California CyanoHAB Network

A Workgroup of the California Water Quality Monitoring Council
Purpose

- Update the Water Quality Monitoring Council on the CCHAB Workgroup’s efforts
- Solicit input from the Council on work products the CCHAB Network is developing
The CCHAB Network Timeline

- 2006 – The Statewide Blue–Green Algae Working Group

  - Thresholds based on WHO guidelines

- 2012 – OEHHA’s Toxicological Summary and Suggested Action Levels to Reduce Potential Adverse Health Effects of Six Cyanotoxins
The CCHAB Network Timeline

- December 2014 – CCHAB Network met and agreed to update the Voluntary Guidance Document
  - Formed a Guidance Update Subcommittee

- February 2015 – Joined the Water Quality Monitoring Council
The CCHAB Network Timeline

- January 2016 – Present updated components of the Voluntary Guidance Document to the CCHAB Network
- February 2016 – Present the updates to the Water Quality Monitoring Council
2010 Draft Voluntary Statewide Guidance for Blue-Green Algae Blooms

- Can be found at:

- Purpose
  - To provide guidance to local, state, and tribal regulators to protect people, pets, and livestock from the effects of toxic cyanobacteria in non-marine water bodies in the state of California.
Volunteers from the CCHAB Network

- Tribes (Karuk and Yurok Tribes)
- Local Environmental Health (Humboldt County)
- Cities (Santa Cruz & Watsonville)
- Local Irrigation District (Solano)
- Water Managers (PacifiCorp)
- Researchers (SCCWRP & Aquatic–Ecosystem Sciences)
- Water Boards (State & Regional)
- Office of Environmental Health Hazard Assessment
- California Department of Public Health
- U.S. EPA
- California Department of Fish and Wildlife
Certain portions of the Guidance Document were updated first.

- Triggers
- Signage
- Decision Tree

A Narrative was added to help describe the steps in the Decision Tree.
Voluntary Guidance Document

- These are only portions of a larger document
- Short Term Goals
  - Bring these parts to the full CCHAB Network
  - Present these to the California Water Quality Monitoring Council for review and comment on February 23, 2016
  - Make them available to the public before the next bloom season
Long Term Goals

- Continue working on other portions of the Voluntary Guidance Document
- Incorporate changes as needed in the 2016 revision process
- Update the entire Voluntary Guidance Document
- Develop a web portal to help make the information more readily available.
Decision Tree Goals

- Provide clear direction for decision makers
- Provide processes to help protect the public
- Allow for varied local circumstances
  - Keep it Simple!
Draft Voluntary Statewide Guidance for Blue-Green Algae Blooms—July 2010

Figure 1. Decision tree for posting health advisory warnings.

Is the scum present associated with toxicogenic* species? If yes, post health advisory warning sign **

Are Microcystis or Planktothrix present? (even if no visible scum is present)

Is the cell density of Microcystis or Planktothrix ≥ 40,000 cells/mL? If yes, post health advisory warning sign **

Is the population of the potentially toxicogenic* blue-green algae ≥ 100,000 cells/mL? If yes, post health advisory warning sign **

Is the concentration of total microcystin ≥ 8 ppb, or is anatoxin-a detected? If yes, post health advisory warning sign **

Do not post health advisory warning sign **

*Potentially toxic blue-green algae that have been detected in California include those of the genera Anabaena, Microcystis, Aphanizomenon, Planktothrix, and Gloeotrichia.

Additional blue-green algae that are known to be potentially toxic may be added to this list.

** See Appendix 2 for examples of Health Advisory warning signs.
Provides explanation of the steps in the Decision Tree

Not intended to provide comprehensive details of each subject

Comprehensive information will be available in other documents

- Full Draft Voluntary Guidance
- SWAMP field and laboratory SOPs
- Web Portal
Box 1A
  - For visible or suspected bloom event

  - Visible suggestion
  - Measured chemical factors
  - Satellite imaging
  - Historic evidence

Box 1B
  - Suspected human or animal illness or death
  - Confirmed human or animal illness or death
Optional step

Focuses on field methods
  - Lists methods to detect cyanobacteria

Field test kits have limitations
  - Useful for presence or absence
  - Not recommended to determine toxin level
Box 3 –

- Sampling and laboratory analysis
- Sampling design considerations
- Not intended to be Comprehensive
  - Comprehensive information will be an appendix of the Voluntary Guidance Document
- SWAMP program
Boxes correspond to Trigger Levels listed in Table 1

- Trigger Levels lead to posting recommendations
  - Post Danger Signs
  - Post Warning Signs
  - Post Caution Signs
Signs

- **CAUTION** – for use when Action Trigger levels are exceeded or while sample collection and analysis are being conducted
- **WARNING** – for use when Tier I Trigger levels are exceeded
- **DANGER** – for use when Tier II Trigger levels are exceeded or when an illness or death due to cyanotoxin has been confirmed
CAUTION

Harmful algae may be present in these waters. For your family’s safety:

DO NOT SWIM OR WADE near algae or scum

DO NOT let pets or livestock go into or drink the water, or eat scum on the shoreline.

KEEP CHILDREN AWAY from algae in the water or on the shore.

For fish caught here, THROW AWAY GUTS AND CLEAN FILLETS with tap water or bottled water before cooking.

DO NOT drink this water or use it for cooking.

DO NOT eat shellfish from these waters.

Call your doctor or veterinarian if you or your pet get sick after going in the water. For more information, contact:
WARNING

Toxins from algae in these waters can harm people and kill pets and livestock

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**NO SWIMMING**

**STAY AWAY** from scum, and cloudy or discolored water.

**DO NOT** use these waters for drinking or cooking. Boiling or filtering will not make the water safe.

**DO NOT** let pets or livestock go into or drink the water, or go near the scum.

**DO NOT** eat shellfish from these waters.

For fish caught here, **THROW AWAY GUTS AND CLEAN FILLETS** with tap water or bottled water before cooking.

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**For people,** the toxins can cause:
- Skin rashes, eye irritation
- Diarrhea, vomiting

**For animals,** the toxins can cause:
- Diarrhea, vomiting
- Convulsions and death

Call your doctor or veterinarian if you or your pet get sick after going in the water.

For more information, contact:
DANGER

Toxins from algae in these waters can harm people and kill pets and livestock

**STAY OUT OF THE WATER UNTIL FURTHER NOTICE.** Do not touch scum in the water or on shoreline.

**DO NOT** let pets or livestock drink or go into the water or go near the scum.

**DO NOT** eat fish or shellfish from these waters.

**DO NOT** use these waters for drinking or cooking. Boiling or filtering will not make the water safe.

<table>
<thead>
<tr>
<th><strong>For people</strong>, the toxins can cause:</th>
<th><strong>For animals</strong>, the toxins can cause:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin rashes, eye irritation</td>
<td>Diarrhea, vomiting</td>
</tr>
<tr>
<td>Diarrhea, vomiting</td>
<td>Convulsions and death</td>
</tr>
</tbody>
</table>

Call your doctor or veterinarian if you or your pet get sick after going in the water.
For more information, contact:
2016 Updates

- Use a multi-tiered approach to risk management
- Focus on toxin levels
  - Cell counts are less reliable
- Incorporate OEHHA’s 2012 Risk Assessment
<table>
<thead>
<tr>
<th></th>
<th>Caution Action Trigger</th>
<th>Warning TIER 1</th>
<th>Danger TIER 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Triggers</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Microcystins&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.8 µg/L</td>
<td>6 µg/L</td>
<td>20 µg/L</td>
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<tr>
<td>Anatoxin-a</td>
<td>Detection&lt;sup&gt;c&lt;/sup&gt;</td>
<td>20 µg/L</td>
<td>90 µg/L</td>
</tr>
<tr>
<td>Cylindrospermopsin</td>
<td>1 µg/L</td>
<td>4 µg/L</td>
<td>17 µg/L</td>
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<tr>
<td><strong>Secondary Triggers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell Density</td>
<td>4,000 cells/mL</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Site Specific Indicators</td>
<td>Blooms, scums, mats</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

<sup>a</sup> Indicates a trigger level for human health risk.
<sup>b</sup> Total microcystins are a group of toxic compounds produced by cyanobacteria.
<sup>c</sup> Detection thresholds vary depending on the specific compound and its concentration level.
<table>
<thead>
<tr>
<th>Toxin</th>
<th>2010</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conc. (μg/L)</td>
<td>Public health action</td>
</tr>
<tr>
<td>MC</td>
<td>≥8</td>
<td>Advisory sign</td>
</tr>
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<tr>
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<td></td>
</tr>
<tr>
<td>ANA–a</td>
<td>detect</td>
<td>Advisory sign</td>
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<tr>
<td>CYN</td>
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* OEHHA action level for protection of human health
OEHHA Action Levels

- For ongoing, repeated exposures over weeks to years
- Animal study → MC dose where adverse impacts begin to appear (POD)

- Uncertainty Factors:
  - Animals → humans
  - Average → sensitive human
  - Incomplete data

- Safe Dose in Humans: POD ÷ UF
OEHHA Action Levels

- Exposure estimate
  - Child swimming in recreational waters 5 hrs each day

- Action Level:
  - Safe Dose in Humans
  - Exposure to Recreational Water
  - *Cyanotoxin Concentration in Water*

- Conservative Assumptions
# Microcystin

<table>
<thead>
<tr>
<th>Basis</th>
<th>Trigger (μg/L)</th>
<th>POD (μg/kg -d)</th>
<th>Total UF</th>
<th>Exposure</th>
<th>Study / Endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTION: OEHHA's Action Level</td>
<td>0.8</td>
<td>6.4</td>
<td>1000</td>
<td>5 hrs/day (250 ml)</td>
<td>Heinze 1999 / Liver Impacts</td>
</tr>
<tr>
<td>WARNING: Modified OEHHA AL</td>
<td>6</td>
<td>6.4</td>
<td>300</td>
<td>2 hrs/day (100 ml)</td>
<td>Heinze 1999 / Liver Impacts</td>
</tr>
<tr>
<td>DANGER: Risk Management</td>
<td>20</td>
<td>--</td>
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<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Basis</td>
<td>Trigger (μg/L)</td>
<td>POD (μg/kg-d)</td>
<td>Total UF</td>
<td>Exposure</td>
<td>Study / Endpoint</td>
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</tr>
<tr>
<td>CAUTION: Precautionary</td>
<td>Detect</td>
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<td>--</td>
</tr>
<tr>
<td>WARNING: OHA’s Guideline</td>
<td>20</td>
<td>100</td>
<td>1000</td>
<td>2 hrs/day (100 ml)</td>
<td>Fawell et al. 1999 / Neurotox</td>
</tr>
<tr>
<td>DANGER: OEHHA's Action Level</td>
<td>90</td>
<td>2,500</td>
<td>1000</td>
<td>5 hrs/day (250 ml)</td>
<td>Fawell et al. 1999 / Neurotox</td>
</tr>
</tbody>
</table>
# Cylindrospermopsin

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<thead>
<tr>
<th>Basis</th>
<th>Trigger (μg/L)</th>
<th>POD (μg/kg-d)</th>
<th>Total UF</th>
<th>Exposure</th>
<th>Study / Endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAUTION: Precautionary Approach</strong></td>
<td>1</td>
<td>--</td>
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<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>WARNING: OEHHA's Action Level</strong></td>
<td>4</td>
<td>33</td>
<td>1000</td>
<td>5 hrs/day (250 ml)</td>
<td>Humpage &amp; Falconer 2003 / Kidney Impacts</td>
</tr>
<tr>
<td><strong>DANGER: Modified OEHHA AL</strong></td>
<td>17</td>
<td>33</td>
<td>600</td>
<td>2 hrs/day (100 ml)</td>
<td>Humpage &amp; Falconer 2003 / Kidney Impacts</td>
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Next Steps

- Continue to take Suggestions for improvement
- Posting on the CCHAB webpage at: www.MyWaterQuality.ca.gov/monitoring_council/cyanohab_network
- Work with the CCHAB Network to update the remainder of the Voluntary Guidance Document
- Work with the CCHAB Network to develop the CCHAB Network Web Portal
Upcoming events

- April 13, 2016 – Next CCHAB Network Meeting
Questions and Comments

For questions contact:

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