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?
Primary consumers
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
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

<table>
<thead>
<tr>
<th>Tier</th>
<th>Concern</th>
<th>Chemicals</th>
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</thead>
<tbody>
<tr>
<td>Tier I</td>
<td>High</td>
<td>Methylmercury, Saxitoxin, Domoic Acid</td>
</tr>
<tr>
<td>Tier II</td>
<td>Moderate</td>
<td>PCBs, Microcystin</td>
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<tr>
<td>Tier III</td>
<td>Low</td>
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<tr>
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**Technical Memorandum**

Microcystin Bioaccumulation in Klamath River Freshwater Mussel Tissue: 2009 Results

**Prepared by:**

- Jacob Linn, Ph.D.
  Aquatic Ecosystem Sciences LLC
  Ashland, OR 97520
  Email: jacoblinn@aqeco.com

- Susan Corum
  Karuk Tribe Natural Resources Department
  Orleans, CA 95556
  Email: susan.corum@karuk.org

- Ken Fetchio
  Yurok Tribe Environmental Program
  Klamath, CA 95542
  Email: kfetchio@yuroktribe.net.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

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<thead>
<tr>
<th>Tier I</th>
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<th>Methylmercury</th>
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<tbody>
<tr>
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<td>PFCs</td>
<td>Dioxins</td>
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The map shows the distribution of Selenium in species with the highest average concentration (ppm) between 2007 and 2010. The concentration ranges are indicated by different colors, with higher concentrations represented by darker shades. The map data is powered by Google, and the map’s terms of use are referenced.
Safe for Aquatic Life – Jay’s Ranking

Tier I
High Concern

Tier II
Moderate Concern

Tier III
Low Concern

Tier IV
Unknown Concern

Methylmercury
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

<table>
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<tr>
<th>Tier</th>
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<th>Biotoxins</th>
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Safe for Aquatic Life – Jay’s Ranking

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*High Concern*  
Methylmercury  
Microcystin  
Other biotoxins

**Tier II**  
*Moderate Concern*  
DDTs  
PCBs

**Tier III**  
*Low Concern*  

**Tier IV**  
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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
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
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
Goals of Today’s Meeting

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

- Quarterly meetings
- Next meeting: review Strategy and begin implementation planning
- Annual Symposium?
More Information on the BOG

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