Ohio EPA Harmful Algal Bloom Program and Lake Erie Updates

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Ohio Environmental Protection Agency

Background: Defining HABs

- **Harmful –** posing threat to ecosystem, animal, and human health; *cyanotoxins* are a primary concern for drinking water and recreation
- **Algae –** photosynthetic aquatic organisms lacking true roots and stems; commonly *cyanobacteria* in freshwater systems
- **Bloom –** excessive biomass, occurs when conditions (e.g., nutrients, light, temperature) support high growth rates



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Cyanotoxins

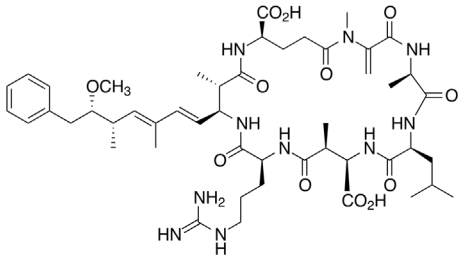
Cyanobacteria can produce cyanotoxins and other irritants that cause serious health effects in people and animals

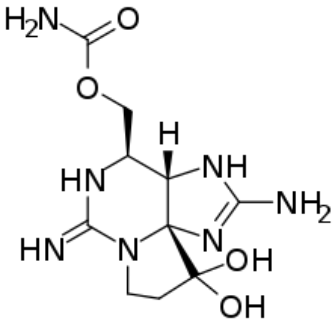
Hepatotoxins (Liver)

- **Microcystins and Nodularins**
- **Cylindrospermopsins**

Neurotoxins

- **Saxitoxins**
- **Anatoxins**





Guanitoxin BMMA

Aetokthonotoxin

Other classes

Dermatoxins and skin-irritating compounds

Secondary metabolites

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Important to Sample and Analyze

- Microcystin Concentrations >100 ug/L
- Green Algae Bloom on Caesar Creek that Resembled a Planktothrix Bloom

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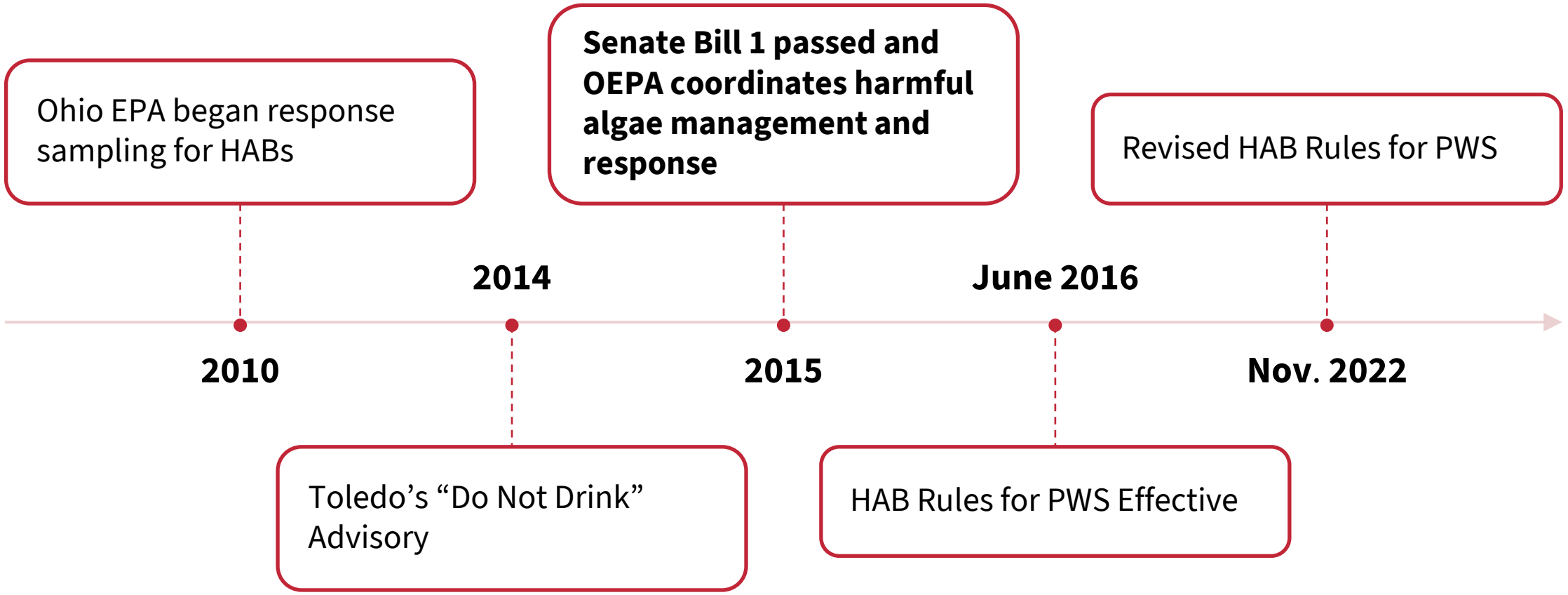
History of Ohio EPA's HAB Program



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HAB Public Water System Rules

- Public water systems with a **surface water source**(s) must comply with HAB monitoring and reporting rule requirements
- **OAC 3745-90: Surface Water PWS Requirements**
  - Microcystins action levels in drinking water
  - Monitoring requirements
  - Treatment technique requirements
  - Public notification and Consumer Confidence Report (CCR) requirements
  - Recordkeeping requirements
- **OAC 3745-90-04 and OAC 3745-89: Laboratory Certification Requirements**
  - Laboratory certification
  - Analytical techniques
  - Reporting deadlines

State of Ohio Drinking Water Thresholds

Drinking Water Thresholds	Microcystins (µg/L)	Anatoxin-a (µg/L)	Cylindrospermopsin (µg/L)	Saxitoxins (µg/L)
Do Not Drink – children under 6 and sensitive populations	0.3	0.3	0.7	0.3
Do Not Drink – children 6 and older and adults	1.6	1.6	3.0	1.6

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Two State of Ohio HAB Strategies

Public Water System (PWS)

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Public Water System Harmful Algal Bloom Response Strategy

Division of Drinking and Ground Waters
November 2022

Mike DeWine, Governor State of Ohio
Laurie A. Stevenson, Director Ohio Environmental Protection Agency

Recreational

Ohio | Department of Health
Environmental Protection Agency
Department of Natural Resources

State of Ohio
Harmful Algal Bloom Response Strategy for Recreational Waters

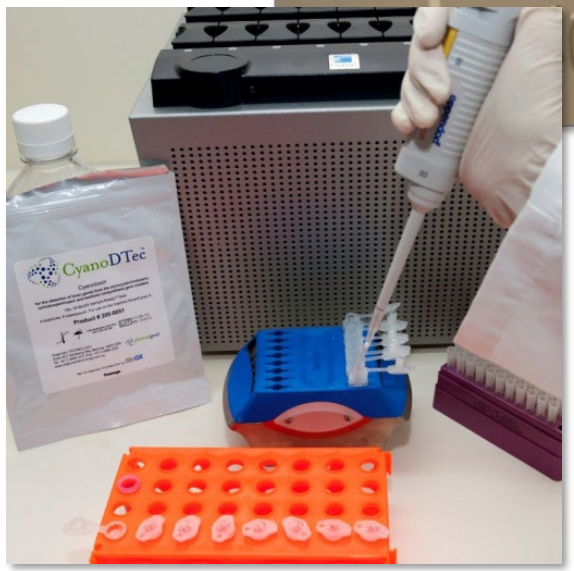
August 2020

Mike DeWine, Governor
Jon Husted, Lt. Governor
Laurie A. Stevenson, Director — Ohio Environmental Protection Agency
Mary Mertz, Director — Ohio Department of Natural Resources
Lance Himes, Interim Director — Ohio Department of Health

PWS Monitoring- What constituents are monitored?

- **<u>Total Microcystins (ELISA)</u>**
  (raw and/or paired)
  - Finished water detections and elevated raw water detections trigger additional sampling

- **<u>Cyanobacteria Screening (qPCR)</u>**
  (raw only by method)
  - Genetic test that triggers follow-up sampling by Ohio EPA for microcystins, saxitoxins, and cylindrospermopsin



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PWS Monitoring

	HAB Season Monitoring (June – Nov)	Off Season Monitoring (Dec – May)
Routine Monitoring	Biweekly raw water cyanobacteria screening alternating with Biweekly raw water microcystins	Biweekly FINISHED water microcystins
GUI system	Monthly raw water cyanobacteria screening	Monthly FINISHED water microcystin
Out-of-state consecutive	Weekly finished water microcystins	Biweekly FINISHED water microcystins

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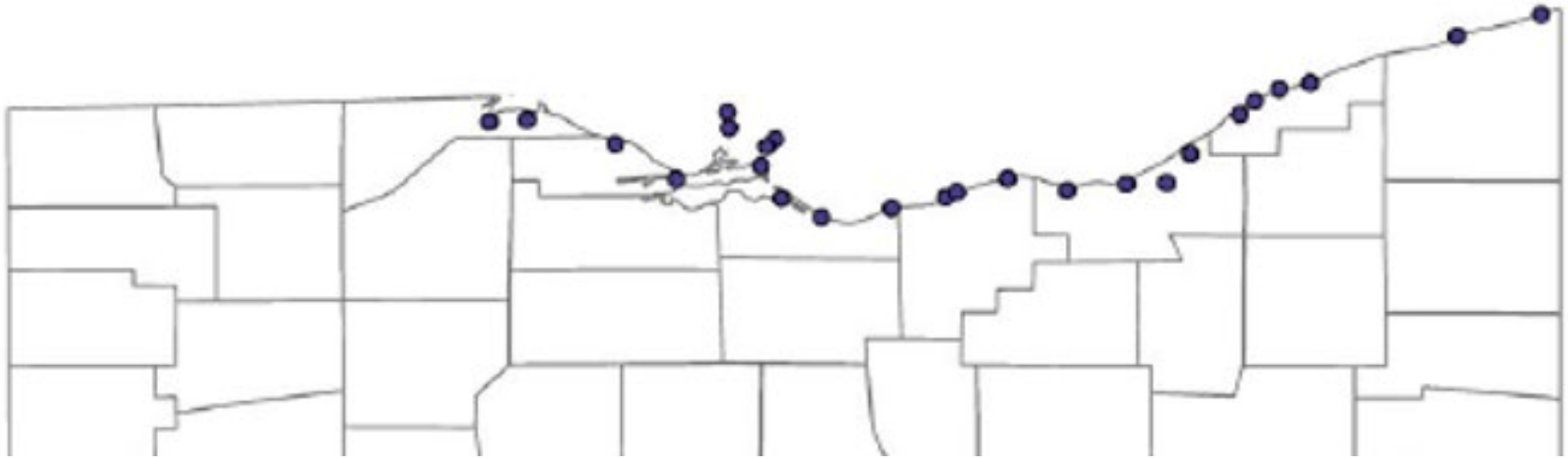
Ohio Lake Erie Systems

22 Ohio Public Water Systems use Lake Erie as a Source

~133 Billion Gallons of Drinking Water Produced Annually
~364 Million Daily



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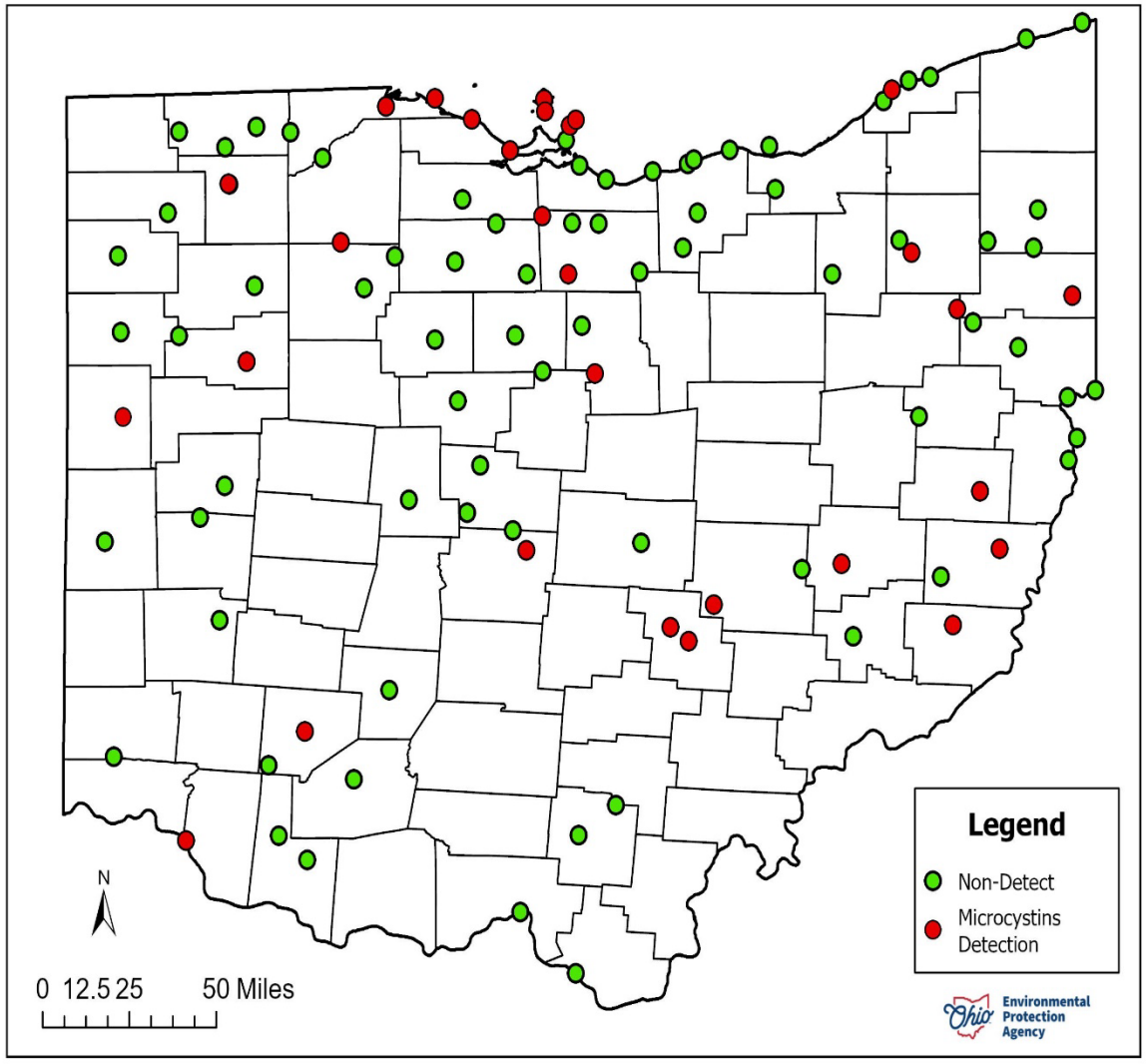
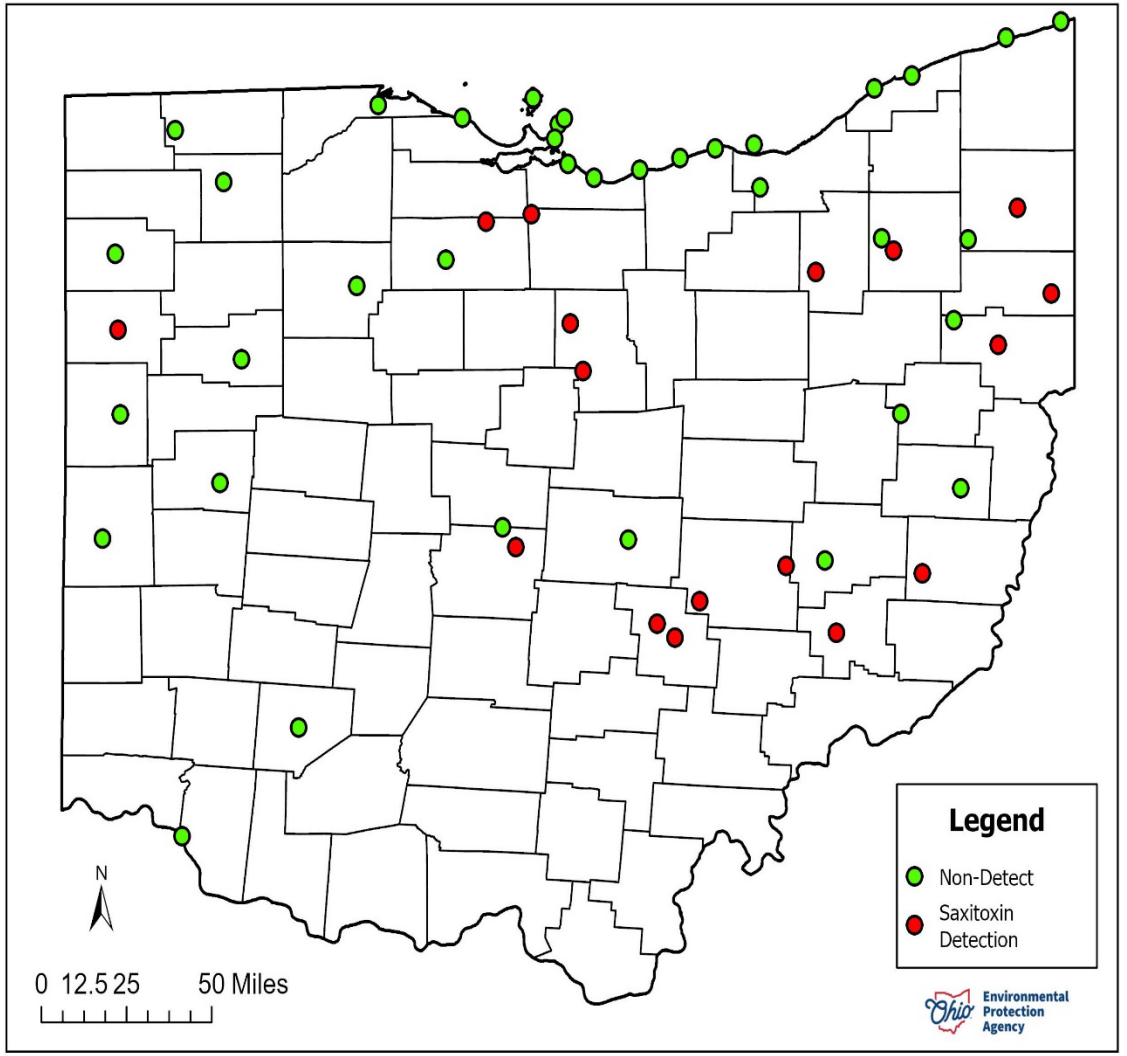
2024 RW Microcystin Detections

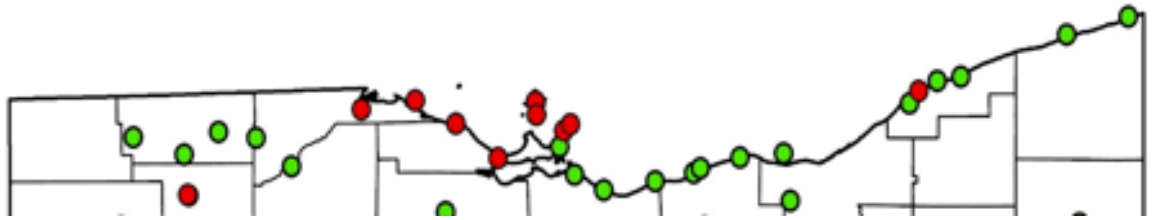


2024 RW Saxitoxin Detections



2024 Raw Water Microcystins Summary

- No Finished Water Detections
- 9 of the 22 PWS had a Detection
- Only One Detection in Central Basin



Highest Detection: 30.0 ug/L
Average Detection: 1.8 ug/L

*Sensitive Pop. Threshold 0.3 ug/L

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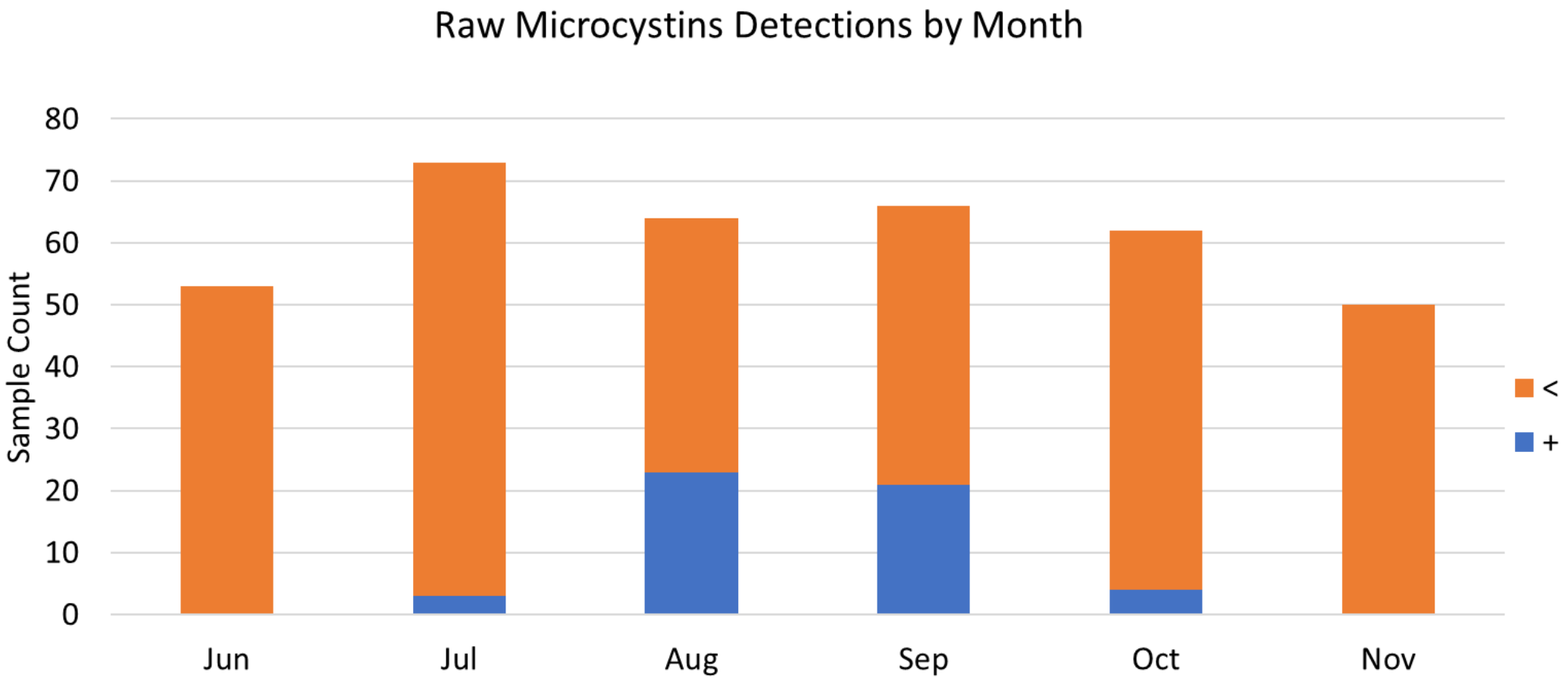

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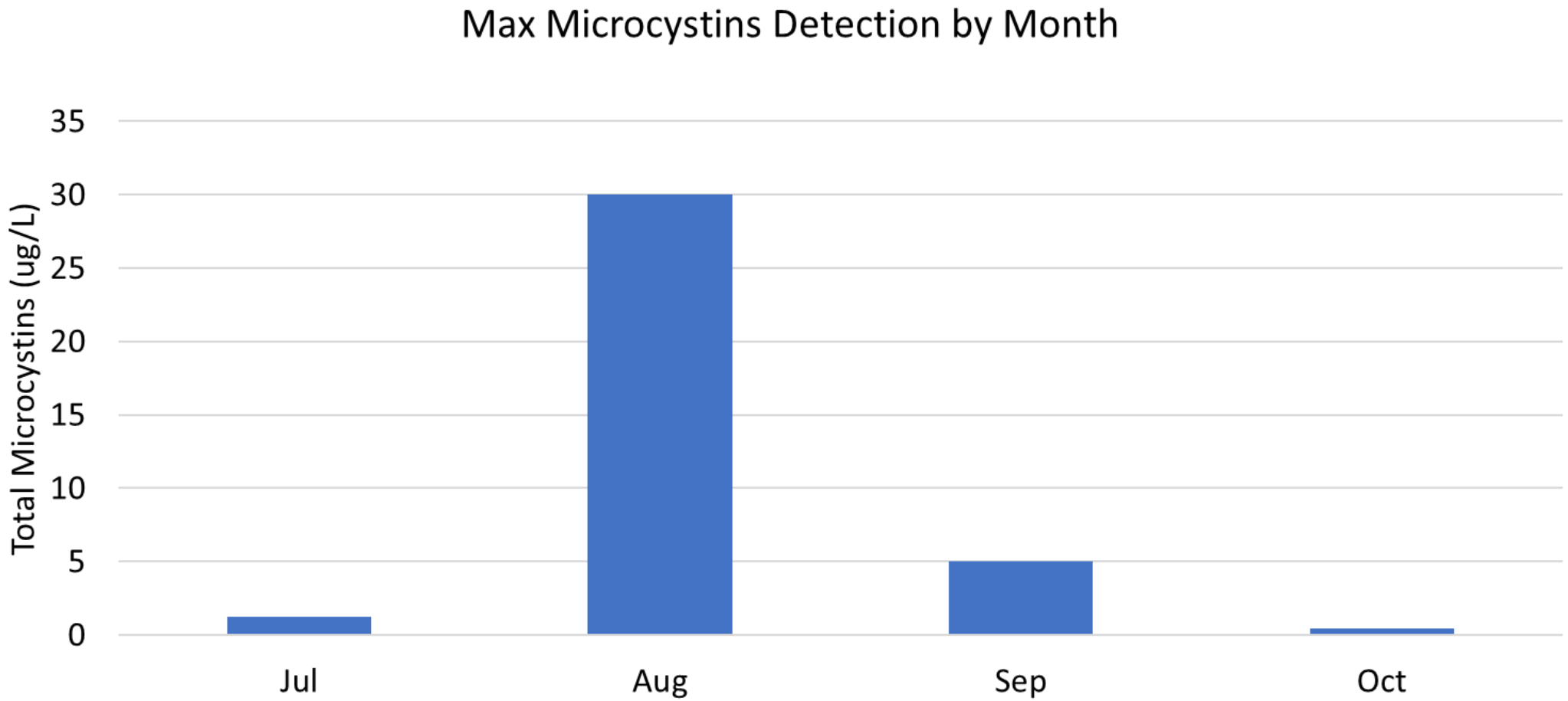

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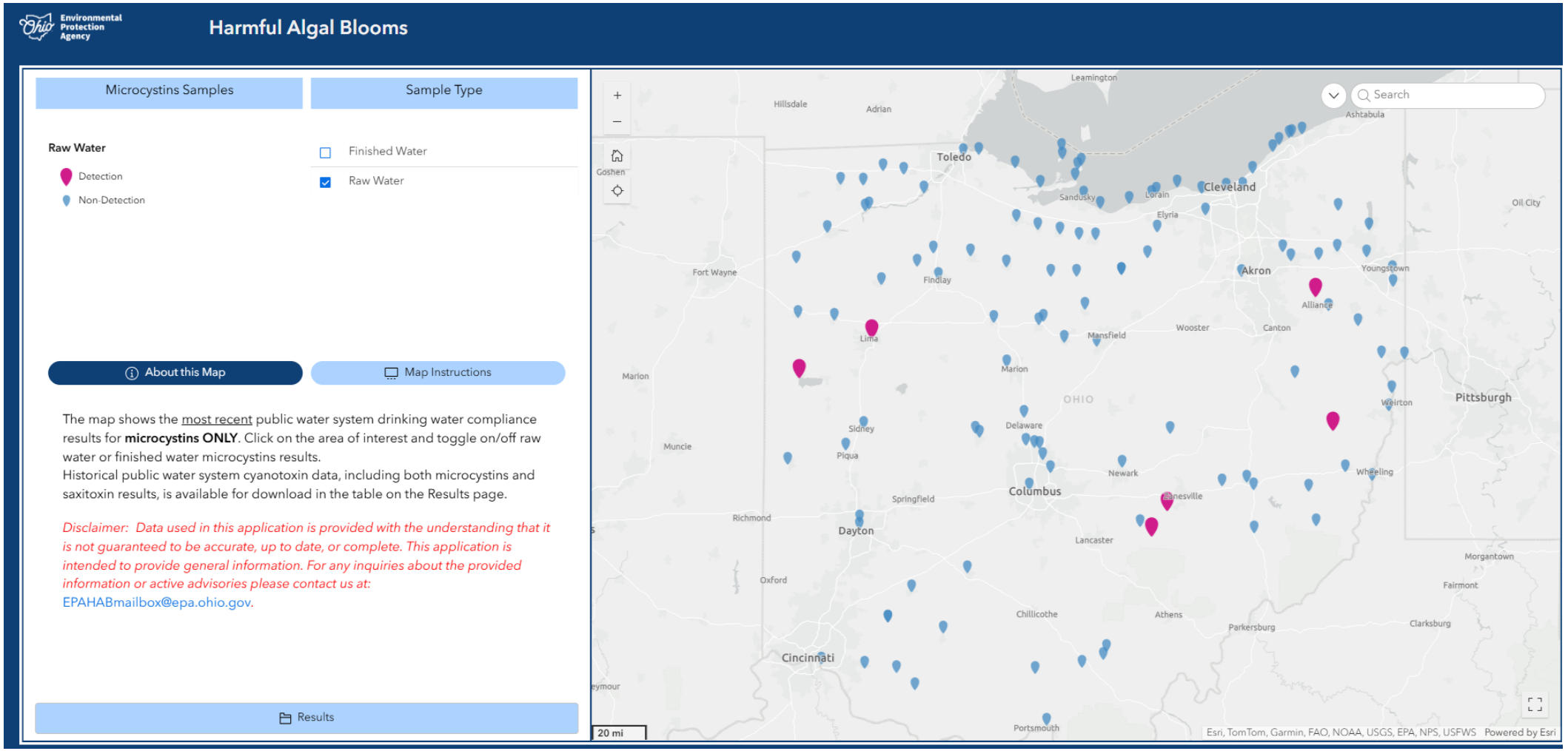
New PWS HAB Map



https://epa.ohio.gov/divisions-and-offices/drinking-and-ground-waters/public-water-systems/harmful-algal-blooms

Lake Erie: Year in Review

NCCOSS Western LE Seasonal Review:

- The 2024 western Lake Erie cyanobacterial bloom had a severity index of 6.6
  - *Considered moderately severe*

- The bloom began in June and peak mid-August, but peak only last about one week

- Through the season, the bloom stayed closer to the U.S. coast, primarily from Monroe, MI to Port Clinton, OH.

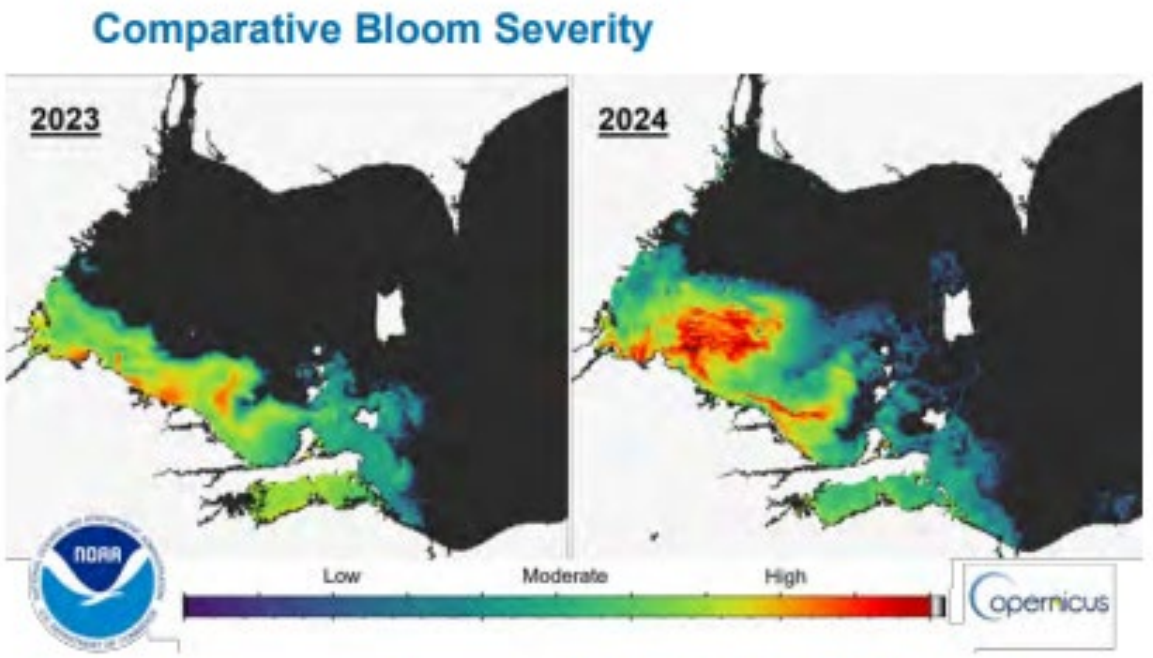
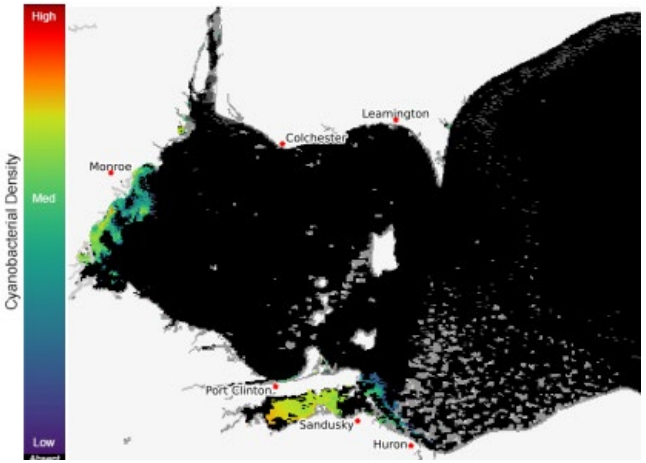


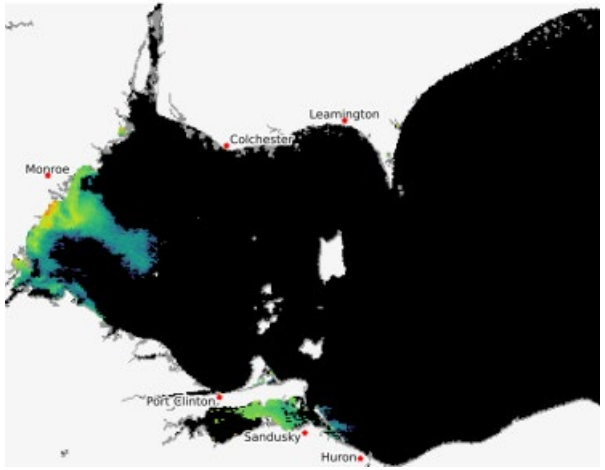
Fig. 4. The maximum bloom severity in 2023 (Aug. 10-19) and 2024 (Aug. 10-19). Bluish-green to dark blue indicates low cyanobacterial concentrations. Sandusky Bay has a different type of cyanobacteria that typically does not form scum.

https://nccospublicstor.blob.core.windows.net/hab-data/bulletins/lake-erie/current/bulletin_current.pdf

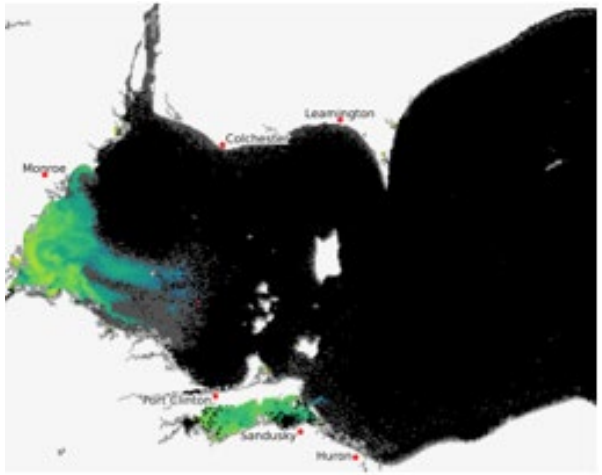
July 1



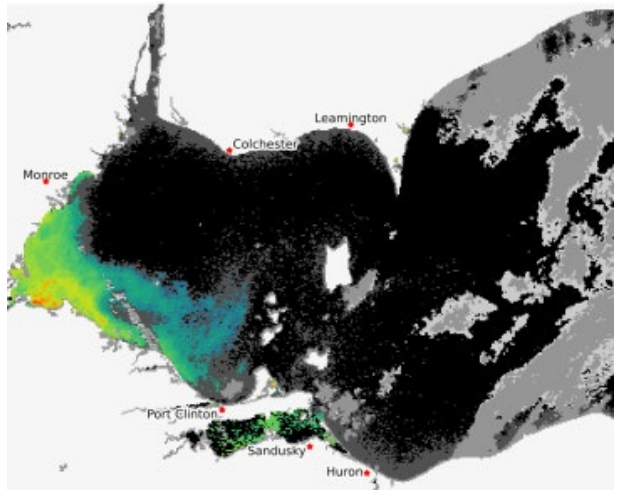
July 13



July 31

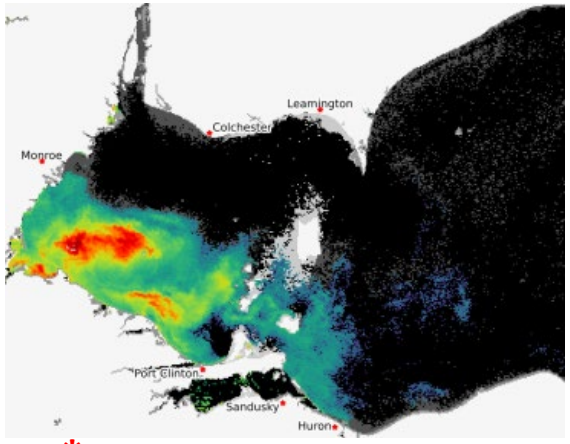


August 4



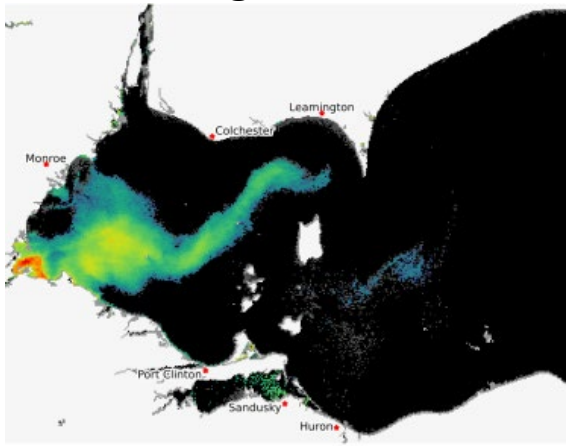
***First PWS Detect**

August 14

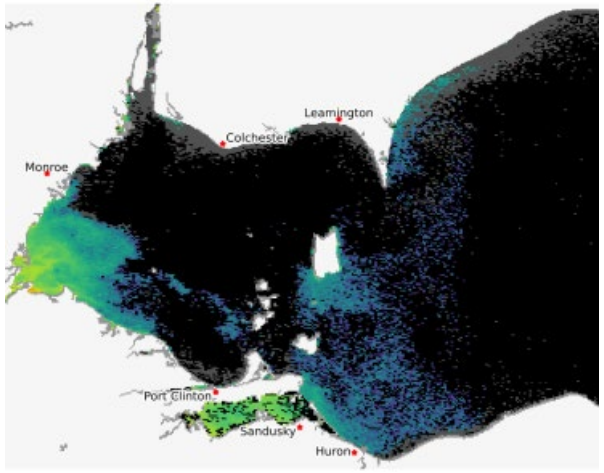


***Highest PWS Detect**

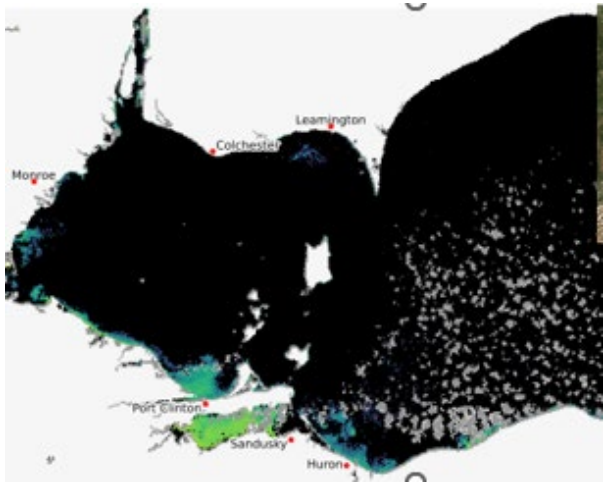
August 26



September 16

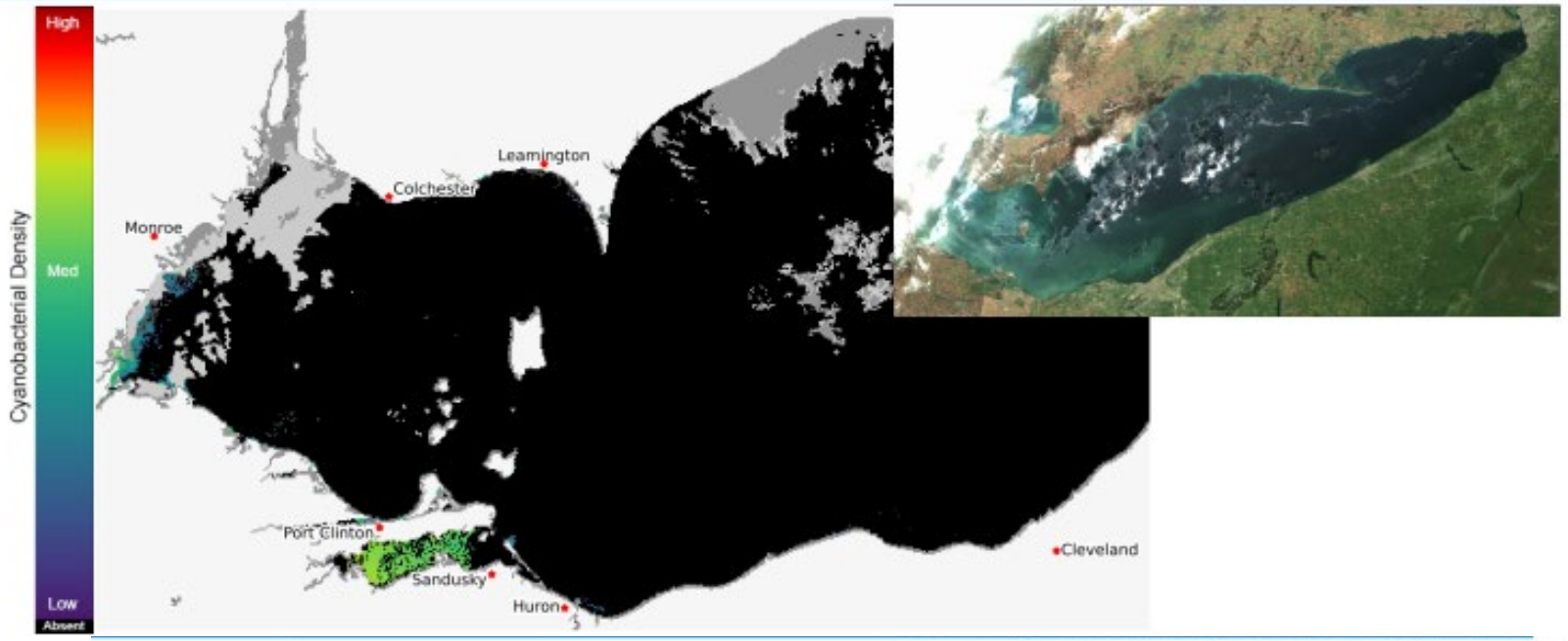


October 11



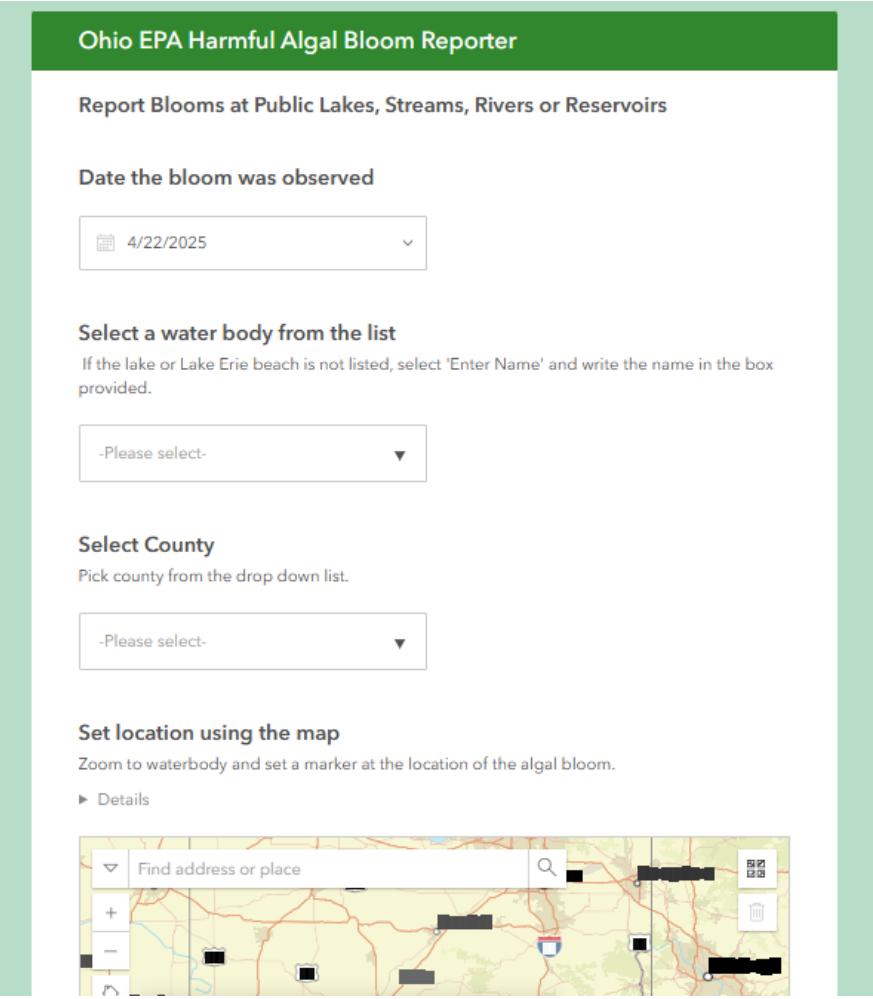
Lake Erie Sentinel-3 satellite imagery from the Ocean and Land Color Imager (OLCI) . Data derived from Copernicus Sentinel-3. coastalscience.noaa.gov/science-areas/habs/hab-forecasts/lake-erie. NCCOS 2024.

October 4



October 22

Bloom Report Forms



Ohioalgaeinfo.com

- Gets sent to Ohio EPA
- OEPA coordinates with State/Local Health Districts and ODNR for follow-up
- Habmailbox@epa.ohio.gov

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In 2024 Lake Erie had….

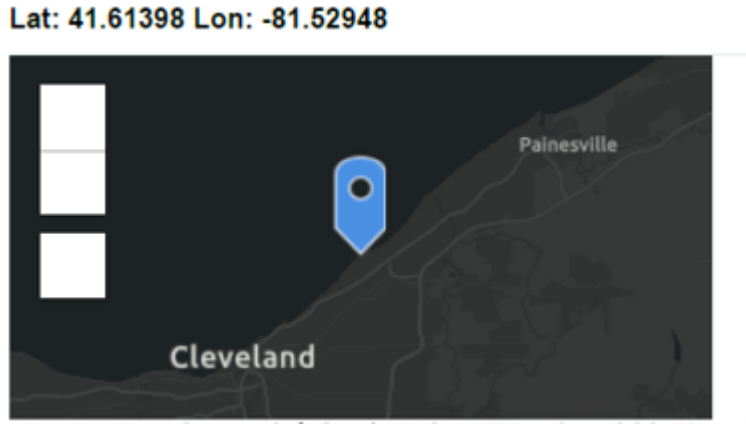
Two Bloom Reports

- Cuyahoga County
- Lucas County

Cuyahoga Co. Bloom Report 10/19/24 by Local Citizen

Two HAB Advisories

- Maumee Bay State Park
- South Bass Island State Park



BeachGuard

Department of Health

Ohio's Beach Water Quality & Advisories Powered by BeachGuard

You can…

- Subscribe to beach Advisory alerts
- Option to do a Lake Erie Beach Advisory Search
- Look and export advisory and monitoring data

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Signage

Posted for recreational waters at all public state park beaches and boat ramps

Caution (Visual Bloom): Beach

ADVISORY: Beach

Caution: Boat Ramp

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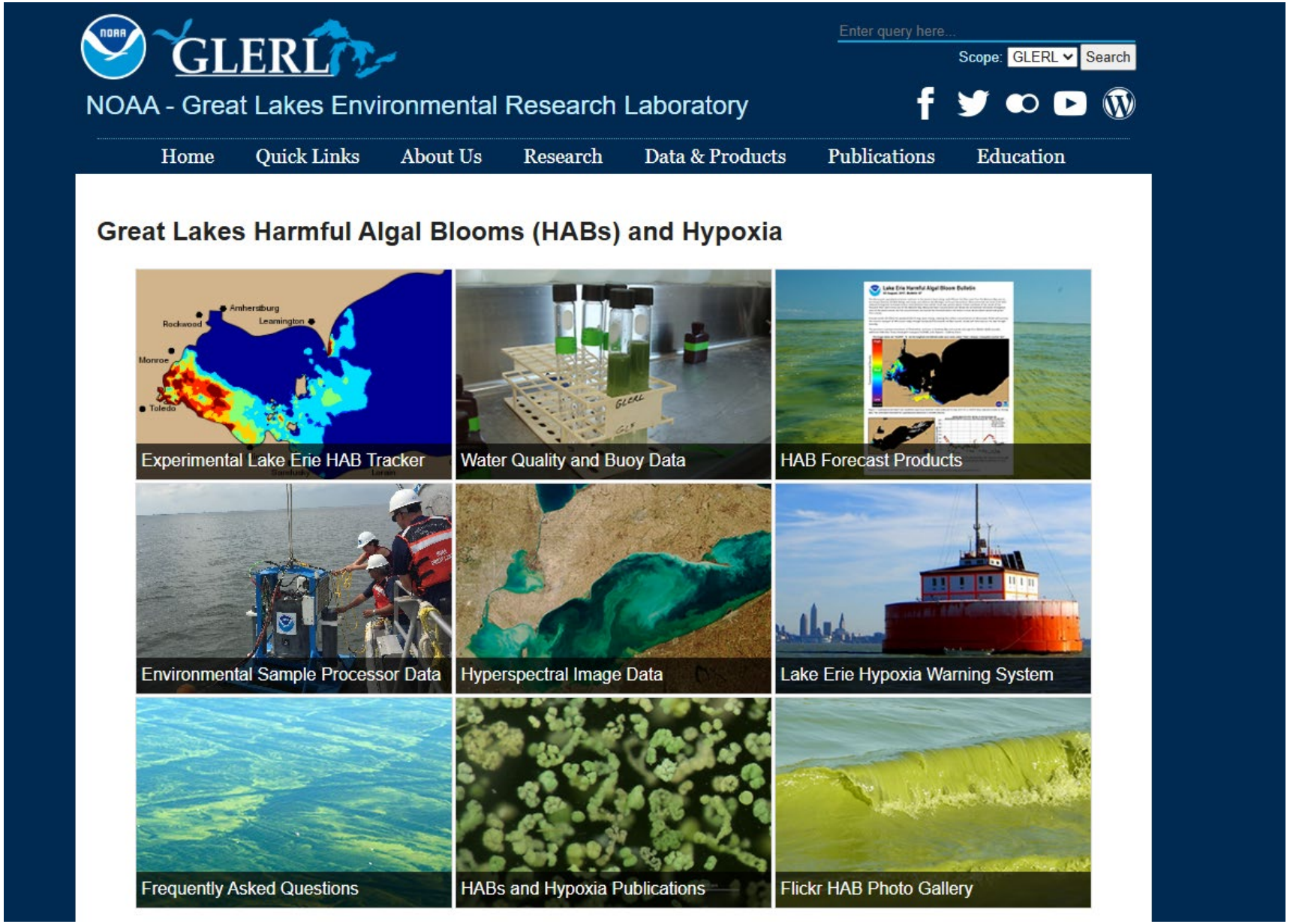


www.glerl.noaa.gov/res/HABs_and_Hypoxia/

Lake Erie Harmful Algal Bloom Forecast

NOAA provides forecasts for seasonal blooms of cyanobacteria (blue-green algae) in Lake Erie, typically from July to October when warmer water creates favorable bloom conditions. Western Lake Erie has been plagued by an increase of HABs intensity over the past decade. These blooms consist of cyanobacteria or blue-green algae, which are capable of producing toxins that pose a risk to human and animal health, foul coastlines, and impact communities and businesses that depend on the lake. A combination of satellite image (for bloom location and extent), a forecasting and mixing model provide information on the current status of the bloom, forecasted position both at the surface and at depth, and toxicity from field samples. See individual products and our FAQs for more information. For our Lake Erie Hypoxia forecast click here.

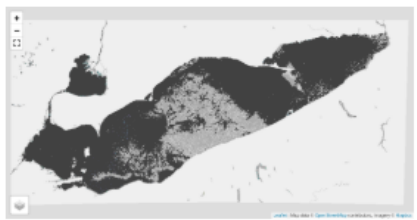
Forecast Products

Download Latest Forecast Bulletin (PDF)

Access Archived Forecast Bulletin for the Bloom Season

⚠ The 2024 cyanobacteria bloom has ended. We will issue the 2024 Seasonal Assessment next week. We will return in May 2025 with more information. For satellite images of western Lake Erie, check the western Lake Erie HAB Monitoring Page. --The NCCOS HAB Forecasting Team 05 November 2024

The past few days of imagery can be seen at the HAB monitoring site. The Lake Erie Forecast is operated by the National Centers for Coastal Ocean Science. Contact hab@noaa.gov for technical Questions. Last Updated: 2024-12-11 07 AM EST



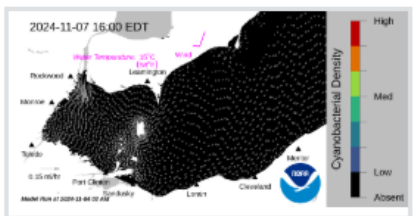
Observed Bloom Position

(from most recent satellite image)

Current satellite imagery from the Ocean Land Color Imager (OLCI) and true color imagery showing bloom location and extent.

Please note, 11/04/2024 is the last model run for the 2024 bloom season.

View Product



Forecasted Bloom Position

(from modelling)

Forecasted extent and position of the bloom for a minimum of 96 hours, based on a combination of a hydrodynamic modeled currents and satellite imagery for initial bloom location.

Please note, 11/04/2024 is the last model run for the 2024 bloom season.

Vertical Mixing Forecast

Forecast of the potential for mixing over the next at least 96 hours, to determine the likelihood that the bloom is at the surface or subsurface.

Please note, 11/04/2024 is the last model run for the 2024 bloom season.

View Product

https://coastalscience.noaa.gov/science-areas/habs/hab-forecasts/lake-erie/

Things to Lookout For?

HAB Season begins June 1, 2025

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2025 Source Water Protection Grants

- ALL municipal community public water systems
- Systems with a smaller population, high susceptibility and/or high-risk potential contaminant sources will be prioritized for funding
- Total of $500,000
- Maximum of $20,000 in reimbursable funds for proposed strategy implementation
  - Examples: Website creation, education materials, spill protection materials, watershed BMPs, surface water quality monitoring instrumentation
- **Online applications open in November 2025**
- Factsheet: Protective_Strategies_Grant_Community_PWS.pdf
- Contact: internet.whp@epa.ohio.gov

Ohio Environmental Protection Agency

Thank You

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