

EPA's Activities on Harmful Algal Blooms OLA Annual Meeting

Rochelle Labiosa, Ph.D.
U.S. Environmental Protection Agency
Region 10 Seattle, WA

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EPA's Approach to Addressing HABs

Interdisciplinary Approach

- Ecologists
- Microbiologists
- Toxicologists
- Epidemiologists
- Chemists
- Hydrologists
- Biologists
- Oceanographers
- Modelers and Statisticians
- Engineers
- Taxonomists
- Public Health Specialists
- Economists
- Veterinarians



EPA R10 HABs program - overview

- EPA R10 – AK, ID, OR, WA and 271 Tribal Nations.
- Two Central POCs in Region 10 - HABs coordinator for national programmatic work and regional ambient waters program; and drinking water treatment lead. Multiple staff assist with HABs program implementation
- Region 10 Lab has EPA analytical methods set up to run ambient and drinking water samples for three toxins: cylindrospermopsin, anatoxin-a, total microcystins. Third party accredited.
- Primary goal of EPA regional HABs program is to assist state and tribal partners in building capacity to effectively respond to and manage HABs issues. We track events and help provide technical support and assistance. Conduct regional research projects to further inform our understanding.

Guidance Recommendations for Cyanotoxins

Drinking Water Health Advisories - June 2015

- Microcystins and Cylindrospermopsin
- HAs are non-regulatory guideline values set at levels anticipated to not create adverse health effects for specific exposure durations.
- Bottle-fed infants and pre-school children: MCs 0.3 µg/L and CYL 0.7 µg/L
- School-age children and adults: MCs 1.6 µg/L and CYL 3 µg/L

Recommended Human Health Recreational Ambient Water Quality Criteria/Swimming Advisories – May 2019

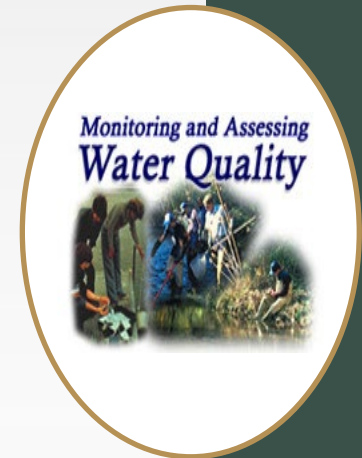
- Microcystins and Cylindrospermopsin
- MCs 8 µg/L and CYL 15 µg/L



Ambient Water Assessment

National Aquatic Resource Surveys (NARS)

- The National Aquatic Resource Surveys (NARS) are collaborative programs between EPA, states, and tribes
- They are nationally-consistent studies of the nation's aquatic resources, designed to report on the condition of lakes, rivers/streams, coastal waters and wetlands.
- Survey parameters: Indicators associated with the presence of blooms and some cyanotoxins.
- National Lakes Assessment occurred in 2022
- National Rivers and Streams Assessment will occur 2023-2024



EPA's Ambient Water Quality Criteria to Address Nutrient Pollution in Lakes and Reservoirs

- EPA published updated national nutrient criteria recommendations for lakes and reservoirs in 2021
- Hypoxia, microcystins, and zooplankton models can be used to derive chlorophyll *a* criteria, in turn used to derive TN and TP criteria
- Models are stressor-response based
- Models were updated in 2022
- FAQs under development

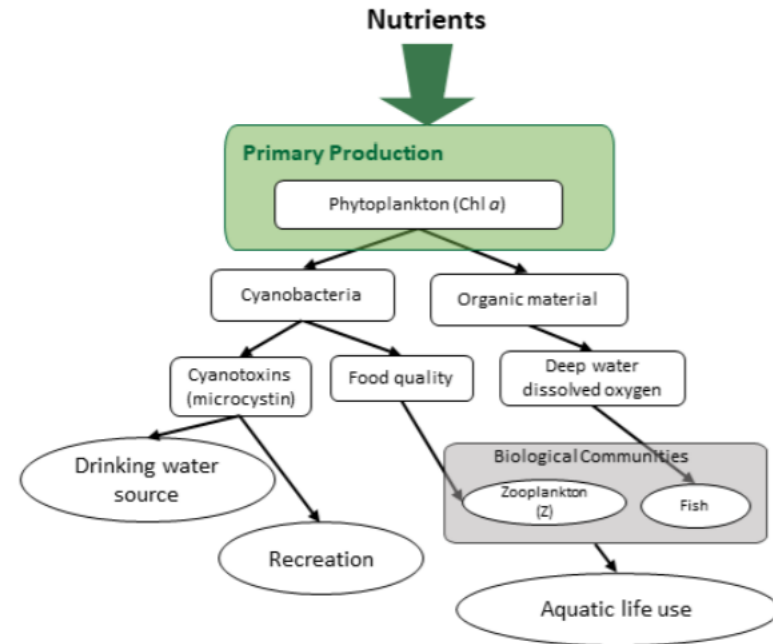


Figure 3. Simplified conceptual model showing pathways selected for analysis.

<https://www.epa.gov/nutrient-policy-data/ambient-water-quality-criteria-address-nutrient-pollution-lakes-and-reservoirs>

Bipartisan Infrastructure Law Funding Allocated to EPA

FACT SHEET: EPA & The Bipartisan Infrastructure Law

November 6, 2021

Following the passage of the historic Bipartisan Infrastructure Investment and Jobs Act, the U.S. Environmental Protection Agency (EPA) will be making significant investments in the health, equity, and resilience of American communities. With unprecedented funding to support our national infrastructure, EPA will improve people's health and safety, help create good-paying jobs, and increase climate resilience throughout the country.

The single largest investment in water that the federal government has ever made.

News Releases: [Region 10](#)

[CONTACT US](#)

Biden-Harris Administration Announces \$18M in Bipartisan Infrastructure Law Funding to Address Emerging Contaminants like PFAS in Drinking Water in Oregon

February 16, 2023

Contact Information

EPA Region 10 Public Affairs Office (r10_press_team@epa.gov)

[CONTACT US](#)

News Releases: [Region 10](#)

Biden-Harris Administration Announces \$26M for Clean Water Infrastructure Upgrades Through the Bipartisan Infrastructure Law in Oregon

Nearly half of funding for states, Tribes, and territories is available as grants and forgivable loans for critical water infrastructure projects that will help underserved communities across the country

February 24, 2023

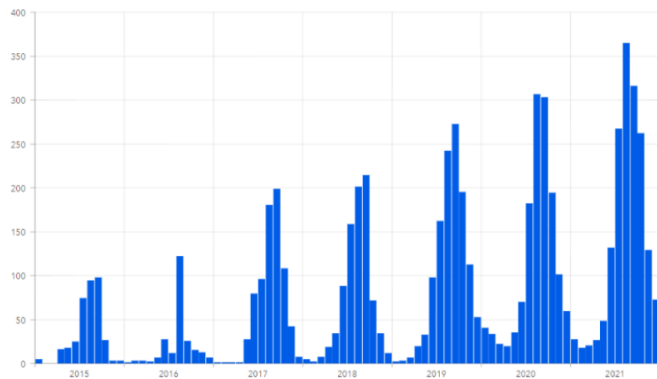
State & Tribal Grants	55.426 billion
Clean Water State Revolving Fund Traditional	11.713 billion
Drinking Water State Revolving Fund Traditional	11.713 billion

<https://www.epa.gov/infrastructure/fact-sheet-epa-bipartisan-infrastructure-law> funding allocated over 5 years; started in FY 22

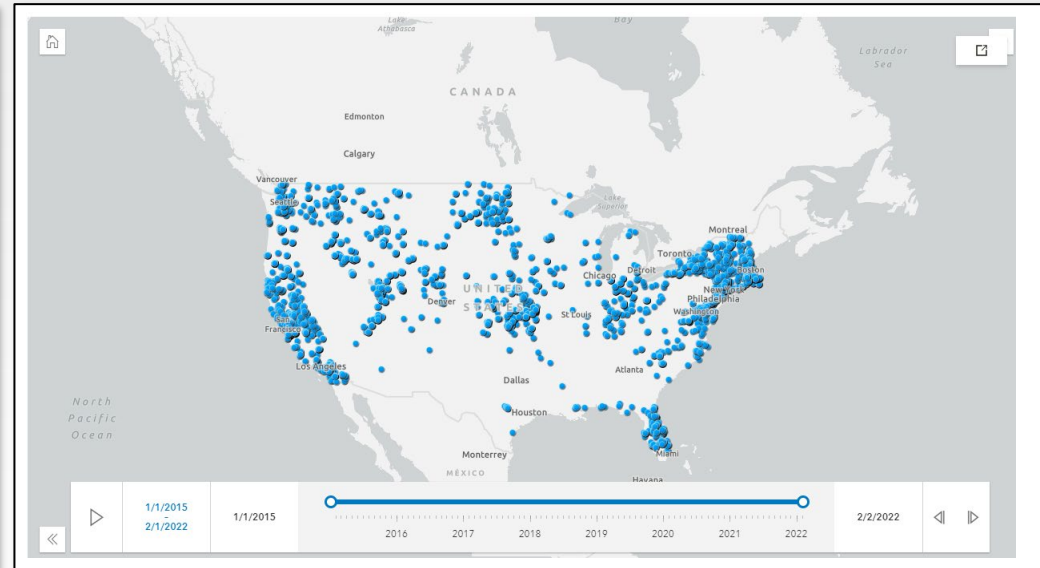
[Clean Water State Revolving Fund FAQs on Emerging Contaminants](#)- includes certain HABs controls

EPA HABs Storymap with Advisories Timeseries

Annual Harmful Algal Blooms, Beach Closures & Advisories



Freshwater HABs, Advisories and Closures Reported by States and Other Public Sources Since 2015



<https://storymaps.arcgis.com/stories/d4a87e6cfd44d6ea7b97477969cb1dd>

Additional recent national program developments and tools

- Final [CCL5](#) (2022) includes cyanotoxins (as a group)
 - Draft CCL 6 update - February 17, 2023 - EPA is requesting nominations of chemicals, microbes, or other substances for consideration on the Draft CCL 6. The public may nominate contaminants by following the instructions contained in the Federal Register notice for CCL 6 nominations. The deadline for nominations is April 18, 2023.

[Federal Register Notice: Drinking Water Contaminant Candidate List 6 - Nominations](#)

- [EPA's CyanoHABs Website](#)
- [EPA's Benthic HABs Discussion Group](#)
- [EPA Memorandum on Nutrients – April 5, 2022](#)

2022 Reported Freshwater HABs Advisories

- In the PNW, ID, OR, WA have monitoring and response programs for freshwater HABs; OR only state with drinking water regulations for state-identified vulnerable Public Water Systems
- 2022: ~140 waterbodies with detections with ~16 raw water intakes for PWS with detects (no do not drink advisories issued)

	WA	OR	ID	R10 Totals
Total Active/State	1	1	2	4
Total Lifted/State	26	4	15	45
2022 Total Events				49

Note – almost all event monitoring is responsive for cyanotoxins after observed scum/identified bloom and limited to peak bloom period for most waters, May-Nov. That is why we say, “when in doubt, stay out”

Regional HABs Research: CyAN Web App Features & Data Provision

- Development of CyAN satellite data [web app](#) data display tools for CONUS

Cyanobacteria Assessment Network Application (CyAN app)

Make faster decisions related to cyanobacterial algal blooms

EPA's Cyanobacteria Assessment Network mobile application (CyAN app) is an easy-to-use and customizable app that provides access to cyanobacterial bloom satellite data for over 2,000 of the largest lakes and reservoirs across the United States. EPA scientists developed the app to help local and state water quality managers make faster and better-informed management decisions related to cyanobacterial blooms.

Compatibility and Availability

The CyAN app is available as two versions: CyANWeb app and the CyAN Android™ app. Both are free apps that require an internet connection and provide the same information using different platforms. The CyANWeb app is a web browser-based interface available on EPA's website that will work with any operating system and is compatible with most devices. The CyAN Android™ app is available for download on Google Play™ and is designed for use on Android™ devices; it is compatible with

On this Page

- [Compatibility and Availability](#)
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CyANWeb app:

https://qed.epa.gov/cyanweb/account

EPA CyAN v1.1.27

User Name * Password *

Login Create New User Reset Password

Cyanobacteria Assessment Network (CyAN)

This experimental web application provides provisional satellite derived measures of cyanobacteria, which may contain errors and should be considered a research tool. Users should refer to the app help menu for more details. The focus of this application is to provide cyanobacteria measures for larger lakes and reservoirs within the contiguous United States. Data products are 7-day maximum cyanobacteria measures updated weekly and, beginning late July 2020, daily snapshots of cyanobacteria measures updated every day.

Some example enhancements - On the fly time series visualization, and data export by polygon (multiple waters)

- AK and other states' CyAN data available on NASA's site:
https://oceandata.sci.gsfc.nasa.gov/api/cyan_file_search

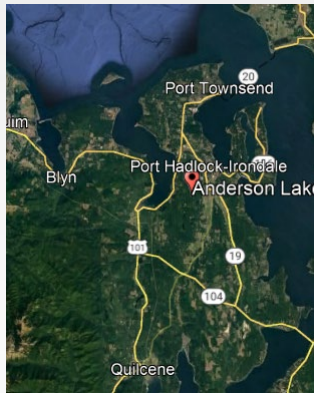
NASA Releases New Dataset of Cyanobacteria in Over 2,300 Lakes in the U.S.



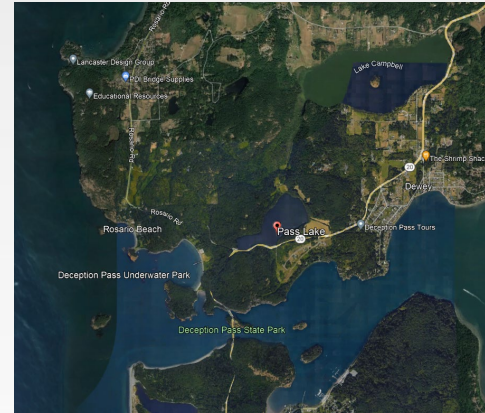
Lakes provide drinking water for people, habitat for plants and wildlife, and a place to fish, boat and swim. But the water can become harmful to humans, animals and the ecosystem when toxic algae called cyanobacteria reach abnormally high levels due to warm, nutrient-rich water conditions.

A now publicly available NASA dataset allows citizens and policymakers to get near-real time updates on the cyanobacteria in over 2,300 lakes in the contiguous United States and more than 5,000 in Alaska. The new study, published in the journal Remote Sensing of Environment, introduces this extensive inland waters dataset that includes a time series of standardized satellite measurements starting in 2002.

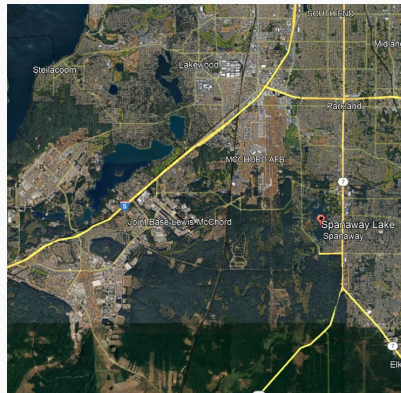
Regional HABs Research: CyanoHABs gene fingerprinting (qPCR) data



Anderson Lake, WA – high concentrations of anatoxin-a and detects of microcystins

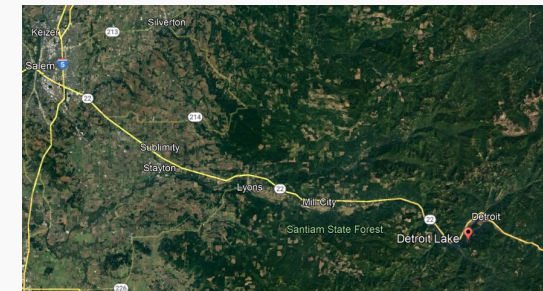


Pass Lake, WA anatoxin-a producers (high concentrations certain years) with microcystin detects



Spanaway Lake, WA microcystin producers (high concentrations) with some anatoxin-a detects

Detroit Lake, OR cylindrospermopsin and microcystin producers



Regional HABs Research: Benthic HABs Pilot

Starting in 2023-2024 – benthic HABs pilot study, Columbia River Tri-Cities- draft list of locations for 2024 (subject to change)

Ringold Boat Launch, Hanford Reach



Leslie Groves Park,
Richland, WA

Bateman Island,
Richland, WA



Two Rivers
Park,
Kennewick WA

Toxic algal mats ARE present in this water

Mats can be attached to the bottom, detached and floating, or washed up on shore



Do NOT let children or adults touch, eat, or swallow any algal mats.



Do NOT let dogs eat algal mats or drink from the water.

Common examples



Call your doctor or veterinarian immediately if you or your pet get sick after contacting or ingesting algae. For more information on toxic algae visit: mywaterquality.ca.gov/habs

For local information, contact:

Date posted:

Figure 5-2. Trigger level sign.

Benthic harmful cyanobacterial blooms are complex –no standard methods



Bouma-Gregson et al. 2018,



[0197669](#)

Benthic HABs Research Questions and Approach

- How extensive are benthic mats? How do we quantify the contribution of phytoplankton and benthic HCBs to the total water column cyanotoxin concentration?
- What are the most appropriate methods for collecting a benthic HCB sample for determining cyanotoxin concentrations and cyanobacterial taxonomic representation?
- What methods should be used for processing a benthic HCB sample including shipping, extracting, and analytical methods?
- Are there less expensive proxies for identifying the presence of benthic HCBs during sampling?

Targeted Metrics

Water column grabs

Benthic HCB grabs

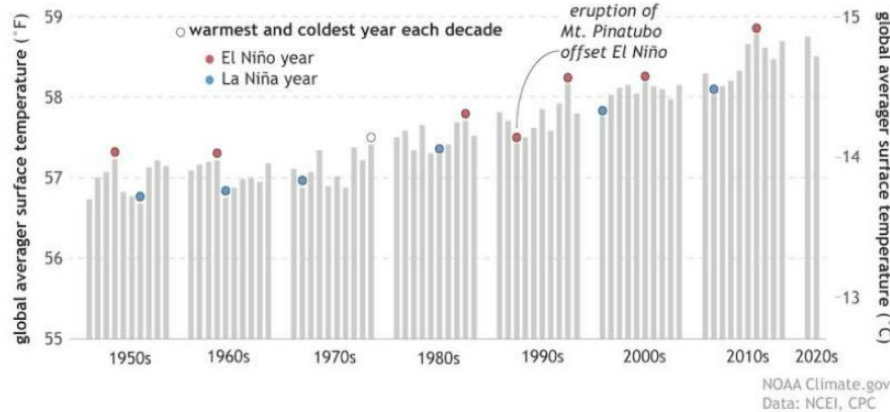
Periphyton and other benthos heterogeneity

Spatial extent

Temporal variability

What will 2023 bring? No more La Nina

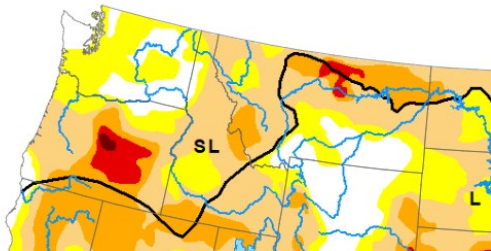
Global surface temperature each year since the 1950s



After a La Niña “three-peat” the current prediction is for ENSO-neutral through early summer 2023; likely El Niño “after” (late summer/fall?)

Map released: March 9, 2023

Data valid: March 7, 2023



Source: <https://droughtmonitor.unl.edu/>

National Weather Service
Climate Prediction Center

Home Site Map News Organization Search Go

ENSO Diagnostic Discussion

EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

issued by
CLIMATE PREDICTION CENTER/NCEP/NWS
9 March 2023

ENSO Alert System Status: Final La Niña Advisory

Synopsis: La Niña has ended and ENSO-neutral conditions are expected to continue through the Northern Hemisphere spring and early summer 2023. During February 2023, below-average sea surface temperatures (SSTs) weakened and currently persist only in the central Pacific Ocean [Fig. 1]. The latest weekly Niño-3.4 index value was -0.2°C [Fig. 2]. In contrast to the central Pacific, SSTs in parts of the eastern Pacific Ocean were significantly above average, with the latest

Contact Information

POC for Recreational/Ambient Waters:

Rochelle Labiosa

206-553-1172

Labiosa.Rochelle@epa.gov

POC for Drinking Waters:

Sam Perry

206-553-2851

Perry.Samuel@epa.gov

For urgent after-hours issues please contact the EPA Spill

Hotline: 206-553-1263; select the menu option for

Regional Duty Officer

EPA's Cyanobacteria HABs Website

www.epa.gov/cyanoabs



Extra Slides

Technical Support Resources

- [Analytical methods development](#) (2015/2016)

Method numbers:

- 544 (microcystins and nodularin-R)
 - 545 (anatoxin-a and cylindrospermopsin)
 - 546 (Adda ELISA Method for microcystins and nodularins).
- [Recommendations for Public Water Systems to Manage Cyanotoxins in Drinking Water](#) (2015)
 - [Cyanotoxin Management Plan Template and Example Plans](#) (2016)
 - [Water Treatment Optimization for Cyanotoxins Document](#) (2016)
 - [Drinking Water Cyanotoxin Risk Communication Toolbox](#) (2016)
 - [EPA Cyanotoxins Drinking Water Webpage](#)
 - [Recreational Water Communication Toolbox for Cyanobacterial Blooms](#) (2017)
 - [Recommendations for Cyanobacteria and Cyanotoxin Monitoring in Recreational Waters](#) (2019) and [Final Technical Support Document](#) (2021)
 - [EPA Cyanobacteria and Cyanotoxins in Recreational Waters Webpage](#)

Outreach and Tools



- [EPA's Cyanobacteria HABs Webpage](#)
- [Freshwater HABs Newsletter and Outreach](#)
- Fact Sheets
 - [Cyanobacteria and Cyanotoxins: Information for Drinking Water Systems](#)
 - [Climate Change and Harmful Algal Blooms](#)
- [Video on Tools for Addressing the Risks of Cyanotoxins in Drinking Water](#)
- Video with EPA Scientist Nick Dugan on algal water treatment studies: <https://www.youtube.com/watch?v=mnok5G0HBgM>
- [Citizen Science Tools for CyanoHABs](#)
- [Federal Funding For Prevention, Monitoring and Treatment of HABs - Workshop Summary \(2021\)](#)
- To sign up for EPA's Listserv, email epacyanohabs@epa.gov