



Cyanobacteria Harmful Algal Blooms: Berkshire County Presentation

Rachel Gladstone

Massachusetts Dept. of Public Health

Bureau of Climate & Environmental Health

Division of Environmental Toxicology, Hazard Assessment & Prevention

Berkshire County

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Cyanobacteria in Massachusetts Waterbodies



What are Cyanobacteria?

Cyanobacteria

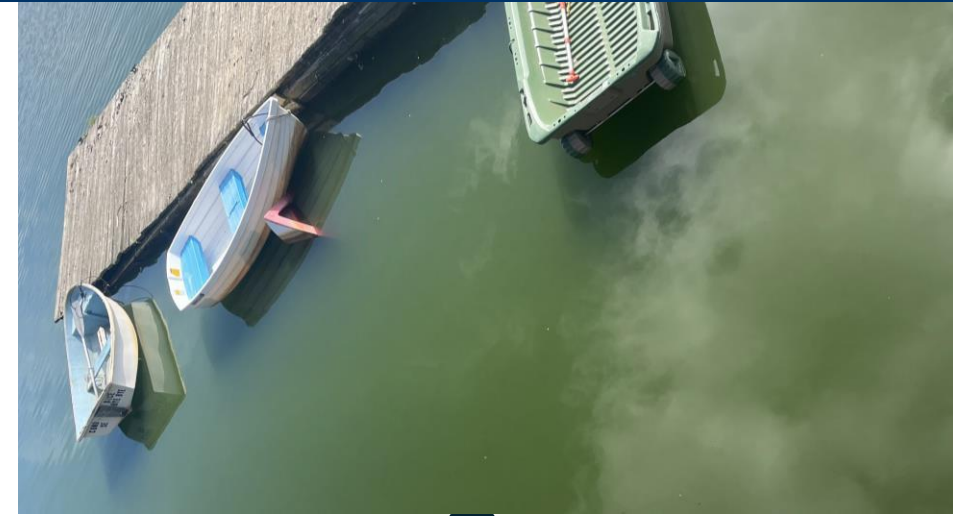
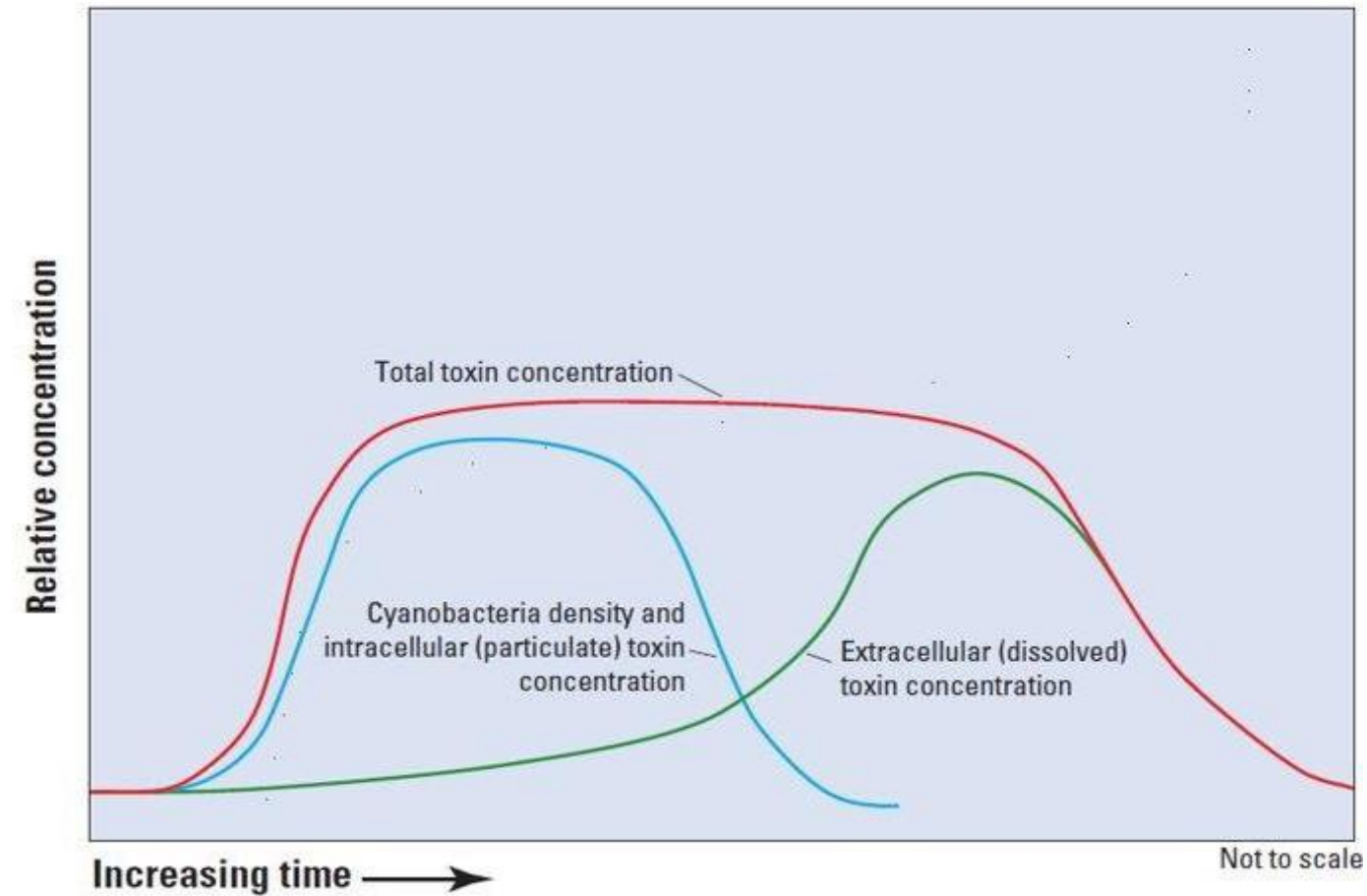
- Occur naturally in fresh, brackish, and salt waterbodies
- Certain environmental conditions can cause excessive growth – “**CyanoHAB**”
- Some species produce toxins called **cyanotoxins**
- Appearance varies among cyanobacteria genera
 - Water can appear discolored, cloudy, or resemble pea soup
 - Typically green or blue but may be brown or red
 - Can give bad odor
 - Dispersed through water column or in scum or mat on surface or sediment
- Highly mobile, photosynthetic organisms



When are Cyanotoxins in the Water?

The figure below shows the relative concentration of cyanotoxins over time.

- The red line shows total (intra- and extracellular) toxin concentration
- The blue line shows cyanobacteria cell density and intracellular (particulate) toxin concentration
- The green line shows extracellular (dissolved) toxin concentration



What are Cyanotoxins?

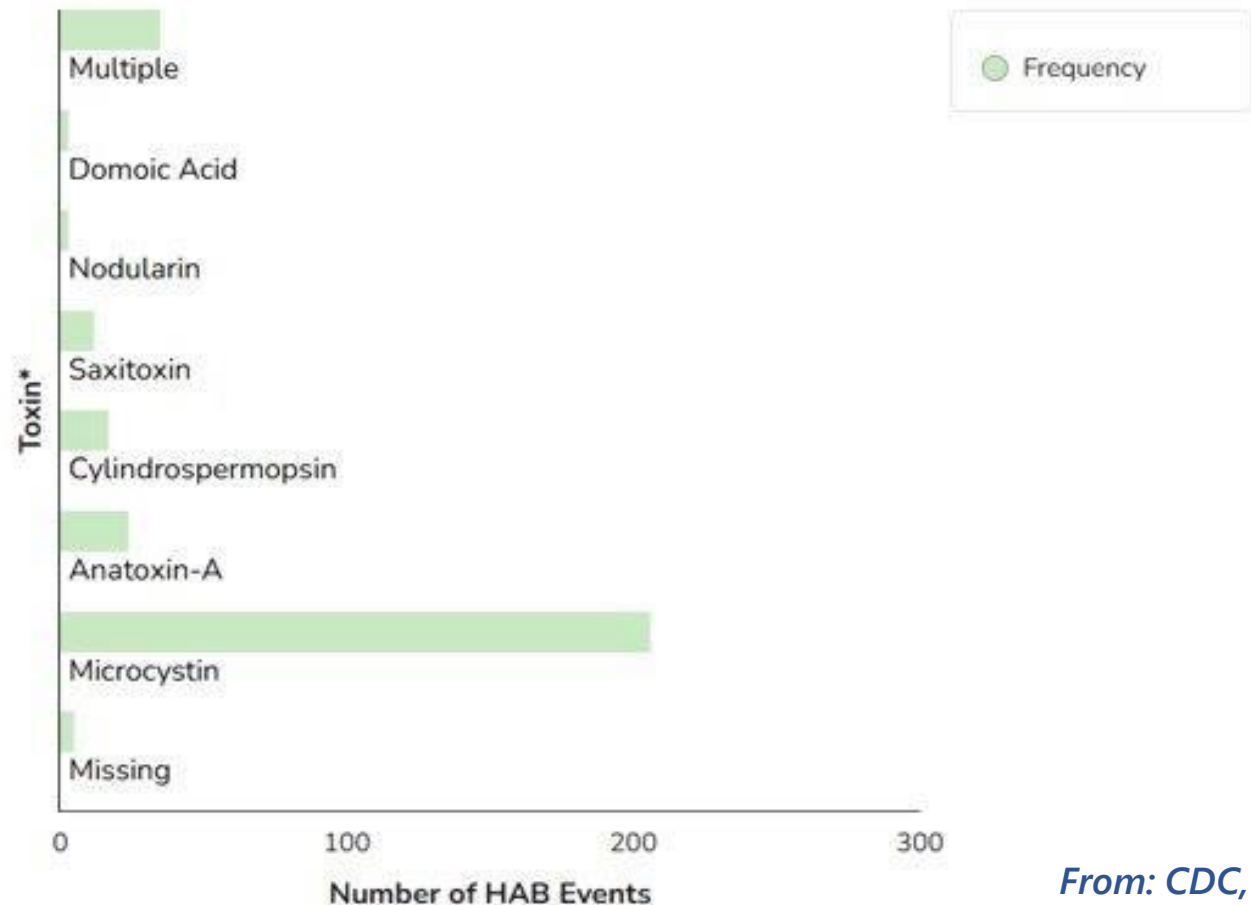
Toxin Name	Toxin Type	DPH Recreational Water Criteria	Notes
Microcystins	Hepatotoxin	8 µg/L	<ul style="list-style-type: none"> • 10% of toxin extracellular • Half-life of ~5 days (biodegradation)
Cylindrospermopsin	Hepatotoxin	15 µg/L	<ul style="list-style-type: none"> • 24% - 99% of toxin extracellular • Half-life of 2 – 4 days (biodegradation)
Anatoxin-a	Neurotoxin	60 µg/L*	<ul style="list-style-type: none"> • <10% extracellular • Half-life: 2 – 12 hours (photodegradation)
Nodularin	Hepatotoxin	-	
Saxitoxin	Neurotoxin	-	
B-N-methylamino-L-alanine (BMAA)	Neurotoxin	-	Potential link to neurodegenerative diseases from chronic exposure (no consensus in scientific community; more research needed)
Lipopolysaccharide (LPS)	Dermatoxin	-	
Lyngbyatoxins	Dermatoxin	-	
Aplysiatoxins	Dermatoxin	-	

Which Cyanotoxins are the Most Common in the US?



Figure 9a. Identified toxins during environmental testing of HAB events, 2022

Among the 228 HAB events with toxins identified during environmental testing, microcystins (206, 90%) were found most often.



Berkshire County Cyanobacteria Genera

Cyanobacteria Genera and Cyanotoxins detected in Berkshire County

Waterbody	Genus	Count	Potential Cyanotoxin(s)
Lower Spectacle Pond	Chroococcus	1	Microcystin
	Pseudanabaena	1	Microcystin, Anatoxin
Stockbridge Bowl	Anabaenopsis	1	Microcystin
	Coelosphaerium	1	Microcystin
	Dolichospermum	3	Microcystin, Anatoxin, Saxitoxin
	Gomphosphaeria	1	Microcystin
	Microcystis	3	Microcystin
	Oscillatoria	1	Microcystin, Anatoxin



How Can I Get Exposed to Cyanotoxins?



INGESTION

Swallowing water with low levels of cyanobacteria or cyanotoxins may cause gastrointestinal problems, while ingestion of higher levels of cyanotoxins may cause neurological or liver damage. Accidental ingestion of water is most likely to occur while swimming.



INHALATION

Inhaling water droplets that contain cyanobacteria or cyanotoxins may cause allergy-like symptoms, such as runny noses or sore throats. Activities such as jet skiing are likely to result in the greatest exposure by inhalation.



DERMAL

The most common route of exposure, dermal contact, can cause rashes or skin irritation in some people. These reactions are caused by cyanobacteria themselves, as well as some cyanotoxins. Any water contact may cause these reactions.



CONSUMPTION OF CONTAMINATED FISH/SHELLFISH

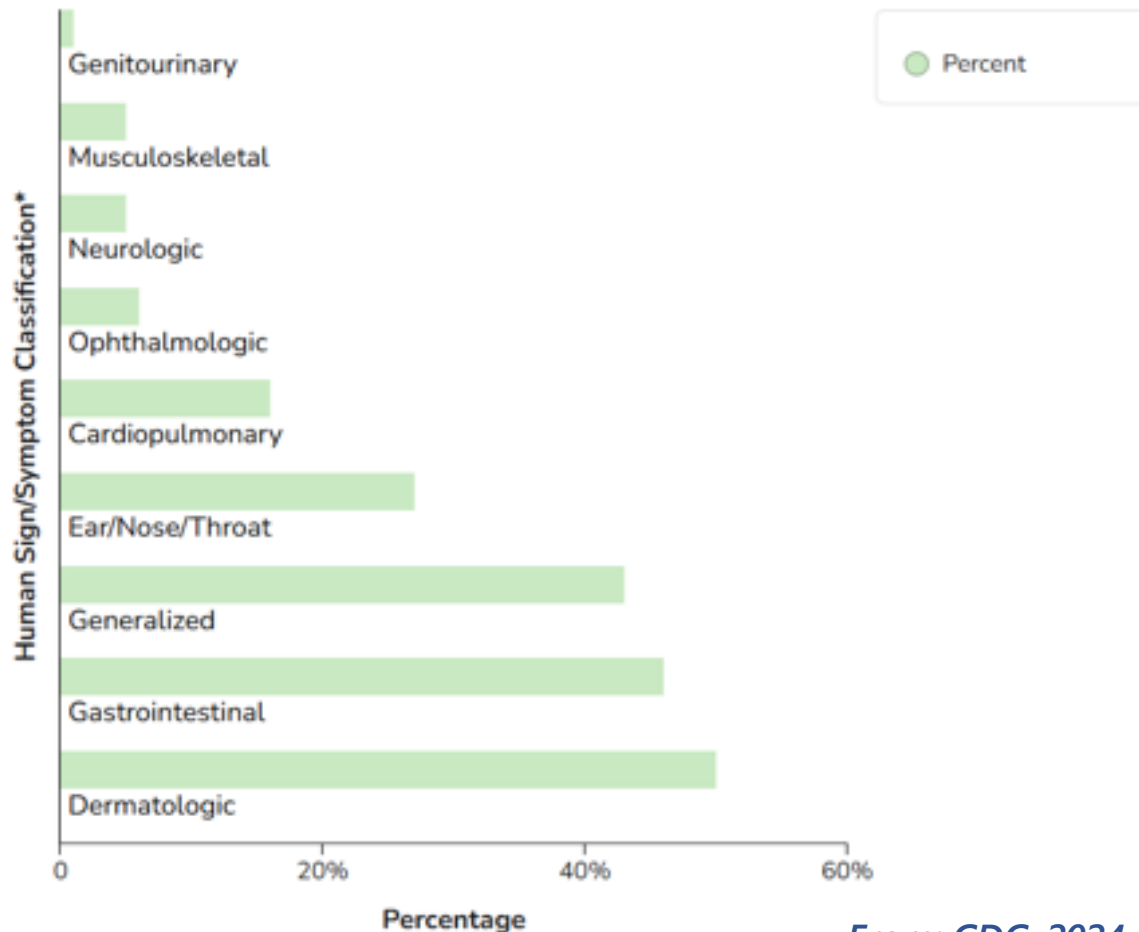
Exposure may also occur through consumption of contaminated seafood, particularly shellfish. Several studies have found cyanotoxins in freshwater fish, but more study is needed to better understand human exposure through fish consumption.



Routes of Exposure

Figure 11: Signs and symptoms of HAB-associated human illnesses, 2022

The most frequently reported types of signs and symptoms by the 95 ill people were dermatologic (47, 50%), gastrointestinal (44, 46%), and generalized (41, 43%) during 2022.



From: CDC, 2024

Exposure Potential	Recreational Activity	Exposure Routes
High	Swimming / Wading	Ingestion, Dermal
	Jet Skiing	Ingestion, Dermal, Inhalation
Medium	Fish consumption	Ingestion
	Canoeing, sailing, boating, etc.	Inhalation, Dermal
Low	Catch-and-release fishing	Dermal
	Running / Walking	N/A

From: Stone & Bress, 2007

Cyanobacteria Management/Advisory Jurisdiction

Cyanobacteria Management/Advisory Jurisdiction

- Local Health Departments are primary point of contact for responding to reports of cyanoHABs in recreational waterbodies.
- BOH should have a clear protocol on complaints related to blooms.
- Ask DPH for a 2nd opinion and assistance if needed.
- Ask other BOH for opinions.
- Update websites to include resources.
- Identify areas to post advisories.
- Establish outreach and media contacts.



MDPH Guidelines

MDPH provides technical support to:

- Answer general questions about cyanoHABs
 - Interpret photos or lab results
 - Inspect waterbody (resource depending)
 - Sample waterbody when cyanoHAB is no longer visible
- Established cyanobacteria guidelines in 2008, revised in 2025

MDPH recommends that the managing entity issue an advisory if any of the following criteria is met:

- A visible scum or mat is present
- The algal cell count exceeds 70,000 cells/milliliter of water
- The level of the toxin microcystin is 8 parts per billion (ppb) or higher
- The level of the toxin cylindrospermopsin is 15 parts per billion (ppb) or higher
- The level of the toxin anatoxin-a is 60 parts per billion or higher

Rescinding an advisory is recommended after two samples, collected one week apart, with levels below guidelines.



MDPH Cyanobacteria Public Health Advice

- Avoid contact with contaminated water
 - Includes: swimming, fishing, boating, jet skiing, wading
- **When in Doubt, Stay Out!**
- If contact occurs, rinse yourself and your pet with clean tap or bottled water.
- If you or your pet swallow contaminated water, call your doctor or veterinarian.
- If you or your pet are experiencing adverse health effects, contact your doctor or veterinarian immediately.


CAUTION

PUBLIC HEALTH ADVISORY


HARMFUL ALGAL BLOOM PRESENT





Waterbody Unsafe for People and Pets

 Do not swim.  Do not swallow water.

 Do not jet ski.  Do not consume fish.

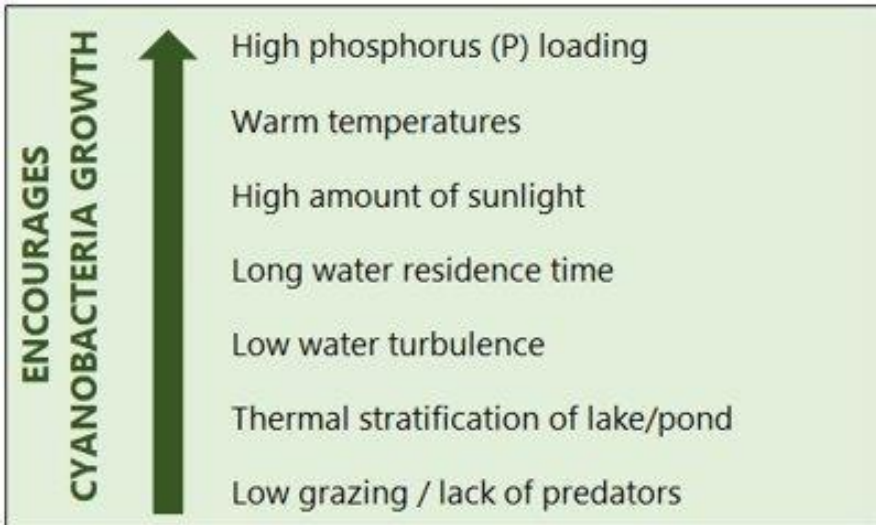
 Do not boat.  Keep animals away.

 Rinse off after contact with water. 

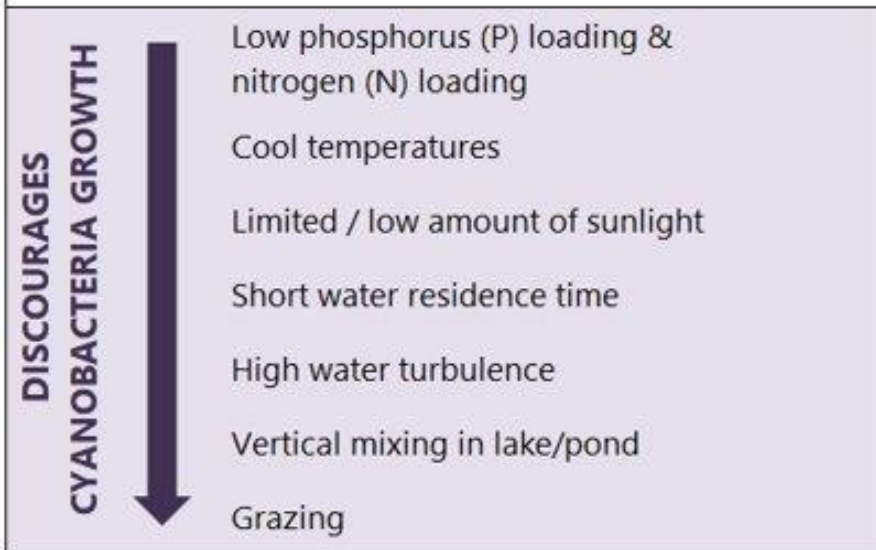
For general questions about cyanobacteria, contact the Massachusetts Department of Public Health:
617-624-5757
www.mass.gov/dph/algae

For questions about the advisory at this waterbody contact:

What Causes Harmful Algal Blooms to Grow?



ENVIRONMENTAL CONDITIONS



2025 MDPH Waterbody Characteristics Analysis

Bloom Duration is **Likely** Shorter For:

- Sand-Based Waterbodies
- Deeper Waterbodies

Max Depth Has a High, Inverse Effect on Large Waterbody Bloom Duration



Cyanobacteria Advisories in Berkshire County

Waterbody	# of Advisories	Advisory Average Days	Max Days	Area (Acres)	% Clay	% Sand	Max Depth (FT)
Buckley Dunton Lake	1	26	26	160	5	55	9
Cheshire Lake	1	80	80	418	11	48	13
Laurel Lake	1	62	62	170	12	32	57
Plunkett Reservoir	4	25	41	73	5	59	22
Pontoosuc Lake	4	40	77	500	12	45	38
Stockbridge Bowl	2	8	15	398	12	32	51

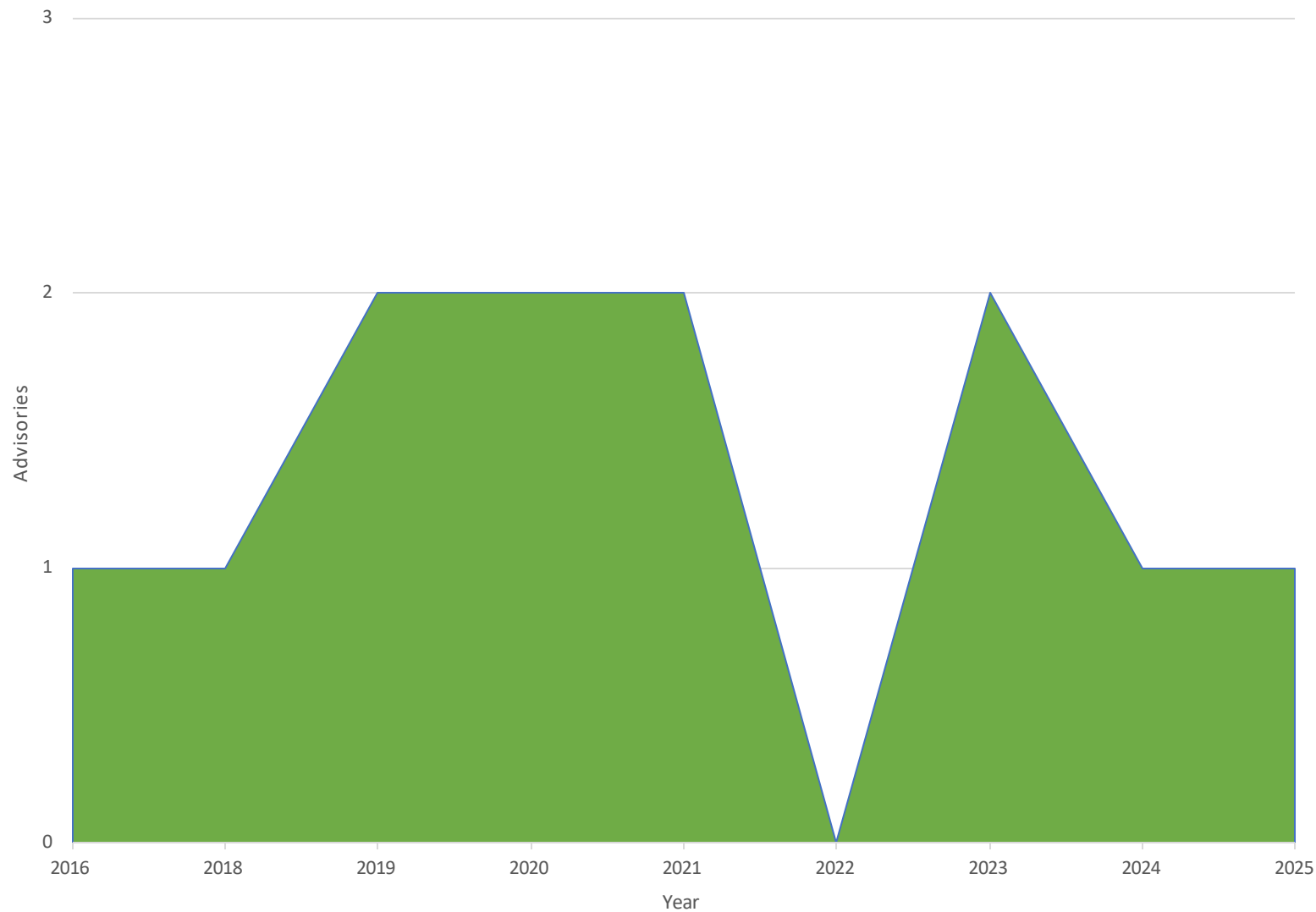
Waterbody Characteristics

- Area: Large?
- Sediment: Sandy?
- Maximum Depth: Deep?

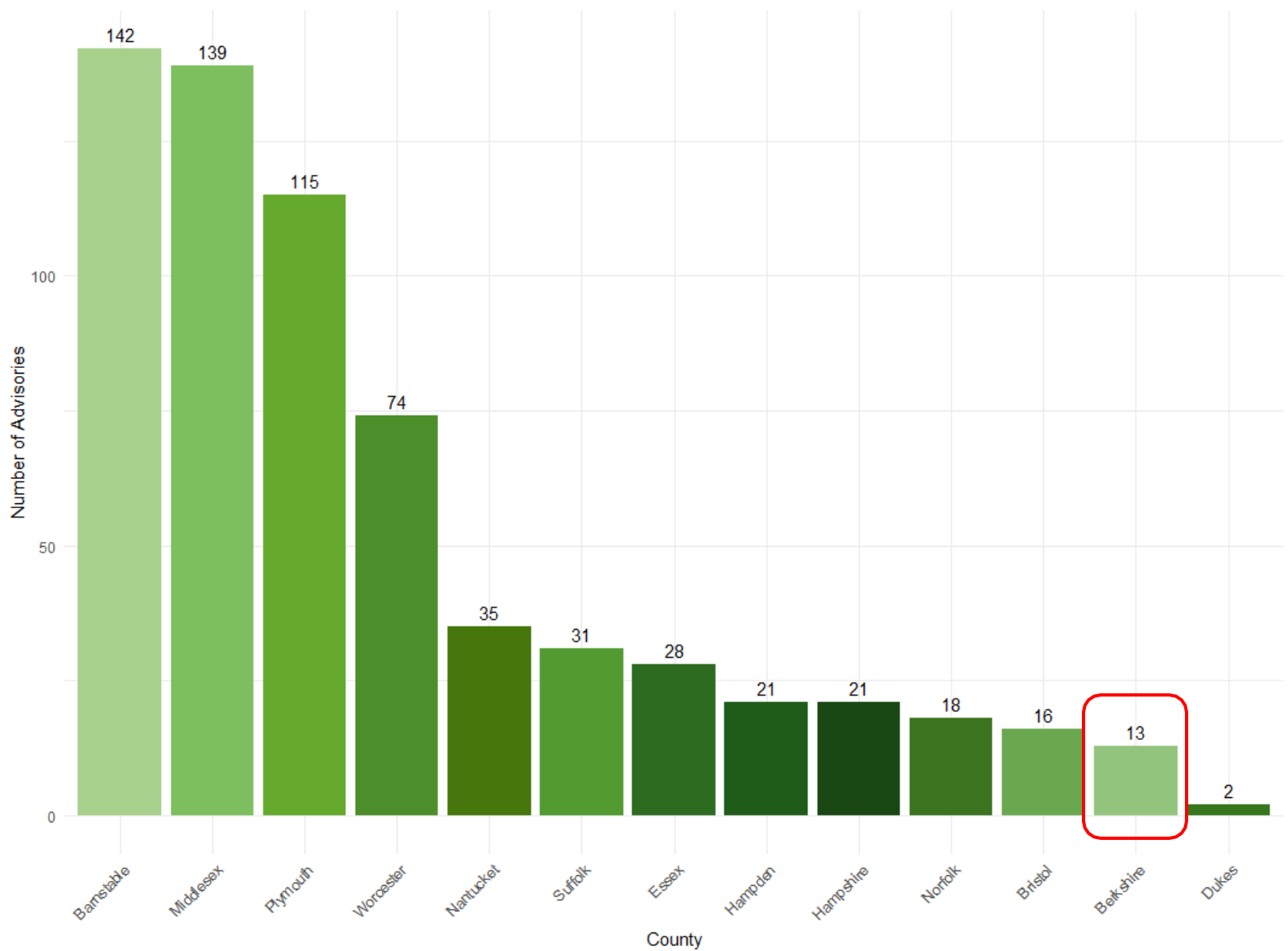


Cyanobacteria Advisories in Berkshire County

CyanoHAB Advisories Per Year in Berkshire County Since 2016



Cyanobacteria Advisories in MA by County



Bloom Warning Approaches

Field Monitoring

Visual Monitoring



Phycocyanin



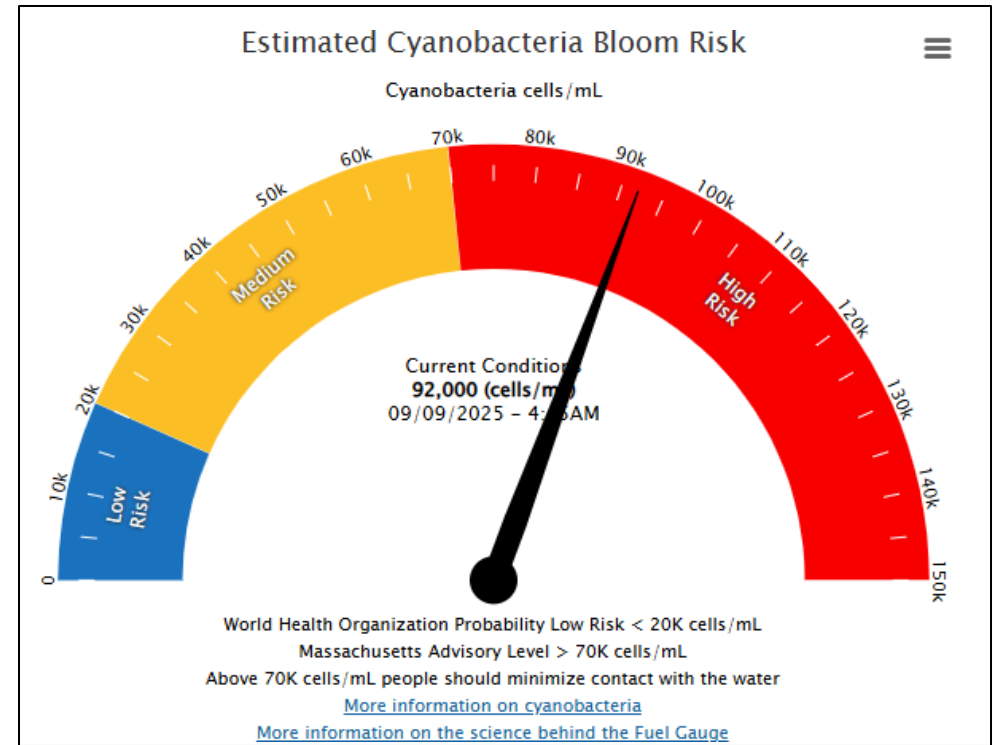
Dissolved Oxygen



Turbidity



Charles River Buoy & Cyano Risk Gauge

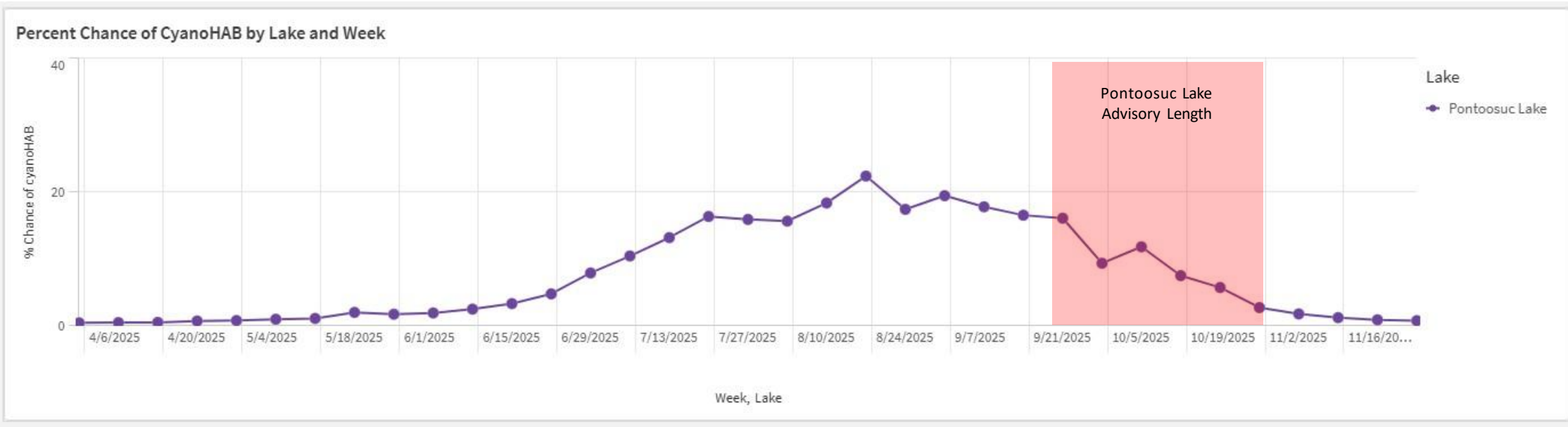


*Courtesy of:
Maura Gould, EPA &
Max Rome, NEU / CRWA*

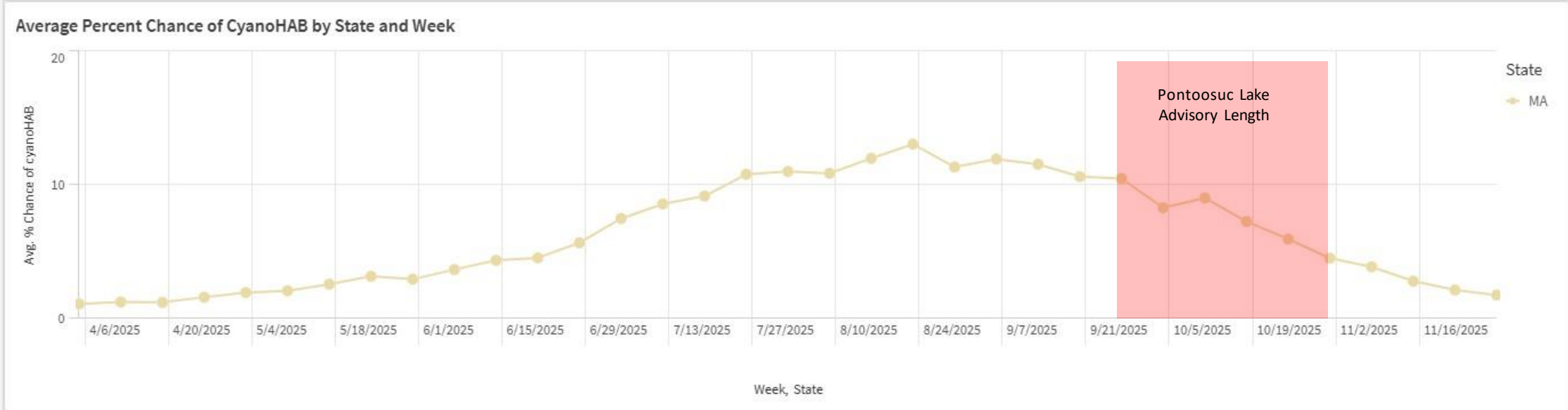


CyanoHAB Forecasts for Pontoosuc Lake: epa.gov/habs/hab-forecasts

- Q Lake
- Pontoosuc Lake ✓
 - Abarngamook Lake
 - Adobe Creek Reservoir
 - Aitkin Lake
 - Alamo Lake
 - Alamoosook Lake
 - Albert Lake
 - Albert Lea Lake
 - Alcova Reservoir
 - Alcove Reservoir
 - Alder Lake
 - Alford Lake
 - Alice Lake
 - Alkali Lake (ND)
 - Alkali Lake (NE)
 - Alkali Lake (SD)



- Q State
- MA ✓
 - AL
 - AR
 - AZ
 - CA
 - CO
 - CT
 - FL
 - GA
 - IA
 - ID
 - IL
 - IN
 - KS
 - KY
 - LA



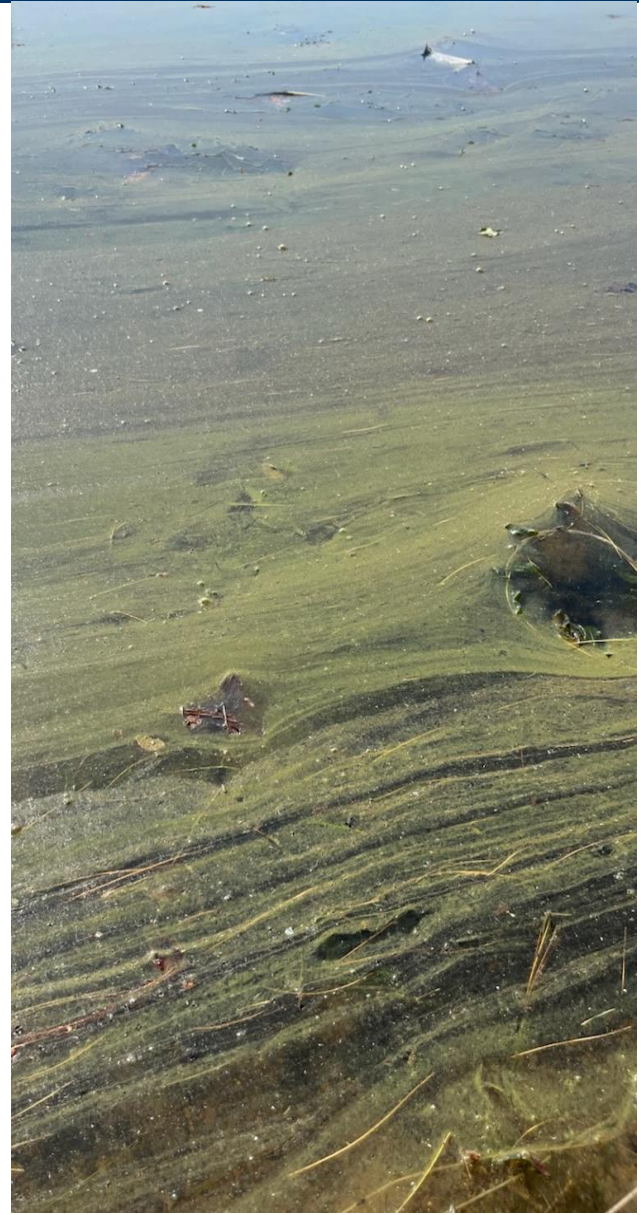
CyanoHAB Management Approaches

There are a number of best management practices that can reduce bloom-promoting nutrients:

- Maintain septic systems and storm drains
- Reduce application of fertilizer
- Pick up pet waste
- Do not feed ducks or geese
- Plant or maintain native vegetation around the water's edge
- Chemical treatment methods (such as algaecides) are not recommended during a bloom.

Cyanobacteria and/or Cyanotoxins Contract Services List

- <https://www.mass.gov/info-details/cyanobacteria-andor-cyanotoxins-contract-services-list>



Helpful Links

- <https://www.mass.gov/guides/cyanobacterial-harmful-algal-blooms-cyanohabs-water>
- [Harmful algae blooms in freshwater bodies | Mass.gov](#)
- <https://www.mass.gov/lists/algae-information#guidelines->
- <https://www.mass.gov/info-details/climate-fact-sheet-contact-with-cyanobacteria>
- <https://www.mass.gov/info-details/cyanobacteria-and-or-cyanotoxins-contract-services-list>
- <https://www.cdc.gov/harmful-algal-blooms/about/index.html>
- <https://www.epa.gov/habs>
- <https://www.epa.gov/water-research/cyanobacteria-assessment-network-cyan>
- [HAB Forecasts | US EPA](#)

Questions?

