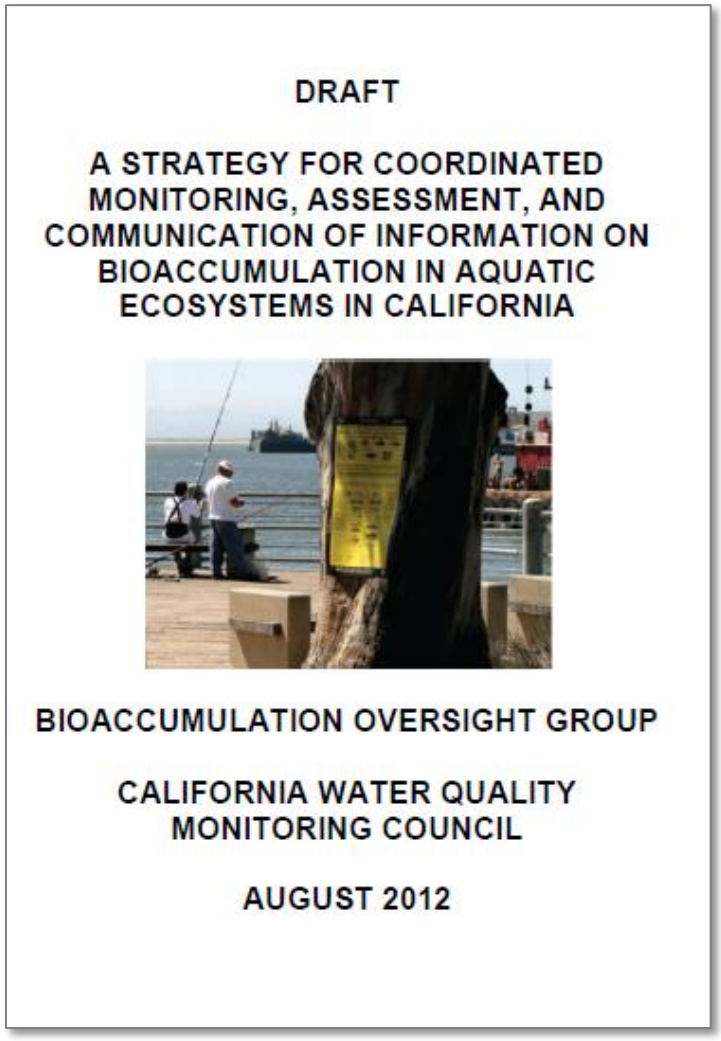
Bioaccumulation Strategy

- Efficient use of limited resources through coordination and thoughtful planning
- Goals
  - Coordinated, cooperative, long-term monitoring
  - Consistent and timely assessment
  - Coordinated communication and access to information



Bioaccumulation Strategy

- Priority Actions
  - Establish BOG as a central forum
  - Inventory existing activities
  - Develop monitoring protocols
  - Develop monitoring plans for legacy pollutants, CECs, and biotoxins
  - Develop plan for development of safe eating guidelines (monitoring, assessment, communication)



What Can the BOG Do For You?

- Goal is to be helpful
- Facilitate sharing of technical information
- Facilitate coordination and leveraging of projects
- A resource
  - Protocols
  - Infrastructure (e.g., for data management and communication)
- You can help define the BOG

SWAMP
Surface Water Ambient Monitoring Program

Goals of Today's Meeting

- Increase participation in the BOG
- Introduction to the BOG
- Information sharing
- Coordination

SWAMP
Surface Water
Ambient Monitoring
Program

Looking Forward

- Quarterly meetings
- Next meeting: review Strategy and begin implementation planning
- Annual Symposium?

SWAMP
Surface Water Ambient Monitoring Program

More Information on the BOG

- Google “Bioaccumulation Oversight Group”
- Email jay@sfei.org to be added to our email distribution list

SWAMP
Surface Water Ambient Monitoring Program