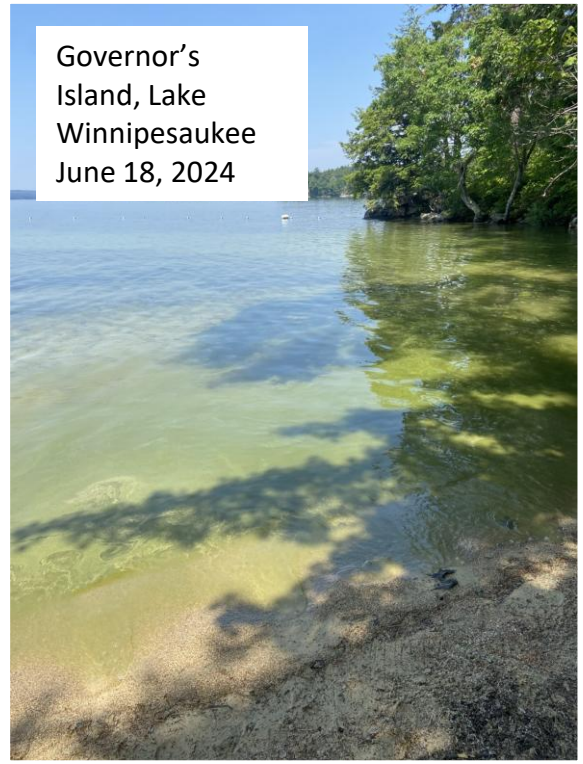
Cyanobacteria: Understanding and Identifying Blooms

Cyanobacteria (formerly Blue-Green Algae)

- Naturally occurring
- Photosynthetic Bacteria
- Growth Factors
  - Sunlight
  - Water Temperature
  - Nutrients (Nitrogen/Phosphorus)
- Some of the earliest known organisms capable of oxygen production!

Yellowstone National Park November 2019

Utah DEQ 2016



Governor's Island, Lake Winnipesaukee June 18, 2024

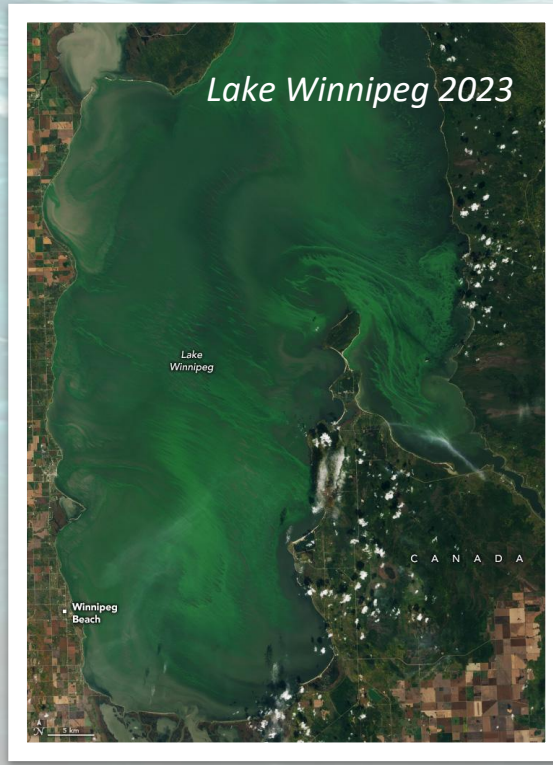
"Cyanobacteria played an important role in the evolution of Early Earth and the biosphere. They are responsible for the oxygenation of the atmosphere and oceans"

Demoulin, Catherine F et al. "Cyanobacteria evolution: Insight from the fossil record."

Harmful Algal Blooms (HABs)

Certain environmental conditions in water bodies can intensify algae growth, causing algal blooms. Blooms with the potential to harm human health or aquatic ecosystems are referred to as Harmful Algal Blooms (HABs).

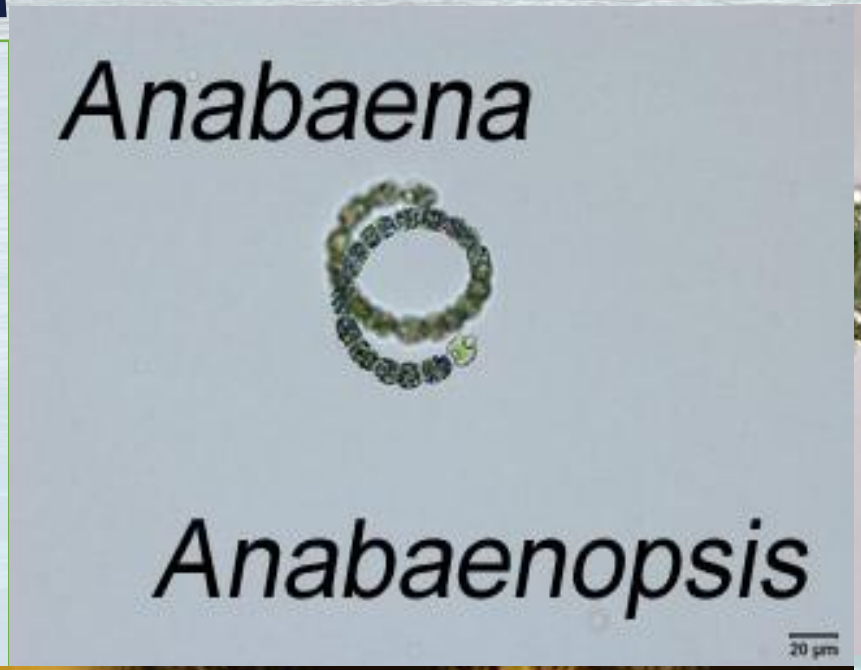
- Thousands of Species of Cyanobacteria
- Hundreds of Toxins
- Freshwater Toxic HABS examples
  - Cyanobacteria, *Microcystis*
  - Cyanobacteria, *Dolichospermum*

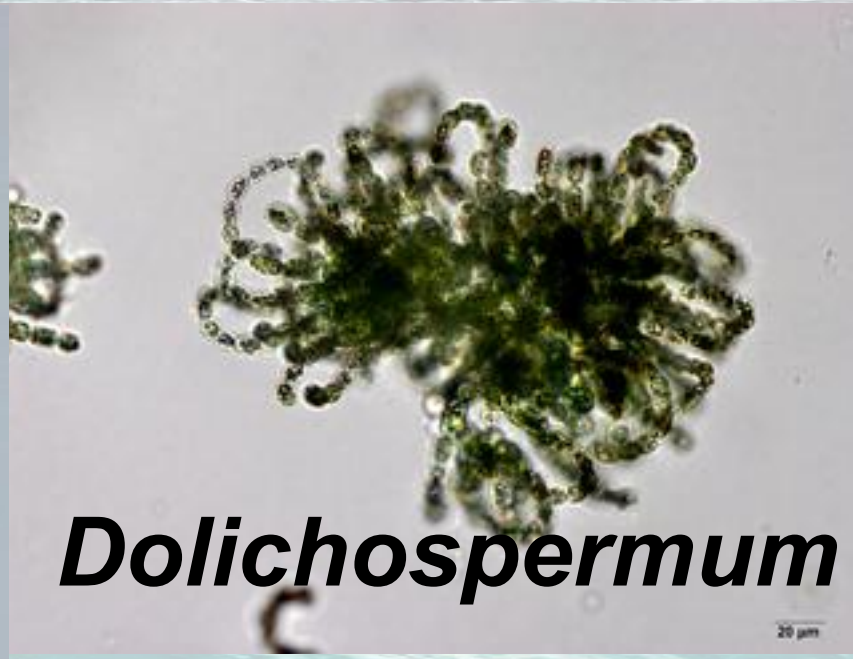


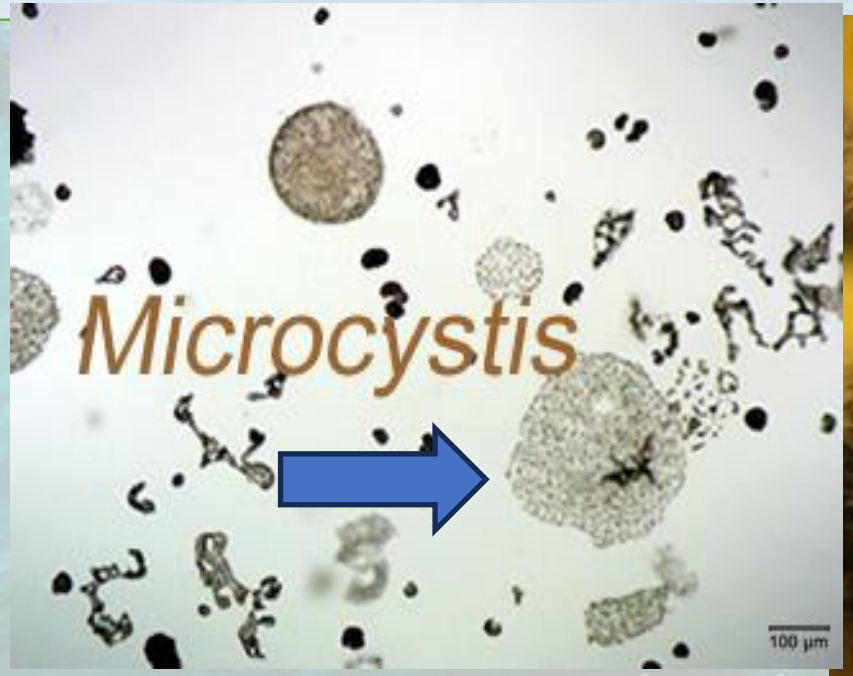
Cyanobacteria

Common Species of Cyanobacteria found in our lakes

- **Seasonal**
- **Hard to identify without a microscope**

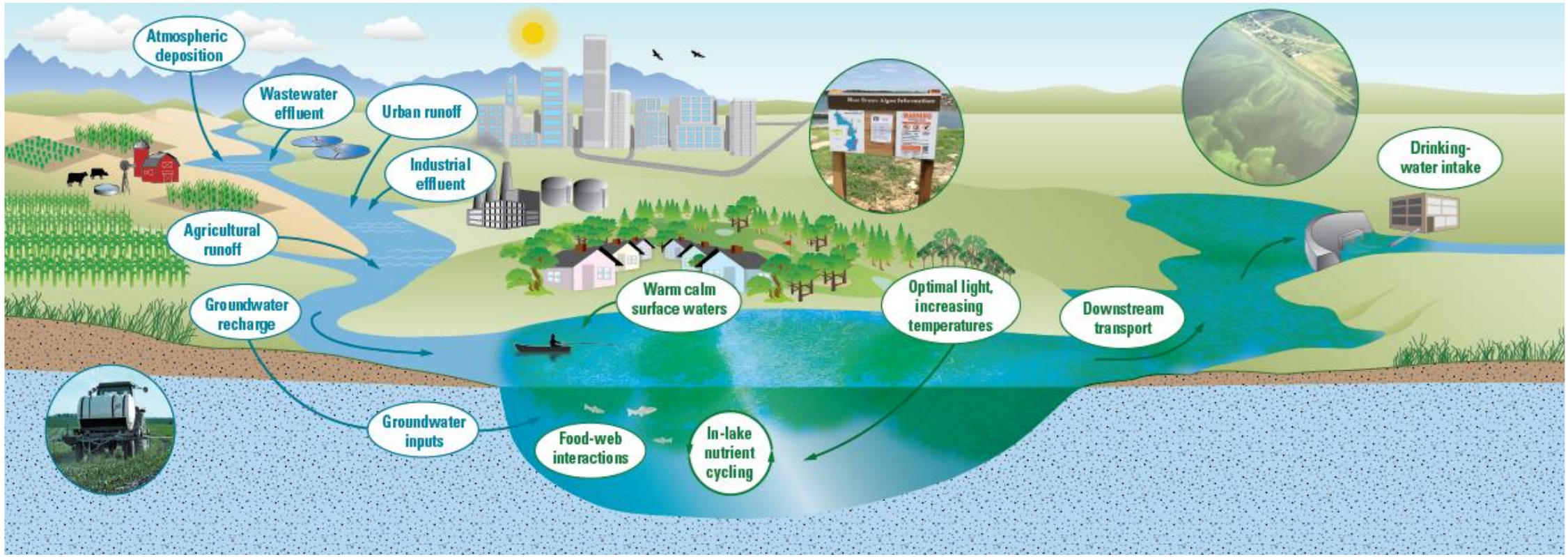






Why are we seeing HABs more often?

Physical and chemical factors contribute to the formation and persistence of HABs including: Nutrient Loading (N and P), Light availability, Water temperature, Alteration of water flow, Stratification/vertical mixing, Salinity

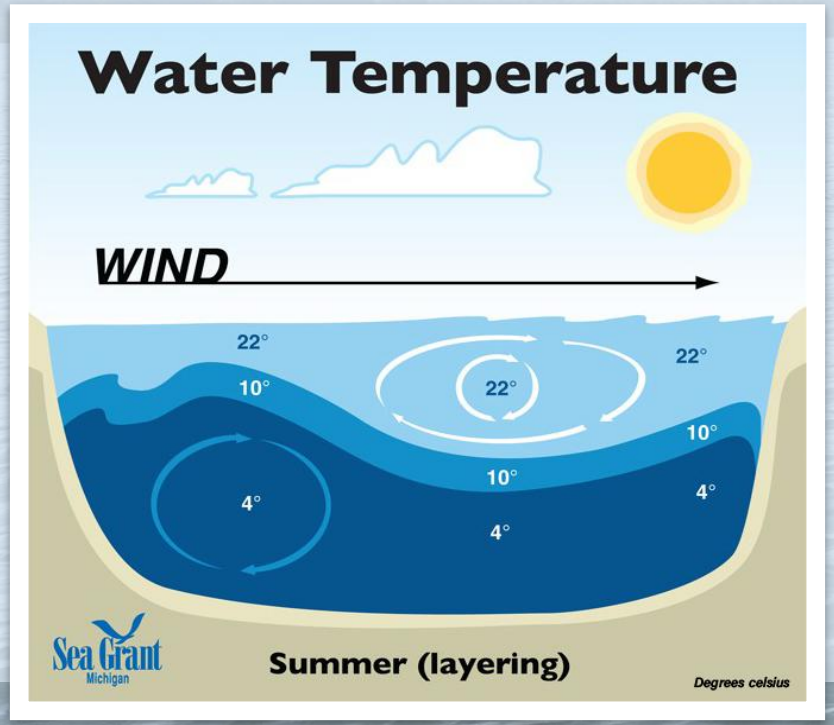


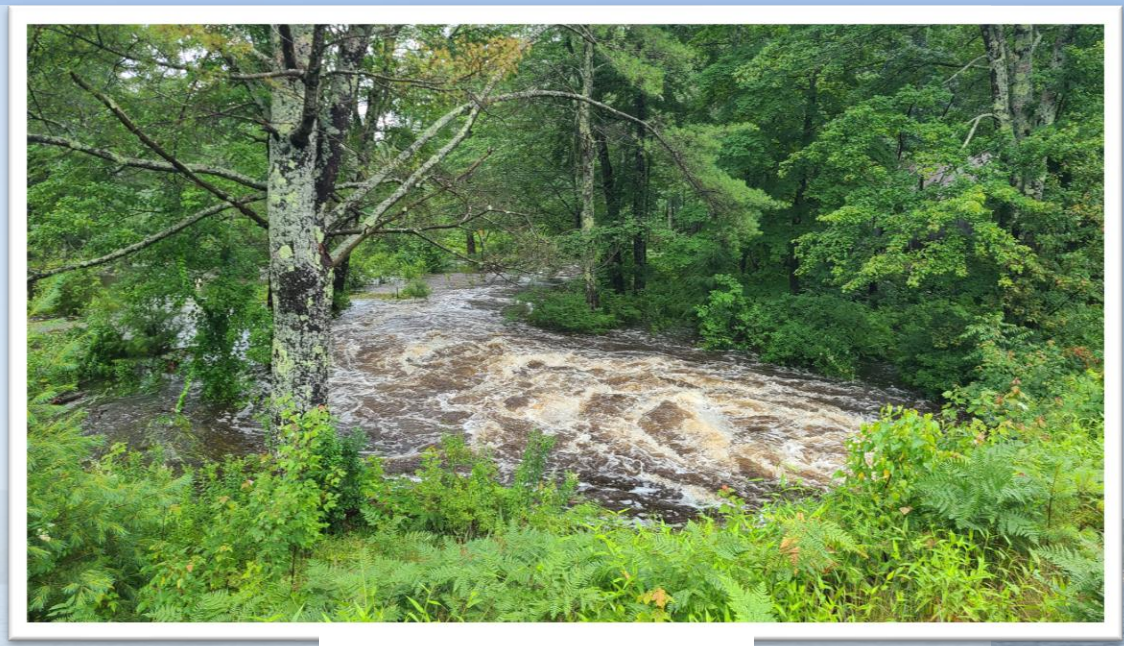
Source: Key factors related to CyanoHAB occurrence and toxicity. (USGS,

Cultural eutrophication is a process that occurs when human activities add excess nutrients to a body of water, speeding up its aging process. An excessive growth of plants and algae indicate that this process is occurring!

Why are we seeing HABs more often?

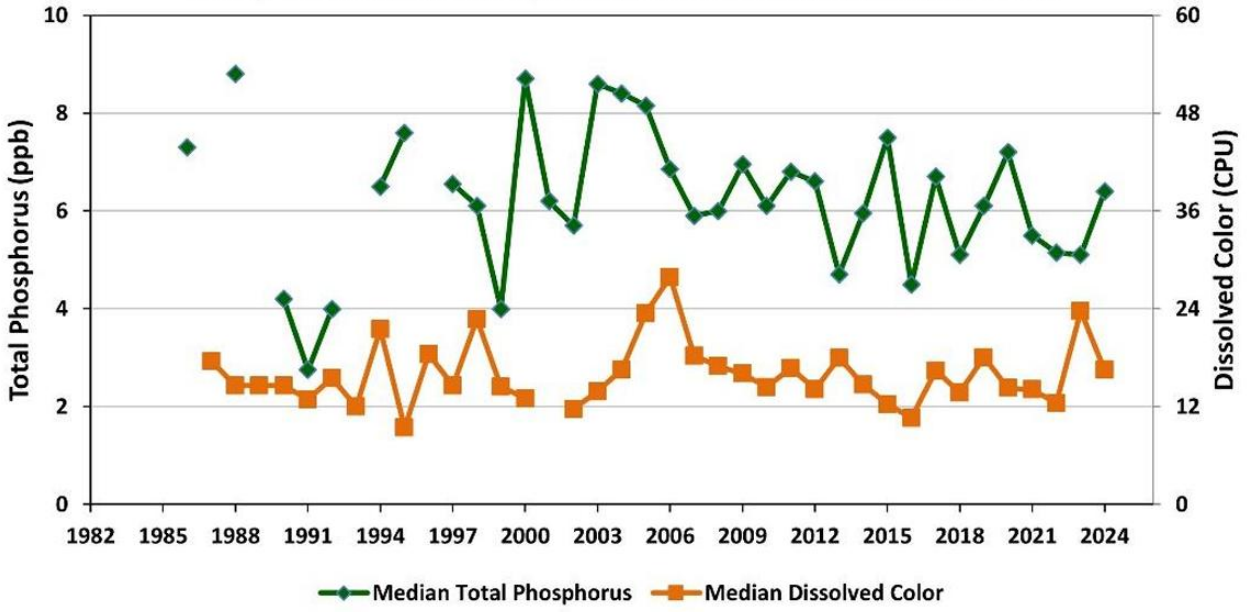
- Climate Change
  - Extreme Weather Events
    - Increases Runoff
    - Increases Erosion
    - Flooding
  - Warming Temperatures
    - Lake Stratification
    - Shift in Ice-In and Ice-Out





Pics from 2023

Figure 5. Lake Wentworth - Site 1 Fullers (1986-2024)
Long-term Total Phosphorus and Dissolved Color Data

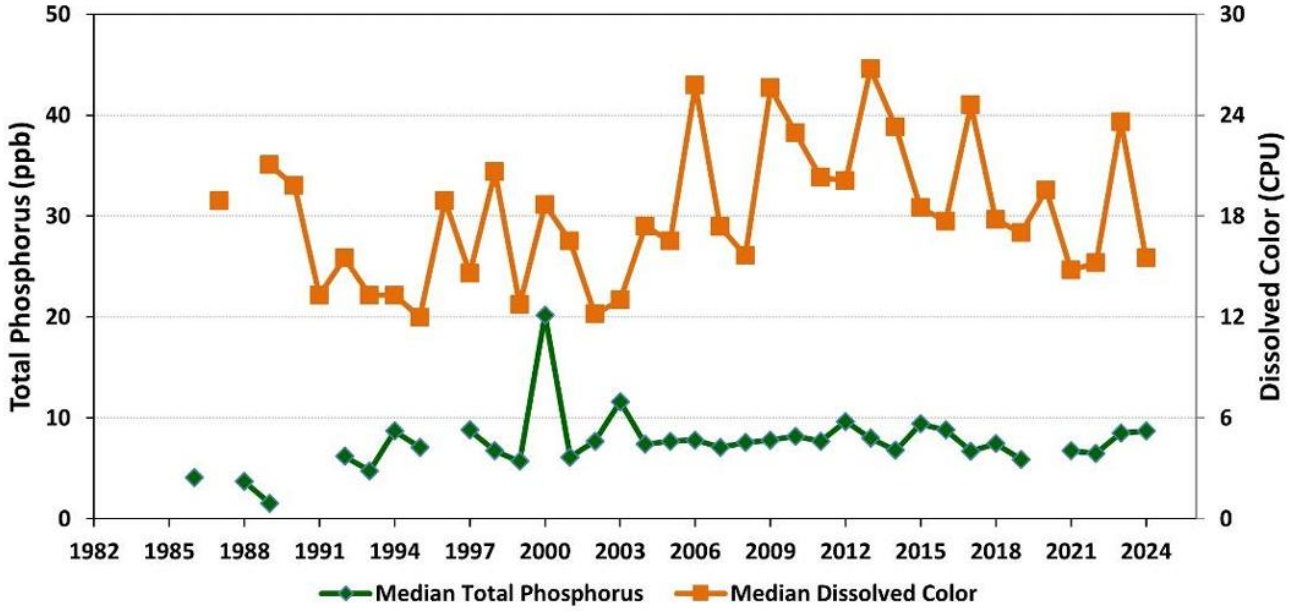


UNH Lakes Lay Monitoring Program

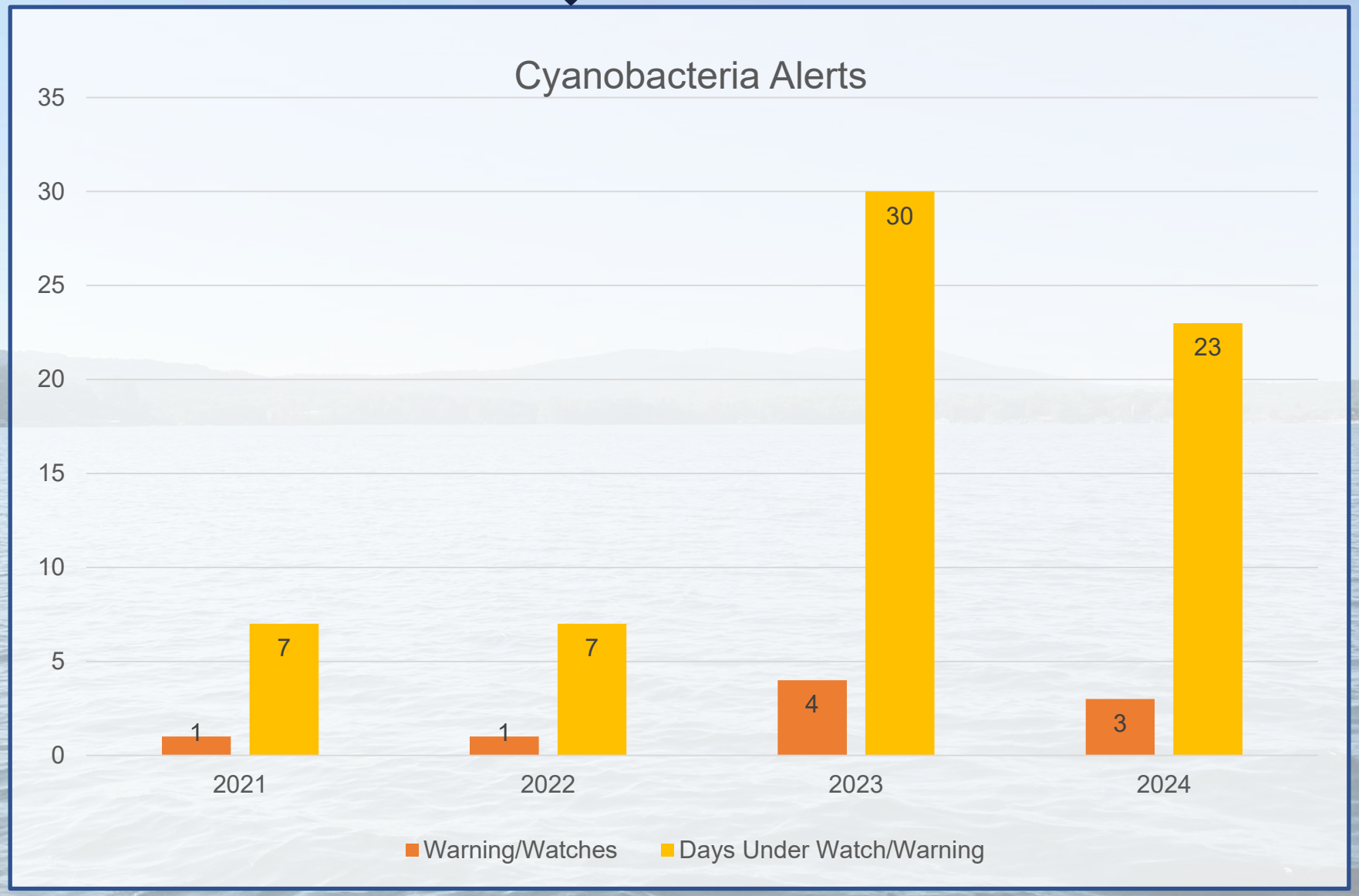
- Data collection since 1986

1 lb. of phosphorus can support 500 lbs. of algae growth

Figure 5. Crescent Lake - Site 6 Center (1986-2024)
Long-term Total Phosphorus and Dissolved Color Data



Lake Wentworth Cyanobacteria History



How do Cyanobacteria Blooms Move?

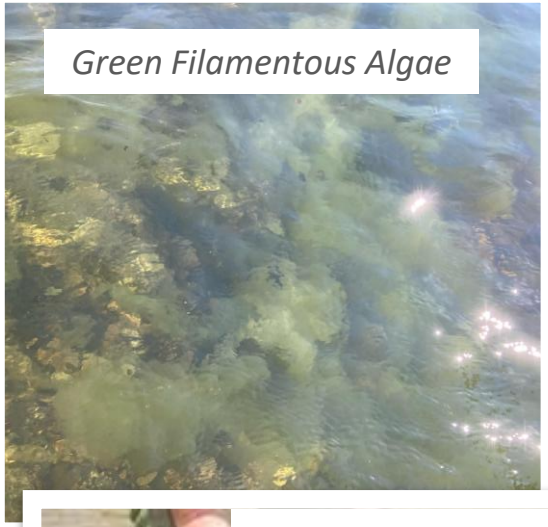
- Dynamic Events
- **Move By**
  - Wind
  - Waves
  - Boat Action
- **Timing**
  - Hours
  - Days
  - Weeks
  - Months

- Even when a bloom looks like it disappeared the cells or toxins may still be present in the water

Cyanobacteria Look-a-Likes

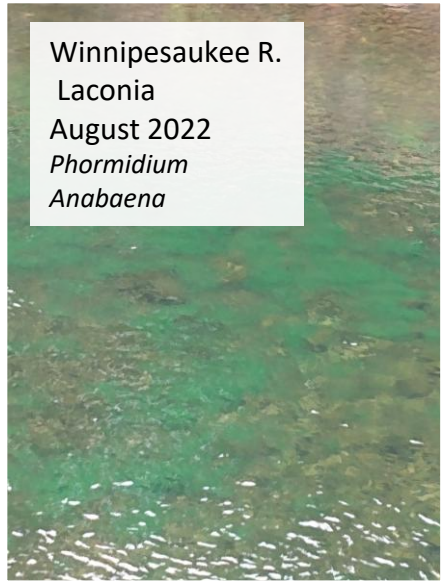
- **Pollen**
  - Yellow, dusty, grainy appearance
  - Floats on the surface in large patches
  - Often found in late Spring
  - Does not mix easily in water
- **Green Filamentous Algae**
  - Hairy, stringy, cotton candy
  - Slimy or fuzzy to the touch
  - Often on rocks, docks, submerged surfaces
- **Duckweed**
  - Tiny floating green leaves
  - Does not discolor the water itself
- **Iron Bacteria**
  - Oily, rusty, rainbow colored sheen
  - Often orange, reddish-brown
  - Smells metallic/swampy
- **Didymo aka "Rock Snot"**
  - Thick, fibrous mats that are white, tan or brown
  - Feels like wet wool
  - Firmly attaches to submerged surfaces

Look-a-likes and cyanobacteria can appear together

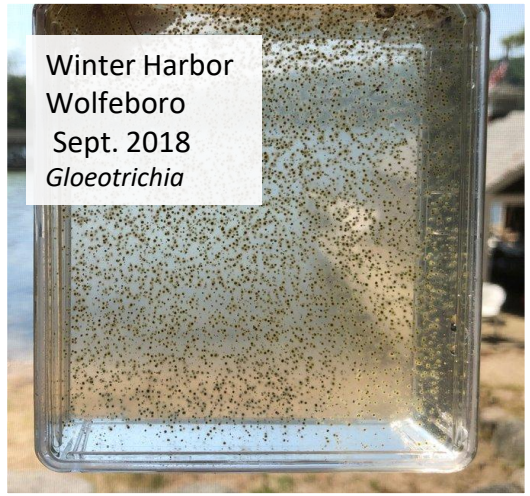


Stick Test

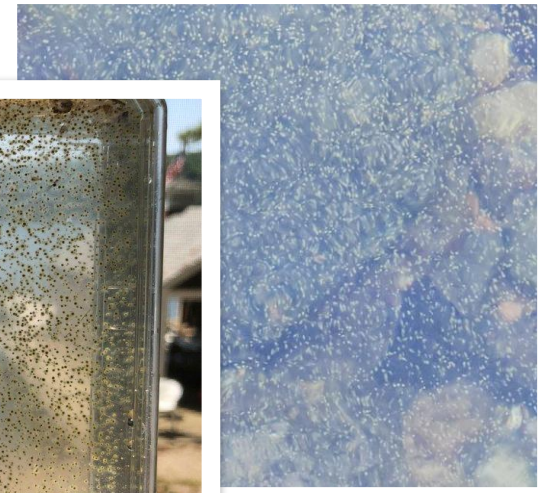
Tucker Pond
Aug. 2020
Woronchinia



Winnipesaukee R.
Laconia
August 2022
Phormidium
Anabaena



Winter Harbor
Wolfeboro
Sept. 2018
Gloeotrichia



Lake Wentworth
August 2024
Gloeotrichia

What's the Risk to Humans and Pets?

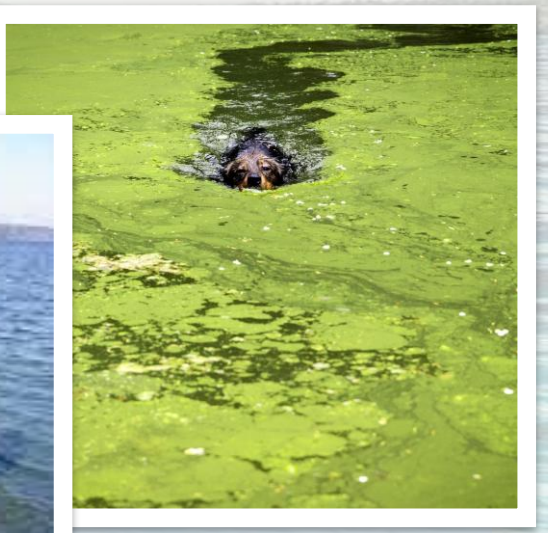
Health Effects in Humans (Contact/Ingestion):

- Skin Irritation
- Gastrointestinal Issues
- Neurological Effects
- Liver Damage

Health Effects in Pets:

Similar Symptoms: vomiting, diarrhea, lethargy, weakness, seizures, and difficulty breathing.

Higher Vulnerability: Kids and pets may be at higher risk due to their tendency to drink from lakes, ponds, or other bodies of water during outdoor activities.



Toxic Algae found in South Portland Park Maine 2019

When in doubt, *STAY OUT!*

Is It Safe to Swim, Boat or Use the Water?

Not During a Warning!
(previously advisory)

During a Watch

Complete a Visual Assessment

Do Not Enter the water if it looks off!

Potential for Toxins to Aerosolize

Boiling the water does not remove the toxins

Source: San Gabriel Valley Tribune

What If I Already Did...

1.) Wash with clean water immediately

2.) Monitor symptoms and seek medical attention if necessary.

3.) Please report your exposure to NHDES

How Can You Help?

- **Look before you leap!** Perform a visual inspection before getting in or on the water.
- Report any suspected blooms to NHDES through the Bloom Report Form.
- After alerting NHDES, call or email WWA so that we can keep an eye on the situation.
- Sign up for alerts – protect yourself!

Who Should You Contact to Report a Bloom?

1. Take a Few Photos
2. Record the Location/Day/Time
3. Send Info to NHDES and WWA
4. Use NHDES Bloom Report Form

NHDES HAB Hotline: (603) 848-8094

NHDES HAB Email: HAB@des.nh.gov

Sign Up for Waterbody Specific Alerts

WWA Call/Text: (603) 534-0222

Email: info@wentworthwatershed.org

Cyanobacteria Bloom Report
NHDES-W-07-092
Updated 6 March 2025

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

If you notice anything resembling cyanobacteria, please refrain from wading, swimming, or drinking the water. Keep all pets out of the water.

Examples of cyanobacteria blooms

Cyanobacteria harmful algal blooms (CyanoHABs) can look very different. Cyanobacteria can look like scum, mats, spilled paint or paint chips. The color of the water can turn blue, green, white, yellow or brownish.

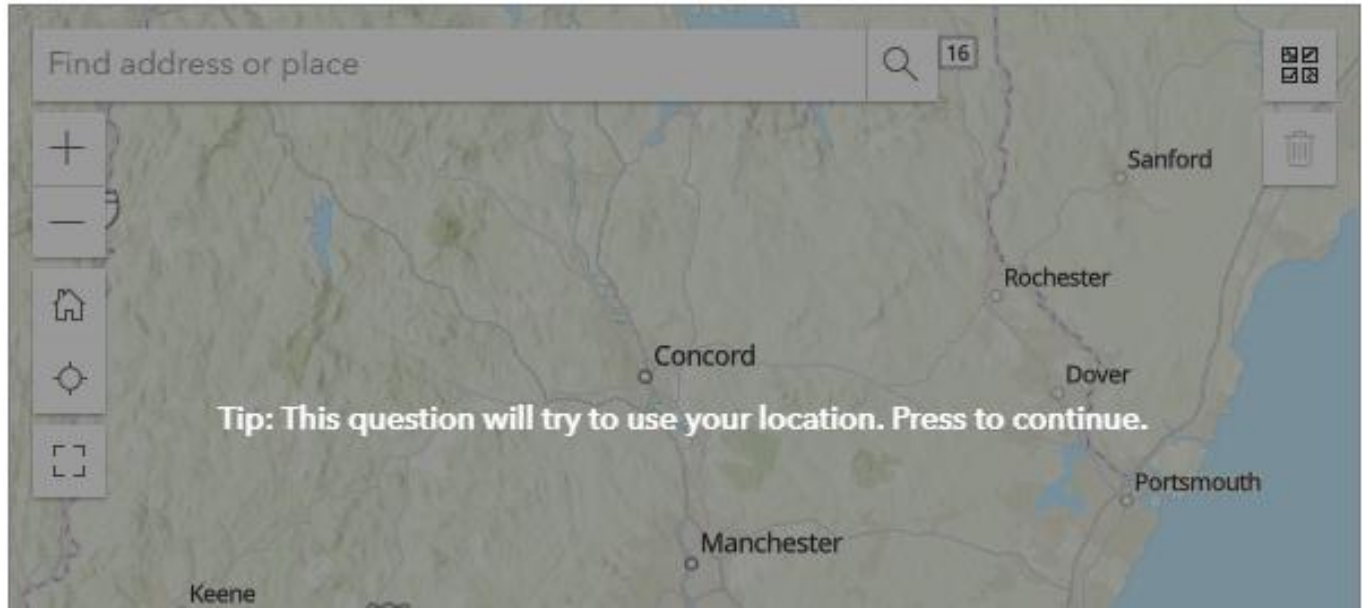
Bloom Information

Date bloom observed*

MM/DD/YYYY

Location of bloom*

Reported location information may be presented on the Healthy Swimmer Mapper with varying degrees of specificity depending on the size and characteristics of the affected waterbody. Specific locational and personal contact information provided on this form will not be published on the NHDES webpage. However, NHDES may be required to share this information under the provisions of RSA 91-A and in the context of legal discovery processes. By providing specific location information you are improving our database and our ability to inform the public about the location and timing of cyanobacteria blooms.



Waterbody name*

Example: Silver Lake

Where on the waterbody is the bloom located?*

- ○ Shoreline
- ○ Main Body
- ○ Both shoreline and main body

Location details

Please add details about the location or extent of the bloom as necessary. Example: Southwest corner, Fisher's Cove, etc.
If you are reporting on continuing bloom conditions, please include your address.

Observer Vantage Point*

Please indicate where you made your observation

- ○ Standing on the shoreline
- ○ While boating

What percentage of the waterbody are you able to observe at this vantage point (approximately)?*

Note: There is no requirement to boat or walk around to observe more of the waterbody

- ○ 5% or less
- ○ between 5% and 25%
- ○ between 25% and 50%
- ○ between 50% and 75%
- ○ 75% or more
- ○ Unknown

What size is the bloom?*

Based on your vantage point indicated above, please indicate the extent the bloom covers on the waterbody

- ○ 5% or less
- ○ between 5% and 25%
- ○ between 25% and 50%
- ○ between 50% and 75%
- ○ 75% or more
- ○ Unknown

How does the bloom appear?*

- ○ Surface scum - mostly scattered thin ribbons of material on the surface
- ○ Surface scum - wider streaks and bands of material visible across the surface
- ○ Surface scum - solid scum of material throughout the waterbody's surface
- ○ Water column - material at low density down in the water, resembling small specks in the water

Bloom Image

Image disclaimer

By submitting an image, you acknowledge that you own the image, and that any/all images may be used by the New Hampshire Department of Environmental Services, without compensation to you, on websites, in reports, for promotion or for other purposes related to its mission.

Please upload a clear close-up photo of the bloom.

This will give us an idea if it is a cyanobacteria bloom, or an organism commonly mistaken for cyanobacteria.

Drop image here or select image

Example of a close-up photo.

Example of a clear wide view photo.

Upload a third photo if needed.

Any additional photos help us get a better understanding of the bloom.

Drop image here or select image

Upload a fourth photo if needed.

Any additional photos help us get a better understanding of the bloom.

Drop image here or select image

Please provide any additional description of the bloom you may have.

Reporter Information

First and Last Name*

Example: John Doe

Phone number*

Example: (603) 999-9999

( ) -

Email*

Your email will be added to the distribution list to receive sampling updates for this waterbody. You can opt out of these emails at any time.

Is there currently a warning on this waterbody?*

Please check the Healthy Swimming Mapper for a list of current cyanobacteria warnings.

- Yes
- No

Submit

What to expect

A warning is issued on a waterbody when samples exceed 70,000 cells/mL at multiple locations.

A watch may be issued based only on a photo, when the cyanobacteria density is approaching 70,000 cells/mL, only one sample exceeds 70,000 cells/mL, or the bloom material has passed.

Healthy Swimming Mapper will be updated to reflect reports, watches, and warnings

WWA Programs and Projects

WWA is working to combat risks and number of occurrences of cyanobacteria through:

- Public education
- Projects to reduce stormwater runoff and erosion
- Partnerships with Wolfeboro Waters Committee, Lake Winnipesaukee Alliance, NH Department of Environmental Services
- Updating our Watershed Management Plan

Year round water sampling to track water quality and understand trends

Questions?

Julie Brown

Executive Director

Wentworth Watershed Association

www.wentworthwatershed.org

juliebrown@wentworthwatershed.org

Thank you to our partners at LWA for sharing slides and data!

LAKE WINNIPESAUKEE ALLIANCE

OUR LAKE. OUR FUTURE.