

Detecting and Preventing Exposure to Harmful Algal Blooms in Recreational Waters: A Quick Guide for Health Departments and Operators



What are harmful algal blooms?



- Harmful algal blooms (HABs) are the overgrowth of toxin-producing algae or cyanobacteria that affect water quality and can cause harm to people, animals, and the environment. HABs can appear in both freshwater and saltwater, including rivers, lakes, ponds, and oceans. HABs can be identified by water appearing as green, brown, red, or gold in color, and foam, scum, paint, or mat-like appearances on a water surface. HABs in freshwater are commonly caused by blue-green algae.¹
- Not all algae and cyanobacteria are harmful. Globally, cyanobacteria are important because they produce oxygen needed to sustain life. There are also “nuisance blooms,” which can be visually seen, have an odor, or cause water or fish to have a bad taste. However, these blooms are not dangerous to people or animals because they are not toxin producing.²

Background

This quick reference guide can be used by local, state, tribal, and territorial health departments as a tool for understanding important recommendations for identifying, detecting, and preventing exposure to freshwater harmful algal blooms in recreational water. Please refer to the resources for additional information.

Common Freshwater HABs

Organism	Toxin
Cyanobacteria	Cylindrospermopsin
Microcystis	Microcystin
Anabaena, Aphanizomenon, and Nostoc sp.	Anatoxins, saxitoxins
Planktonthrix	Saxitoxins, microcystins

How are people exposed to toxins from HABs in recreational water?



People are exposed to toxins from HABs through accidental or deliberate ingestion, inhalation, or dermal exposure during recreational activities in contaminated water such as:

- Swimming
- Wading
- Fishing
- Boating



Exposure Route	Possible signs and symptoms
Swallowing water contaminated with cyanobacteria or toxin(s).	<p>Hepatotoxins and nephrotoxins</p> <ul style="list-style-type: none"> • Nausea, vomiting, diarrhea • Bad taste in mouth • Acute hepatitis, jaundice • Blood in urine or dark urine • Malaise, lethargic • Headache, fever • Loss of appetite <p>Neurotoxins</p> <ul style="list-style-type: none"> • Progression of muscle twitches • For saxitoxin, high doses may lead to progressive muscle paralysis.
Skin contact with water that is contaminated with cyanobacteria or toxin(s).	<ul style="list-style-type: none"> • Allergic dermatitis (including rash, itching and blisters) • Conjunctivitis
Inhaling aerosols contaminated with cyanobacteria or toxin(s).	<ul style="list-style-type: none"> • Upper respiratory irritation (wheezing, coughing, chest tightness, shortness of breath)

How can freshwater HABs be detected?³



- Qualitative, visual observations of bloom formations
 - » California's State Water Resources Control Board has a [visual quick guide](#) on differences in appearance between non-toxic algae and plants and cyanobacteria and HABs.⁴
- Detection of HABs' toxins in water without a visual bloom.
 - » Monitor for environmental factors such as changes in salinity in water, increase in carbon dioxide levels in water and air, changes in rainfall patterns, nutrient pollution, and warmer water temperatures, all of which can lead to an increase in HAB growth ([Climate Change and Freshwater Harmful Algal Blooms | US EPA](#)).⁵
 - » Monitor for cyanobacteria that do not produce visible blooms because they proliferate lower in the water column.
- Professional water testing for water quality parameters
 - » The EPA has a list of [State and Tribal HAB Monitoring Programs and Resources](#) along with a compilation of the cyanotoxin thresholds used to determine advisory decisions for recreational uses.⁶
 - » Here are a list of [Laboratories Approved by EPA to Support the Fourth Unregulated Contaminant Monitoring Rule \(UCMR 4\)](#).⁷
 - A fact sheet for specifically monitoring cyanotoxins is also available: [Fact Sheet: Cyanotoxin Assessment Monitoring on the Fourth Unregulated Contaminant Monitoring Rule | US EPA](#).⁸
 - These laboratories are approved to monitor water samples for nine cyanotoxins, one cyanotoxin group, and 20 additional water contaminants in public water systems specified by UCMR. ⁴
 - » EPA's [Selected Analytical Methods for Environmental Remediation and Recovery \(SAM\)](#) includes several methods and procedures for the detection of cyanotoxins in ambient freshwater.⁹
- Satellite Monitoring Data
 - » The EPA and National Oceanic and Atmospheric Administration (NOAA) offer near real-time satellite derived HAB data, assess trends, and develop forecasts.¹⁰
 - [Harmful Algal Blooms Monitoring and Remote Sensing Research | US EPA](#).¹¹
 - [Harmful Algal Bloom Monitoring System | NCCOS](#).¹²
 - » NOAA also offers an [HAB Event Response Program](#) to support state, tribal, and local officials managing HAB events.¹³
 - » EPA's CyAN network provides interpreted satellite data for many U.S. lakes:
 - [Cyanobacteria Assessment Network \(CyAN\) | US EPA](#).¹⁴

How can HAB exposures be reported?



Report exposures to the [One Health Harmful Algal Bloom System \(OHHABS\)](#), which collects data on human, animal, and environmental illnesses to help CDC and partners better understand and prevent HABs.²¹

How can exposure to HABs be prevented?



- Protect people by disseminating local advisories of waterbody closures to prevent them from visiting and participating in recreational activities in lakes, rivers, and ponds.¹⁵ Ensure that advisories are available for relevant non-English speaking populations.
- Additional resources from state departments of health to help develop public health advisories and share guidance with the public:
 - » [Cyanobacteria in Recreational Waters in Massachusetts: 2022 Local Board of Health Guidance | Massachusetts Department of Public Health](#).¹⁶
 - » [Harmful Algal Blooms in Freshwater Bodies | Massachusetts Department of Public Health](#).¹⁷
 - » [Blue-green Algae and Health | New York State Department of Health](#).¹⁸
 - » [Guide for Public Health Response to Cyanobacterial Harmful Blooms in Recreational Fresh Water of Texas | Texas Department of State Health Services](#).¹⁹
- Communicate information about how residents can spot blooms or monitor toxins.
 - » The EPA has [Infographics to Help Educate Public on HABs Basics](#) with messages and graphics that can be shared with the public on social media, websites, and blogs.²⁰
 - » Send out reminders about not filling swimming pools with water that directly comes from lakes, rivers, or ponds.

How are dogs and other pets affected by HABs?



Pets and livestock can get very sick and die after coming in contact with cyanobacterial toxins.

Exposure Route	Likely signs and symptoms (within minutes to hours)
Swallowing water that is contaminated with cyanobacteria or toxin(s) or licking it off fur or hair.	Hepatotoxins and nephrotoxins <ul style="list-style-type: none"> • Excess drooling, vomiting, diarrhea, • Foaming at mouth • Jaundice, hepatomegaly • Blood in urine or dark urine • Malaise • Stumbling • Loss of appetite • Photosensitization in recovering animals • Abdominal tenderness
	Neurotoxins <ul style="list-style-type: none"> • Progression of muscle twitches • For saxitoxin, high doses may lead to respiratory paralysis and death if artificial ventilation is not provided.
Skin contact with water contaminated with cyanobacteria or toxin(s).	<ul style="list-style-type: none"> • Rash, hives, allergic reaction



Public Health Advisory

Public guidelines for Harmful Algal Bloom (HAB) exposure in recreational water.



How to prevent exposure to HABs?

1. Protect yourself by following local advisories of water closures before visiting and participating in recreational activities in lakes, rivers, and ponds.
2. If you see any signs of a bloom, do not go into or play with the water.
3. Keep your animals and livestock protected from getting sick by preventing them from entering the water, drinking the water, grazing near HABs, or eating HAB mats.
4. Be cautious when fishing and consuming fish caught from waters where a bloom is occurring.
5. Do not fill swimming pools with water that directly comes from lakes, rivers, or ponds.

What do you do if you have been exposed to HABs?

1. Rinse off with tap water.
2. Reach out to your healthcare provider to manage symptoms.
3. Report illnesses to your local health department.
4. Call the poison control center hotline at 1-800-222-1222 for more information about illnesses associated with HAB exposure.
5. If you think your pet was exposed to an HAB, rinse them immediately with clean water and call your veterinarian if symptoms develop.
6. If you notice HABs in a body of water, contact your local park authority, public health department, environmental protection authority, or state environmental protection department.

Source: www.cdc.gov/harmful-algal-blooms/prevention/index.html

Flyer designed by the National Association of County and City Health Officials.



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Resources

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3. HAB Methods | US EPA. (<https://www.epa.gov/habs/hab-methods#determination>). Accessed April 2024.
4. Identifying a Harmful Algal Bloom (HAB) | California Water Quality Monitoring Council. (https://mywaterquality.ca.gov/habs/what/visualguide_fs.pdf). Accessed April 2024.
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[QUICK GUIDE]

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Have Questions?

Contact NACCHO at mahcnet@naccho.org.

NACCHO has compiled a list of resources from our partners and members to assist local health departments with anticipating, preventing, and responding to WASH emergencies. Information about HABs and cyanobacteria are included in this list. This information is available in our Water, Sanitation, & Hygiene Preparedness Resource Library (www.naccho.org/programs/environmental-health/hazards/water/water-sanitation-hygiene-preparedness-toolkit).

More detailed information on HABs, communication resources, data, and ongoing work can be found on CDC's website (www.cdc.gov/harmful-algal-blooms/about/index.html).



The mission of the National Association of County and City Health Officials (NACCHO) is to improve the health of communities by strengthening and advocating for local health departments.

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