Materials for Recreational Water Managers Interested in Monitoring for Cyanobacteria and Responding to Cyanobacterial Blooms
test - Cyanotoxins and Cyanobacterial Blooms in Recreational Waters

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- What are the Health Risks from Cyanobacteria and Cyanotoxins?
- What Causes Cyanobacteria and Cyanotoxin Levels to Increase?
- What Levels of Cyanotoxins are Safe in Recreational Waters?
- What Are States Doing to Protect the Public?
- What Are Some Visual Signs of a Cyanobacterial Bloom?
- What Should the Public Do if They See a Bloom?
- What Should a Recreational Waterbody Manager Do if a Cyanobacterial Bloom is Identified or Suspected?
- How Can a Public Health Official Be Prepared to Respond to a Cyanobacterial Bloom in the Future?
- What Can Be Done to Reduce the Frequency and Severity of Future Cyanobacterial Blooms?

What are Cyanotoxins and Cyanobacteria?

Cyanotoxins, such as microcystins or cylindrospermopsin, are produced by cyanobacteria, commonly referred to as blue-green algae. Cyanobacterial blooms are a specific type of growth which is sometimes referred to more generally as harmful algal blooms, or HABs, although HABs can refer to other types of bloom as well. Cyanobacteria are actually...
1-PAGE KEY COMPONENTS OF AN EMERGENCY RESPONSE PLAN

What Should a Recreational Waterbody Manager Do If a Cyanobacterial Bloom Is Identified or Suspected?

Recreational water managers should take action to confirm the presence of cyanotoxins and consider whether to notify partner agencies and the public, depending on the level of cyanotoxins present. They should follow key steps of an emergency response plan including:

1) Assess whether the bloom is producing cyanotoxins at levels potentially harmful to human or animal health.
   - For more information regarding how to determine whether the suspected bloom is harmful, see Recommendations for Cyanotoxin Monitoring in Recreational Waters.
   - For a list of laboratories in each state that conduct sample analyses for cyanobacteria and cyanotoxins, see State Resources.
   - For testing methods, see Detection Methods for Cyanobacteria and Cyanotoxins.
   - For an example of guidance from the State of Colorado on handling a harmful algal bloom, see the Colorado Lake and Reservoir Management Association’s Guidance Document for Harmful Algal Blooms in Colorado.

2) Notify key partners at the local and state level to coordinate a response.
   - For a list of possible partner agencies (such as poison control, veterinary facilities,
test – Recreational Water Communication Toolbox for Cyanobacterial Blooms

[pictures of blooms, beaches, marinas]

Purpose of the Toolbox

Recreational water managers should explore multiple pathways to communicate the cyanobacterial risks to swimmers, as well as owners of pets and livestock, including information about the symptoms potentially caused by exposure. Communication to the public may occur through signage at the recreational water, radio and TV announcements, and social media. Different messages should be tailored to the different levels of risk and contamination, for example, based on the different degrees of water contact in different types of recreation.

This toolbox provides tools and resources for communicating risk to the public about cyanotoxins in lakes, rivers or other bodies of water where people recreate. Recreational water managers should also be aware that toxins may be carried downstream and could still have effects downstream in coastal waters.

The communication toolbox (located right) is a ready-to-use, “one-stop-shop” to support states, tribes, territories, and local governments in developing, as they deem appropriate, their own risk communication materials. It includes editable social media posts, press release templates and other quick references.
SAMPLE SOCIAL MEDIA MESSAGES

SOCIAL MEDIA

RECREATIONAL WATER ADVISORY or CLOSURE ISSUED

TWITTER

- “WARNING—Water Contact Might Cause Illness. The water at [location] contains cyanotoxins at levels that could cause harm. Do not swim. For more information, see: [insert website link]”

- “[Location] is closed. The water at [location] contains cyanotoxins at levels that could cause harm. Avoid all contact with the water, foam or algae. For more information, see: [insert website link]”

FACEBOOK

- WARNING- cyanotoxins have been measured at [location] and could cause harm.
SAMPLE PRESS RELEASE

PRESS RELEASE

RECREATIONAL WATER CLOSURE LIFTED
FOR IMMEDIATE RELEASE
Media Contact: [insert name, title, telephone and fax number, and e-mail of spokesperson]


[LOCATION] [Month Date, Year] – Officials from [organization name] lifted the recreational water advisory in [area affected] issued on [date]. Water quality samples collected on [dates] showed [cyanotoxin name], a toxin produced by cyanobacteria (formerly known as blue-green algae), detected at [levels and/or ranges] on [dates]. This level is [less than or equal to] the state-designated recreational water health advisory levels for [cyanotoxin level]. Residents may resume recreating at [location].
**FREQUENTLY ASKED QUESTIONS**

**WHAT ARE CYANOBACTERIAL BLOOMS AND CYANOTOXINS?**

Cyanobacteria, also referred to as blue-green algae, are found naturally in lakes, rivers, ponds, and other fresh waters. When certain conditions exist, such as warm water containing an abundance of nutrients, they can multiply rapidly. Blooms, referred to as cyanobacterial blooms, can have negative impacts on the ecosystem, human and animal health, and on the economy. Some blooms are capable of producing toxins, called cyanotoxins, which can harm humans and animals.

**WHAT ARE THE HEALTH EFFECTS FROM CYANOTOXINS?**

Cyanobacteria and cyanotoxins have been shown to cause acute and chronic effects in humans and animals. Exposure to cyanotoxins is associated with eye irritation, respiratory irritation, and skin irritation. Symptoms can include sneezing, coughing, and wheezing, and eye irritation. Cyanotoxins that are ingested, inhaled, or absorbed through the skin can cause headaches, vomiting, and diarrhea.

**IS ANY CYANOBACTERIAL BLOOM POTENTIALLY DANGEROUS?**

Yes. Any cyanobacterial bloom potentially dangerous, and it is difficult to tell by looking at a bloom if it is producing toxins. To determine if a bloom is producing toxins, it needs to be tested. If a bloom has developed near recreational areas or drinking water intakes, testing should be considered as soon as possible.

**WHAT TYPES OF ALGAE ARE ASSOCIATED WITH TOXINS?**

In freshwater, cyanobacteria (formerly known as blue-green algae) are capable of producing toxins. Cyanobacteria can produce various types of toxins that can affect the skin, liver, and neurological functions. In addition, cyanotoxins are capable of producing toxins that have been responsible for the death of fish, wildlife, and humans. These toxins can be harmful to humans and animals.

**HOW MIGHT ONE BE EXPOSED TO CYANOTOXINS?**

Exposure to cyanobacteria and their toxins may occur by accidental ingestion or inhalation of bloom-contaminated water, or through contact during recreational activities (for example, swimming, wading, or boating).

**WHAT ARE THE RECREATIONAL SWIMMING GUIDELINES FOR CYANOTOXINS?**

EPA developed draft guidelines for cyanotoxins and cyanobacteria for states to consider as the basis for public health protection in recreational waters (see Table 1). Although these guidelines are intended...
SAMPLE SIGNAGE

CAUTION

Harmful algae may be present in this water. For your family’s safety:

- **You can swim in this water, but stay away from algae and scum** in the water.
- **Do not** let pets and other animals go into or drink the water, or eat scum on the shore.
- **Keep children away** from algae in the water or on the shore.
- **Do not** drink this water or use it for cooking.
- **For fish caught here, throw away guts and clean fillets** with tap water or bottled water before cooking.
- **Do not** eat shellfish from this water.

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

For information on harmful algae, go to mywaterquality.ca.gov/monitoring_council/cyanohab_network
For local information, contact:
Cyanobacteria Bloom Response Contact List

This contact list template is meant to prepare a recreational water manager or program to respond in the initial phase of a cyanobacterial bloom. Collecting contact information and establishing relationships with the organizations listed below prior to a bloom will allow for a quicker response or notification. Blank rows at the bottom of the table are for additional contacts, if necessary.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Function/responsibility</th>
<th>Contact Name</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory</td>
<td>Testing and analysis of cyanobacteria and toxins (see <a href="https://www.epa.gov/nutrient-policy-data/states-resources">https://www.epa.gov/nutrient-policy-data/states-resources</a>)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poison Control</td>
<td>May receive illness calls and should be alerted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency medical facilities</td>
<td>May need to provide medical services for people</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veterinary facilities</td>
<td>May need to provide medical services for pets and livestock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other water managers or water body users</td>
<td>Public drinking waters systems, other recreational locations, agricultural users</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Health Department</td>
<td>State-level organization that can provide health services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Department of Homeland Security and Emergency Response. (or its equivalent)</td>
<td>Provide resources for large-scale environmental or public health issues, such as flooding, a large toxic bloom, or avian flu.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How to Monitor Cyanotoxins in Recreational Waters

Step 1: Assess vulnerability of the water body to cyanobacterial blooms and prioritize recreational waters for monitoring

Protecting public health is the primary objective for a monitoring program. To meet this objective, recreational water program managers and public health officials should make every effort to sufficiently characterize the water body to better understand the potential for harmful blooms, and thus the adverse public health risk that might occur in these waters. Sometimes phytoplankton (which include cyanobacteria, macroalgae, dinoflagellates and other microorganisms) can grow to high cell densities and form blooms. These blooms may or may not be toxic. This document focuses on cyanobacterial blooms with the potential for harmful cyanotoxins (also known as harmful algae blooms or HABs). A bloom can have extremely high cell densities of cyanobacteria (extremely high densities are typically defined as greater than 20,000 to 100,000 cells per mL) (Loflin et al., 2008). High cell densities do not necessarily mean cyanotoxins are present; however, contact with some cyanobacterial cells can cause skin rashes.

1.1 Assess vulnerability of the water body to cyanobacterial blooms

Some recreational waters will have greater vulnerabilities than others based on the waterbody characteristics. Fast flowing, narrow, poor rivers are less vulnerable than nutrient-rich lakes and reservoirs. Existing water quality data can help to determine if the water body has had a history of blooms or bloom indicators such as high cyanobacterial cell counts or chlorophyll-a levels. Elevated nitrogen and phosphorus levels will be important to consider in a waterbody evaluation. Waterbody assessments, including a consideration of the predominant land use in the watershed and potential nutrient sources that may lead to cyanobacterial growth, will provide useful information for a system-specific evaluation. Similarly, climate and weather information such as water temperature and intensity of precipitation events will help to determine if conditions are conducive to increased levels of site-specific cyanobacterial growth currently and in the future.