



New Organizational and Emerging Policy Efforts USEPA National HAB Program

Michael Paul, PhD, USEPA

National HAB Program Lead

Presentation for

Oregon Lakes Association Meeting



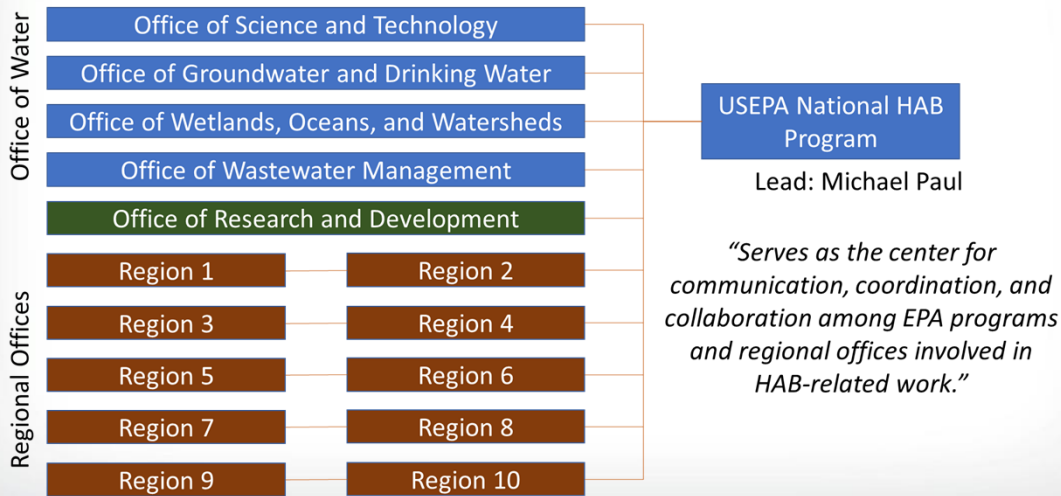
March 8, 2024

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USEPA National HAB Program – Improving Intra-agency HAB Coordination



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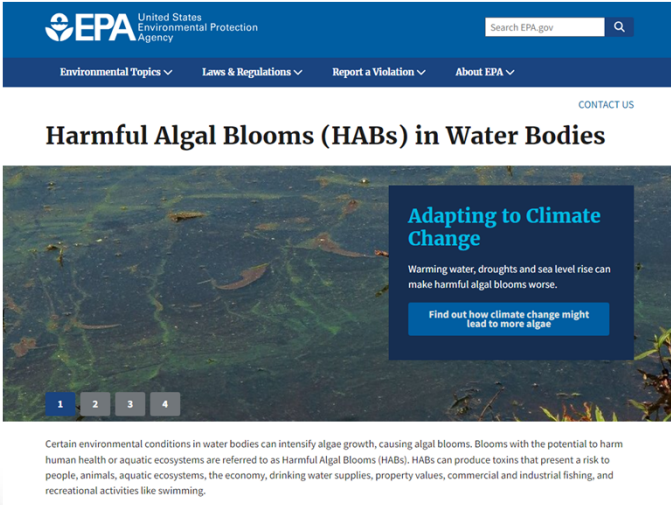
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- Monitor
- Forecast
- Control
- Response



<https://www.epa.gov/habs>

CONTACT US



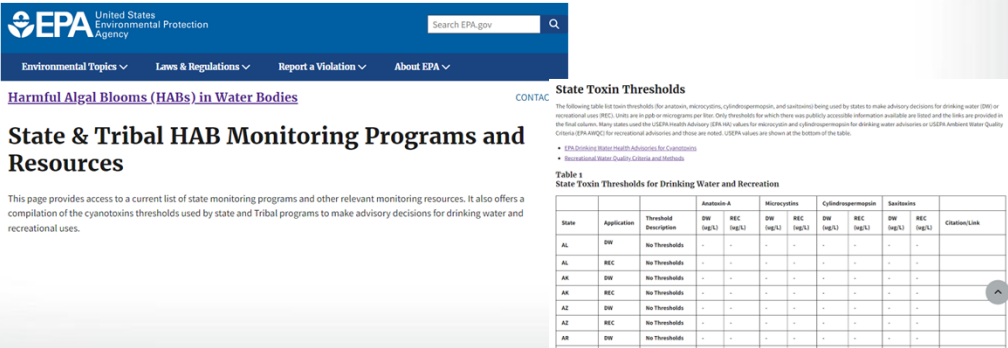
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Cyanotoxin	Drinking Water Health Advisory (10-day)	
	Bottle-fed infants and pre-school children	School-age children and adults
Cylindrospermopsis	0.7 µg/L	3.0 µg/L
Microcystins	0.3 µg/L	1.6 µg/L

Table. Recommended magnitude for cyanotoxins.


Microcystins	Cylindrospermopsis
8 µg/L	15 µg/L

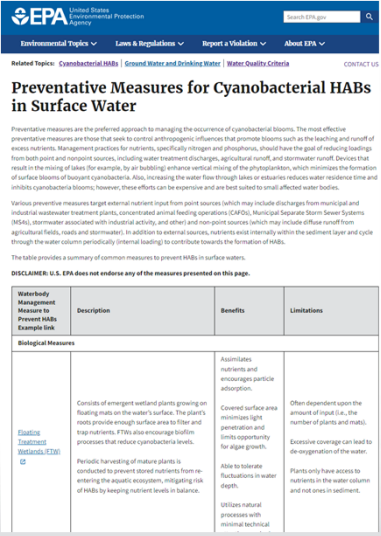




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Emerging HAB Topics

NC(=O)O[C@@H]1[C@H](N)C(=O)N[C@@H]1O

Saxitoxin HESD



United States Environmental Protection Agency


Office of Water
Mail Code 4304T
EPA-820R15104
June 2015

“The available data on toxicity are not adequate to derive a health-based value for anatoxin-a at the present time. EPA will reevaluate the ability to derive an HA for anatoxin-a as new information becomes available”

**Health Effects Support Document
for the Cyanobacterial Toxin
Anatoxin-A**

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Cyanobacteria Assessment Network Application (CyAN app)

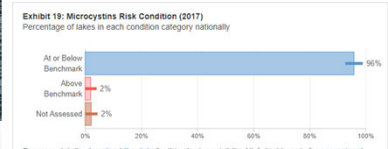


Make faster decisions related to cyanobacterial algal blooms




What was the condition in 2017?

Microcystins were detected in **21% of lakes** in 2017. The detection of **microcystins in the ecoregions** ranged from 2% to 58%. Levels exceeded EPA's recreational criterion in 2% of lakes, representing 4,400 lakes nationally, as shown below.



For more details, [download the data](#) for this chart, or visit the NLA dashboards for [ecoregional data](#) on microcystins risk.




[BECOME A BLOOMWATCH BETA TESTER](#)

[WHAT IS BLOOMWATCH?](#) [HOW DOES IT WORK?](#) [WHERE ARE THE BLOOMS?](#)

Cyanotoxins and the Safe Drinking Water Act: Drinking Water Protection Act, Contaminant Candidate List and the Unregulated Contaminant Monitoring Rule

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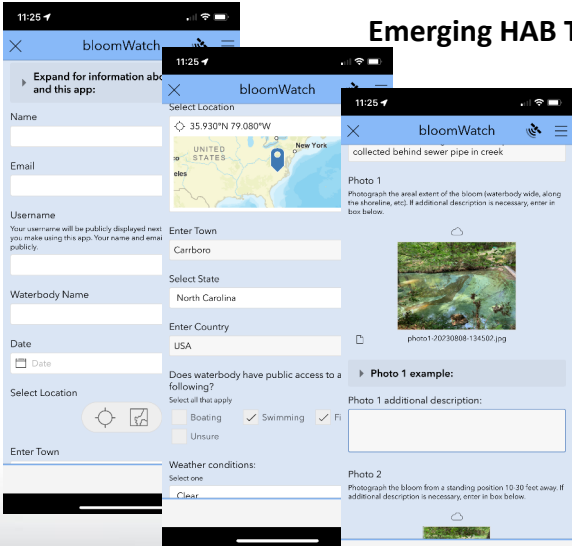
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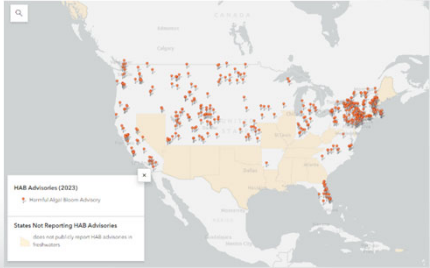
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Benthic HABs Discussion Group

Mission Statement:
The mission of this international collaborative is to accelerate mutual understanding of benthic HABs in rivers and lake sharing data and monitoring protocols, experiences and lessons learned.

Calendar of Webinars:


- [Benthic HABs Discussion October 17, 2023](#)

Contact Information:

Benthic HAB Workgroup Facilitators – Contact us to join the workgroup or to be a presenter!

Name	Affiliation	Contact Information
Eric Zimdars	U.S. Army Corps of Engineers	Phone: 206-764-3506 Email: Eric.S.Zimdars@usace.army.mil
Margaret Spoo-Chupka	Metropolitan Water District of Southern CA	Phone: 909-392-5127 Email: MSpoo-Chupka@mwdh2o.com
Keith Bouma-Gregson	U.S. Geological Survey	Phone: 510-230-3091 Email: kbouma-gregson@usgs.gov
Janice Alers-Garcia	US EPA, Washington, DC	Phone: 202-566-0756 Email: Alers-Garcia.Janice@epa.gov

* Disclaimer: The information presented in the Benthic HABs Discussion Group Webinars does not constitute an official endorsement by the U.S. government.




Developing Standardized Methods for Sampling, Analyzing and Assessing Benthic Harmful Algal Blooms

Innovative Science for a Sustainable Future

Background


Benthic harmful cyanobacterial blooms (HCBs) and their toxins pose a significant environmental threat to domestic animals, wildlife, and humans, and have impacted drinking water treatment operations in recent years. Specifically, rna and cattle deaths have recently experienced benthic HCBs. Researchers are looking to characterize locations on wadeable streams and wadeable areas of larger rivers where high exposure risks have the potential to occur, such as places where children and pets (i.e., dogs) play in water, wade, or have the potential



Related Info

[Past Benthic Webinars](#)


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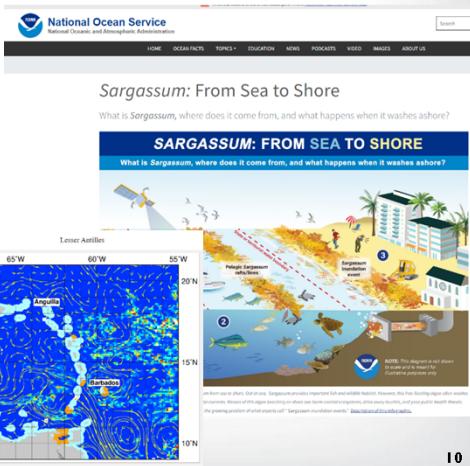


Sargassum Inundation Events (SIEs)

Related information in Spanish

Sargassum is a type of floating algae that forms large aggregations or floating mats in the ocean and is historically found in the Sargasso Sea, a region in the North Atlantic Ocean. Despite being a familiar sight on beaches along the Atlantic coast, Sargassum has gained significant attention from scientific and coastal communities since 2011 because of new, large aggregations of the algae outside of the Sargasso Sea. The area this new aggregation of Sargassum occupies has been named the Great Atlantic Sargassum Belt (GASB) and stretches from the west coast of Africa to the Caribbean and Gulf of Mexico.

When in abundance at sea, Sargassum is a foundational ecosystem species that provides habitat for diverse invertebrates, sea turtles, and sea birds. However, when large amounts of Sargassum from the GASB aggregate onto shore (also known as Sargassum inundation events- SIEs) these can harm human health, the environment, and when a large amount of beached Sargassum decomposes it can release gases that contribute to air and water quality issues.

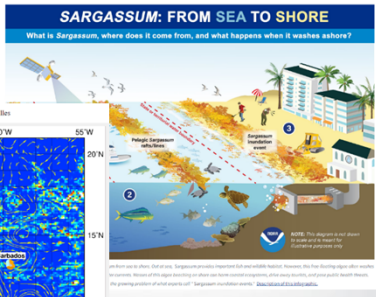
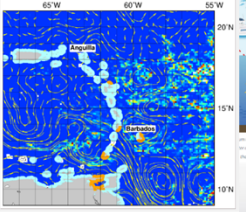


Sargassum: From Sea to Shore

What is Sargassum, where does it come from, and what happens when it washes ashore?

SARGASSUM: FROM SEA TO SHORE


What is Sargassum, where does it come from, and what happens when it washes ashore?

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Cyanobacteria Assessment Network Application (CyAN app)

Make faster decisions related to cyanobacterial algal blooms



Contents lists available at ScienceDirect

Journal of Environmental Management

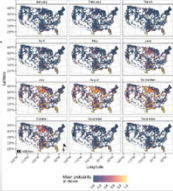
Journal homepage: www.elsevier.com/locate/jenvman

Research article

Forecasting freshwater cyanobacterial harmful algal blooms for Sentinel-3 satellite resolved U.S. lakes and reservoirs

Blake A. Schaeffer^{a,*}, Natalie Reynolds^b, Hannah Ferrity^b, Wilson Salls^c, Deron Smith^d, John M. Johnston^e, Mark Myer^f

^a US EPA, Office of Research and Development, Durham, NC, USA
^b RTI International, Research Triangle Park, NC, USA
^c Foss Tech, Research Triangle Park, NC, USA
^d US EPA, Office of Research and Development, Atlanta, GA, USA
^e US EPA, Office of Chemical Safety and Pollution Prevention, Durham, NC, USA



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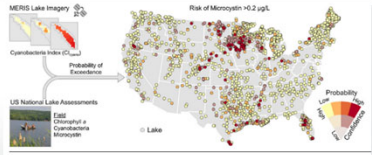
Science of the Total Environment


Journal homepage: www.elsevier.com/locate/scitotenv

Identifying lakes at risk of toxic cyanobacterial blooms using satellite imagery and field surveys across the United States

Amalia M. Handler^{a,*}, Jana E. Compton^a, Ryan A. Hill^a, Scott G. Leibowitz^a, Blake A. Schaeffer^b

^a Center for Public Health and Environmental Assessment, Office of Research and Development, U.S. Environmental Protection Agency, Corvallis, OR 97331, United States of America
^b Center for Environmental Measurement on...



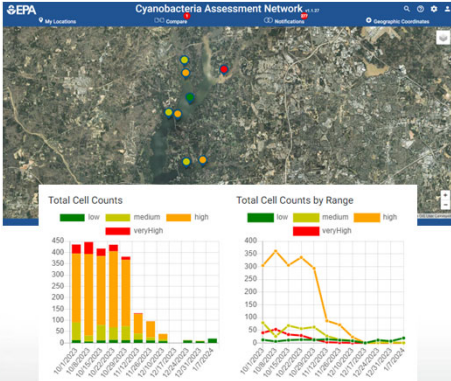


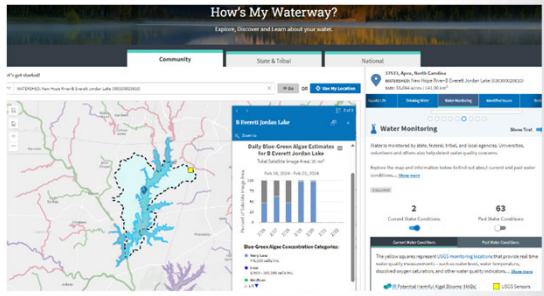
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Operationalizing CyAN Forecasts

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Summary of Cyanotoxins Treatment in Drinking Water

Conventional water treatment (coagulation, sedimentation, filtration and chlorination) can generally remove cyanobacterial cells and low levels of toxins. However, water systems may face challenges providing drinking water during a severe bloom event, when there are high levels of cyanobacteria and cyanotoxins in drinking water sources.

Once cyanobacteria and/or their cyanotoxins are detected in the surface water supplying the water system, the treatment system operators can act to remove or inactivate them in a number of ways. Some treatment options are effective for some cyanotoxins, but not for others. Effective management strategies depend on understanding the growth patterns and species of cyanobacteria that dominates the bloom, the properties of the cyanotoxins (i.e., intracellular or extracellular), and appropriate treatment processes. For example, oxidation of microcystin depends on the chlorine dose, pH and the temperature of the water. Applying the wrong treatment process at a specific state in treatment could damage cells and result in the release rather than removal of cyanotoxins.

The table below summarizes the effectiveness of different types of water treatment to remove intact cyanobacteria cells and treatment processes that are effective in removing extracellular dissolved toxins of several of the most important cyanobacteria. Drinking water operators are encouraged to monitor the treated water to confirm the removal of cyanotoxins.

A Summary of Cyanotoxin Treatment Processes and Their Relative Effectiveness

Treatment Process	Relative Effectiveness
Intracellular Cyanotoxin Removal (Intact Cells)	
Pre-treatment oxidation	Oxidation often inactivates or lyses cyanobacteria cells releasing the cyanotoxin to the water. If oxidation is required to meet other treatment objectives, consider using lower doses of an oxidant less likely to lyse cells. Oxidation at higher doses must be used at sufficiently high doses should be used to not only lyse cells but also destroy total toxins present (see extracellular cyanotoxin removal).
Coagulation/ Sedimentation/ Filtration	Effective for the removal of intracellular toxins (cyanobacteria cells). Ensure that captured cells accumulated in sludge are removed frequently to release toxins. Ensure that sludge supernatant is not

Control Measures for Cyanobacterial HABs in Surface Water

Measures can be employed that blooms have already occurred to control the phytoplankton blooming site and to remove blooms. The table provides a summary of the common physical and chemical measures for cyanobacterial blooms in surface waters and their respective effectiveness and limitations.

To learn more about ways to manage cyanobacterial blooms visit: [Recent Solutions for Managing Cyanobacterial Blooms: A Science Summary for Decision Makers \(2021\)](#) or the [HAB Strategies for Prevention and Mitigation Beyond Chemical Cyanobacterial Bloom Management Criteria Tool 2](#).

DISCLAIMER: U.S. EPA does not endorse any of the measures presented on this page.

A Summary of Waterbody Management Measures for Cyanobacterial Blooms

Waterbody Management Measure	Description	Effectiveness	Limitations
Physical Controls			
Aeration	Aerators operate by pumping air through a diffuser near the bottom of the waterbody, resulting in the formation of plumes that rise to the surface and create vertical circulation cells as they propagate upwards from the aerator. This mixing of the water column disrupts the behavior of cyanobacteria to migrate vertically in addition to limiting the accessibility of nutrients.	Successfully implemented in small ponds and waterbodies. May also provide more	Generally more efficient in deeper water columns. Also highly
Hydrologic manipulations	Manipulation of inflow/outflow of water in the system to disrupt stratification and control cyanobacterial growth.		
	Mechanical mixers are usually surface-		

Cyanotoxin Management Tools for Public Water Systems

The following resources can help public water systems plan for and manage cyanotoxins in their drinking water. Key resources provide information on treating, monitoring and communicating the risks of cyanotoxins in drinking water.

Preparing a cyanotoxin management plan

- [Recommendations for Public Water Systems to Manage Cyanotoxins in Drinking Water](#)
- [Cyanotoxin Management Plan Template and Example Plans](#)

Treating cyanotoxins

- [Water Treatment Optimization for Cyanotoxins Document](#)
- [Comprehensive Performance Evaluation Protocol to Address Harmful Algal Blooms and Associated Cyanotoxins](#)
- [Summary of Cyanotoxin Treatment in Drinking Water](#)
- [Practical and Promotional Information for Drinking Water Systems Fact Sheet](#)

Determination of Cyanotoxins in Drinking and Ambient Freshwaters

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US Army Corps of Engineers

USACE Freshwater Harmful Algal Bloom Research and Development Initiative



Low-energy ultrasound

One P21-start project led by The Ohio State University (OSU) will explore energy-efficient ultrasound with hydrogen peroxide treatment has potential to increase effectiveness of existing cyanobacteria cells in treatment plants will be replaced in another P21-start.



treating overwinter preventative treatment in

can "seed" the next HAB event

Efficacy of Algaecides and Novel Ozone Nanobubble Technology on Prevention and Management of HABs

Lead: Heather Raymond, The Ohio State University

In Situ Evaluation of Peroxide Treatments Applied to HABs

Lead: Richard Co-Lead: Ait

USACE Harmful Algal Bloom Research & Development Initiative

Delivering scalable freshwater HAB prevention, detection, and management technologies through collaboration, partnership, and cutting-edge science.

A Novel Biological Control Approach for Cyanobacteria

Lead: Dr. Karl J. Indest, ERDC, Karl.J.Indest@usace.army.mil


Rapid Response and Management of HABs through Peroxide-based Algaecide Studies

Co-PI: Kurt Getsinger, ERDC, Kurt.D.Getsinger@usace.army.mil
Co-PI: Benjamin Sperry, ERDC, Benjamin.P.Sperry@usace.army.mil

USACE Harmful Algal Bloom Research & Development Initiative

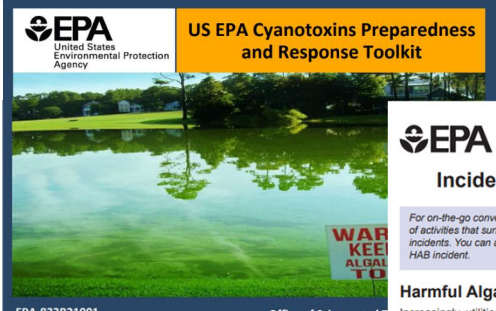
Delivering scalable freshwater HAB prevention, detection, and management technologies through collaboration, partnership, and cutting-edge science.

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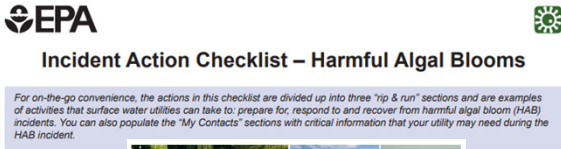


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US EPA Cyanotoxins Preparedness and Response Toolkit



Incident Action Checklist – Harmful Algal Blooms

For on-the-go convenience, the actions in this checklist are divided up into three "rip & run" sections and are examples of activities that surface water utilities can take to: prepare for, respond to and recover from harmful algal bloom (HAB) incidents. You can also populate the "My Contacts" sections with critical information that your utility may need during the HAB incident.

Monitoring and Responding to Cyanobacteria and Cyanotoxins in Recreational Waters

This information is intended for recreational waterbody managers, which may include public health officials, lake managers, or other state, local or tribal officials, involved in monitoring water quality and protecting the health of people and animals that use waterbodies within their jurisdiction.

DISCLAIMER: This information does not impose legally binding requirements on EPA, states, tribes, or the public, nor does it confer legal rights. It does not constitute a regulation, nor does it change or substitute for any Clean Water Act provision or EPA regulation. Any mention of trade names, products, or services does not convey and should not be interpreted as conveying official EPA approval, endorsement, or recommendation for use.

On this page:


- [Investigation of a Cyanobacterial Bloom](#)
- [Developing an Emergency Response Plan for Cyanotoxins](#)

Harmful Algal B

Increasingly, utilities face drinking water to their cu

Related Information

- [Communication about Cyanobacterial Blooms in Recreational Waters](#)
- [Treatment, Pollution Policy, and Data](#)
- [Recreational Water Quality Criteria or Swimming Advisories for Cyanobacteria](#)
- [Final Technical Support Document: Implementing 2003 Recommended Recreational Criteria on Swimming Advisories for Microcystins and Cylindrocapsa](#)



RECREATIONAL WATER CLOSURE ISSUED

FOR IMMEDIATE RELEASE

Media Contact: [Insert name, title, telephone and fax number, and e-mail of spokesperson]

WHY IS THERE A CLOSURE?

- [Cyanotoxin or cyanobacteria name], a toxin produced by cyanobacteria (formerly known as blue-green algae) was detected in the water at levels that could cause harm at [location] on [date].
- Samples collected on [date] show [cyanotoxin or cyanobacteria name] at [location] at [levels and/or range], which are above the state-designated recreational water health advisory levels.


WHAT SHOULD I DO?

- Do not swim, wade or come in contact with the water, solum, foam or algae at [location].
- Seek medical attention if you or family members are experiencing illness after swimming or playing in water. Recreational waters containing [cyanotoxin or cyanobacteria name] at levels exceeding the state's guidelines for issuing a Health Advisory can put you at risk of various adverse health effects including upset stomach, vomiting and diarrhea. Exposure to concentrations of cyanotoxins higher than the state's guideline values could potentially result in more serious illnesses, including liver or kidney damage.
- Animals may be vulnerable to adverse health effects of [cyanotoxin or cyanobacteria name] if they drank or ate indicated above. Contact a veterinarian if animals show signs of illness.
- If you, your family members or your animals have experienced adverse [cyanotoxin- or cyanobacteria-related] health effects, please contact [State or local Health Department] to report the illness.

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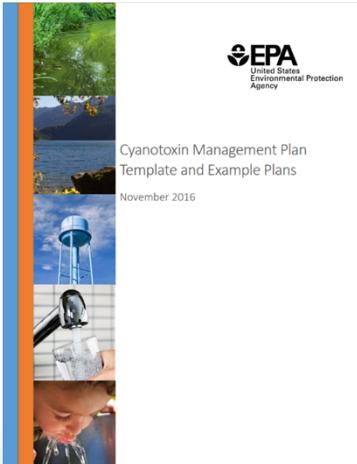
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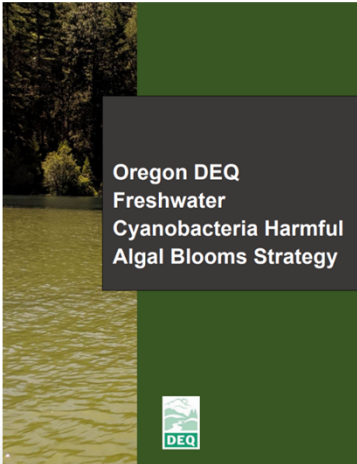
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Cyanotoxin Management Plan Template and Example Plans

November 2016



Oregon DEQ Freshwater Cyanobacteria Harmful Algal Blooms Strategy

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Contact:
Michael J. Paul, USEPA
202-564-1665
paul.michael@epa.gov
<https://www.epa.gov/cyanoabs>

12th U.S. Symposium on Harmful Algae
October 27-November 1, 2024
Holiday Inn Portland by the Bay in Portland, Maine.

<https://neiwpsc.org/events/ushab12/>

Search: US HAB Meeting 2024

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