EPA United States Environmental Protection Agency

September 2021

Harmful Algal Blooms (HABs) Newsletter

In this issue

More HABs information is available on EPA's CyanoHABs in Water Bodies website

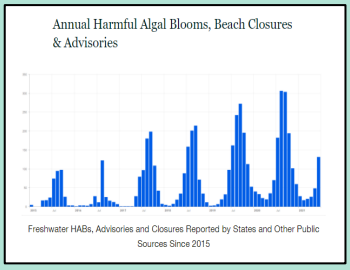
EPA Updates!

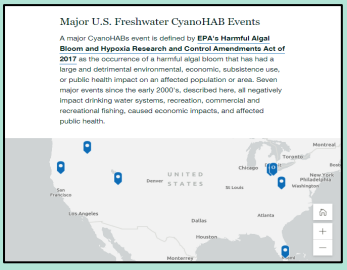
HABs Research, Resources, and Tools

Tracking CyanoHABs Story Map

On Aug. 13, 2021, EPA published an ArcGIS StoryMap that allows the public to learn about and track reported cyanobacterial HABs (cyanoHABs) in freshwaters across the country.

EPA's *Tracking CyanoHABs Story Map* creates a single online resource for information about cyanoHAB events across the U.S. It consolidates freshwater advisory and closure information from state environmental and health agencies into user-friendly, interactive maps. In addition, the story map includes links to information on freshwater HABs causes and effects; several EPA tools on HABs preparedness and response; and state and local HAB resources such as the laboratories that perform analysis of water samples for cyanotoxins. These maps can help the public better understand the occurrence of cyanoHAB events and may assist in further exploring the causes of cyanoHAB formation.





ADDITIONAL EPA RECENTLY RELEASED RESOURCES

Recommended Nutrient Criteria for Lakes and Reservoirs

On August 13, 2021, EPA published revised ambient water quality criteria to address nutrient pollution in lakes and reservoirs. These Clean Water Act section 304(a) recommended ambient water quality criteria are part of EPA's ongoing effort to help states, territories, and authorized Tribes in adopting numeric nutrient criteria into their water quality standards to protect public health and aquatic life from the adverse effects of nutrient pollution and harmful algal blooms. The criteria are based on the latest science and replace EPA's previously recommended criteria for lakes and reservoirs that were published in 2000 and 2001. EPA developed national statistical models that provide a flexible approach for identifying appropriately protective numeric nutrient criteria. States, territories, and authorized Tribes can use the national models or incorporate local data into them to help develop numeric nutrient criteria that are consistent with national relationships while accounting for unique local conditions. EPA stands ready to assist states, territories, and authorized Tribes through the Nutrient Scientific Technical Exchange Partnership & Support (N-STEPS) program.

Final Technical Support Document: Implementing the 2019 Recommended Recreational Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin

To help states, territories and authorized Tribes protect swimmers from two cyanotoxins produced by cyanoHABs, EPA also published *Final Technical Support Document: Implementing the 2019 Recommended Recreational Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin* on August 13, 2021. This document explains how states, territories, and authorized Tribes may adopt EPA's 2019 recommended criteria for the two cyanotoxins into their water quality standards or use the criteria in swimming advisory programs. The document also addresses implementation of the 2019 criteria recommendations through other Clean Water Act programs including identifying and listing of impaired waters, and Total Maximum Daily Load development.

New National Coastal Condition Assessment (NCCA) Data

EPA has published a new report as a part of the National Aquatic Resource Surveys dataset, *National Coastal Condition Assessment: A Collaborative Survey of the Nation's Estuaries and Great Lakes Nearshore Waters*, its accompanying *NCCA 2015 Technical Support Document* (TSD), and an updated NCCA Data Dashboard and webpage. The report includes key indicators relevant to ecological condition and human health. In the summer of 2015, EPA and its partners visited a total of 1,060 randomly selected sites in 28 coastal states (excluding Alaska and Hawaii): 699 sites in estuaries and 361 in the Great Lakes, representing about 27,479 square miles and 7,118 square miles of coastal waters, respectively. This summary includes four indicators for ecological health and three indicators related to the recreational use of these essential resources. Visitors to the NCCA dashboard can explore the eutrophication index and component metrics (dissolved inorganic nitrogen, dissolved inorganic phosphorus, dissolved oxygen, chlorophyll *a* and water clarity) of the Gulf of Mexico across its full extent.

NEWS

Proceedings of the Interagency Virtual workshop "Harmful Algal Bloom (HAB) Preparedness & Response"

The two-day workshop, held on April 27 -28, 2021, focused on HAB preparedness and response capabilities and responsibilities across the Federal Interagency Working Group on Harmful Algal Bloom and Hypoxia Research and Control Act (IWG – HABHRCA) members and select state agencies. Following the workshop, a half-day virtual tabletop exercise was held on April 29, 2021, to understand the resources, expertise, capabilities, roles, and responsibilities of IWG-HABHRCA federal agencies and select state agencies related to a HAB event. Additionally, the exercise facilitated discussions on current plans, policies, and procedures in place to effectively manage a cross-agency, coordinated response. View the workshop proceedings.

EPA Project to Characterize Toxic Benthic Cyanobacteria

Benthic cyanobacterial blooms can contain high concentrations of neurotoxins like anatoxin-a, homoanatoxin-a, dihydroanatoxin-a and dihydrohomoanatoxin-a, that can cause death, when ingested, via asphyxia from respiratory paralysis. Little is known about the compositions of toxic benthic cyanobacterial blooms, species or genotypes and other ecological aspects nationwide. EPA's Office of Research and Development (ORD) Center for Environmental Measurement & Modeling initiated a project to examine the toxic species compositions, genotypes, toxigenic genes, and other ecological aspects of benthic cyanobacterial blooms, and to understand their distribution nationwide.

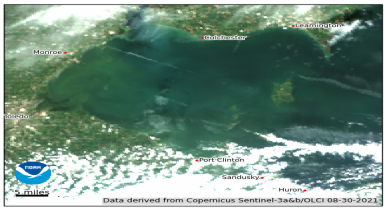
EPA's ORD is interested in collecting samples of benthic cyanobacterial blooms affecting freshwater bodies. If USEPA Regional Offices, State, or Tribal Environmental Programs would like to provide a benthic bloom sample, ORD suggests the following steps for collecting and shipping samples:

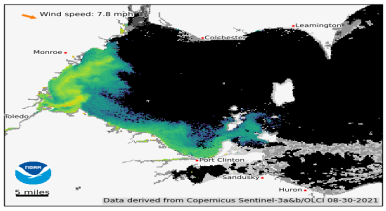
- Scrape three (3) small areas (ca. 2-5 cm diameter, depending on the thickness or biomass of algal mat) using a disinfected spatula. Record the actual dimeters or areas measured.
- Place the samples separately into a 15 mL centrifuge or conical tube, which contains ~5 mL water filled from the place where the benthic algae grow.
- Stored the samples on ice before returning to a laboratory or during shipping, and freeze (-20°C) prior to further analysis.
- Record water quality parameters (e.g. dissolved oxygen, temperature, pH, conductivity and secchi depth, etc.) as well as nutrient data if available.

Ship the samples to:

Ian Struewing,
26 W. Martin Luther King Drive (MS:587)
Cincinnati, OH 45268

For more information please contact Dr. Jingrang Lu at Lu.Jingrang@epa.gov





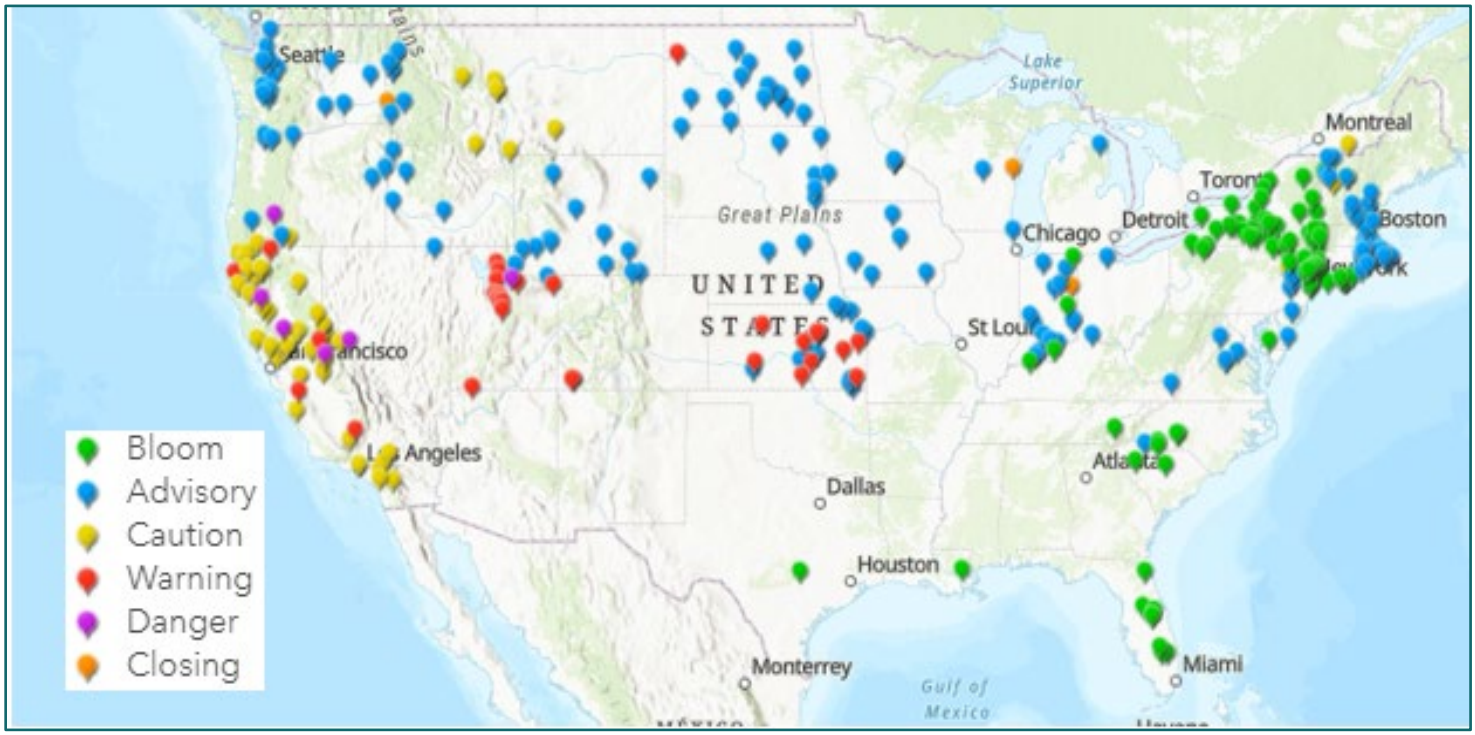
Lake Erie HABs Forecast

View seasonal forecasts for cyanobacterial blooms in Lake Erie provided by NOAA.

Reported Blooms, Beach Closures, and Health Advisories* - August 2021

**Includes blooms, cautions, warnings, public health advisories, closings, and detections over state thresholds due to the presence of algae and or/toxins. This is not a comprehensive list; not all blooms have been reported and /or not all lakes are actively monitored.*

The map below displays the monthly freshwater HABs and advisories reported by states. Go to the interactive ***Tracking CyanoHABs* Story Map** to access the data points and for more information.



States reporting blooms for the month of August 2021

California (58), Colorado (2), Florida (8), Idaho (14), Indiana (18), Iowa (5), Kansas (23), Louisiana (1), Maryland (1), Massachusetts (18), Michigan (1), Minnesota (3), Montana (7), Nebraska (4), New Hampshire (10), New Jersey (9), New York (75), North Carolina (4), North Dakota (17), Ohio (1), Oregon (4), Rhode Island (13), South Carolina (4), South Dakota (6), Texas (1), Utah (12), Vermont (10), Virginia (4), Washington (20), Wisconsin (3)

Upcoming Virtual Events

19th International Conference on Harmful Algae
October 10 -15, 2021 La Paz, B.C.S. (live and virtual)

CERF 2021 – November 1-4 and 8-11, 2021
Impact of Climate Change on Harmful Algal Blooms

SETAC North America 42nd Annual Meeting
November 14-18, 2021. Pelagic and Benthic HABs: The detection, fate, effects, monitoring, and management of blooms and their associated toxins

2nd Annual Virtual Harmful Algal Bloom Symposium
January 6-7, 2022. Emerging Research & Case Studies

12th International Conference on Toxic Cyanobacteria
May 22-27, 2022 in Toledo, Ohio

Useful Resources

EPA announces the availability of a ***Data Export Tool for EPA's Sanitary Survey App for Marine and Fresh Waters***. This new tool makes downloading data quick and easy because it includes all data and photos for one or more surveys in one file.

Read more information and instructions on the Data Export Tool.

Protect yourself and your pet by avoiding **#HarmfulAlgalBlooms**

Here are some common signs:
- Looks slimy or foamy
- Has a strange color like blue, green, brown, or red
- Produces a bad smell

Watch EPA's *Algal Blooms Can Harm Your Health* video

Recently Published Articles*

Allium sativum mitigates oxidative damages induced by Microcystin-LR in heart and liver tissues of mice
Leila Ait Abderrahim, Khaled Taibi, Mohamed Boussaid, Baker Al-Shara, Nawel Ait Abderrahim, Sabrina Ait Abderrahim, Toxicon, Volume 200, 2021, Pages 30-37.

Rapid detection and quantification of microcystins in surface water by an impedimetric immunosensor
Abraham O. Ogungbile, Idan Ashur, Itzik Icin, Orr H. Shapiro, Sefi Vernick, Sensors and Actuators B: Chemical, 2021, 130687.

Fish tissue accumulation and proteomic response to microcystins is species-dependent
René S. Shahmohamadloo, Xavier Ortiz Almirall, Denina B.D. Simmons, David G. Poirier, Satyendra P. Bhavsar, Paul K. Sibley, Chemosphere, Volume 287, Part 1, 2022,132028.

Chlorophyll a as an indicator of microcystin: Short-term forecasting and risk assessment in Lake Erie
Song S. Qian, Craig A. Stow, Freya E. Rowland, Qianqian Liu, Mark D. Rowe, Eric J. Anderson, Richard P. Stumpf, Thomas H. Johengen, Ecological Indicators, Volume 130, 2021,108055.

Characterizing algal blooms in a shallow & a deep channel
Maryam R. Al-Shehhi, David Nelson, Rashed Farzanah, Rashid Alshihi, Kourosh Salehi-Ashtiani, Ocean & Coastal Management, Volume 213, 2021, 105840.

Environmental window of cyanobacteria bloom occurrence
Oscar Dario Beltran-Perez, Joanna J. Waniek, Journal of Marine Systems, 2021, 103618.

High-resolution temporal detection of cyanobacterial blooms in a deep and oligotrophic lake by high-frequency buoy data
Manxue Zhang, Yunlin Zhang, Jianming Deng, Miao Liu, Yongqiang Zhou, Yibo Zhang, Kun Shi, Cuiling Jiang, Environmental Research, Volume 203, 2022, 111848.

Impacts of storm events on chlorophyll-a variations and controlling factors for algal bloom in a river receiving reclaimed water
Anran Liao, Dongmei Han, Xianfang Song, Shengtian Yang, Journal of Environmental Management, Volume 297, 2021, 113376.

Antibiotic-accelerated cyanobacterial growth and aquatic community succession towards the formation of cyanobacterial bloom in eutrophic lake water
Sijia Xu, Yunhan Jiang, Ying Liu, Jian Zhang, Environmental Pollution, Volume 290, 2021,118057.

**Articles are retrieved monthly from Science Direct research database searching for the following key words: cyanobacteria, cyanotoxins, harmful algal blooms, and HAB(s).*

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