

Bloom 23-3404-B1



Harmful Algal Blooms (HABs) on Cayuga Lake: 6 Years of Local Volunteer Monitoring

Grascen Shidemantle, PhD
Executive Director
Community Science Institute

Cayuga Lake Watershed Network
Community Conference
6/20/2024

Agenda

- Community Science Institute
- Brief overview of HABs
- Cayuga Lake HAB Monitoring Program
 - Program structure
 - 2023 HAB Monitoring Season
 - HAB patterns on Cayuga Lake (2018-2023)
 - Looking ahead to the 2024 Season
- Get Involved!
- Acknowledgements and Q&A



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CSI is a 501(c)3 non-profit and NYSDOH-ELAP certified water testing lab

CSI offers three types of programming:

Fee-for-
Service Water
Testing

Volunteer
Water
Monitoring
Partnerships

Outreach and
Education

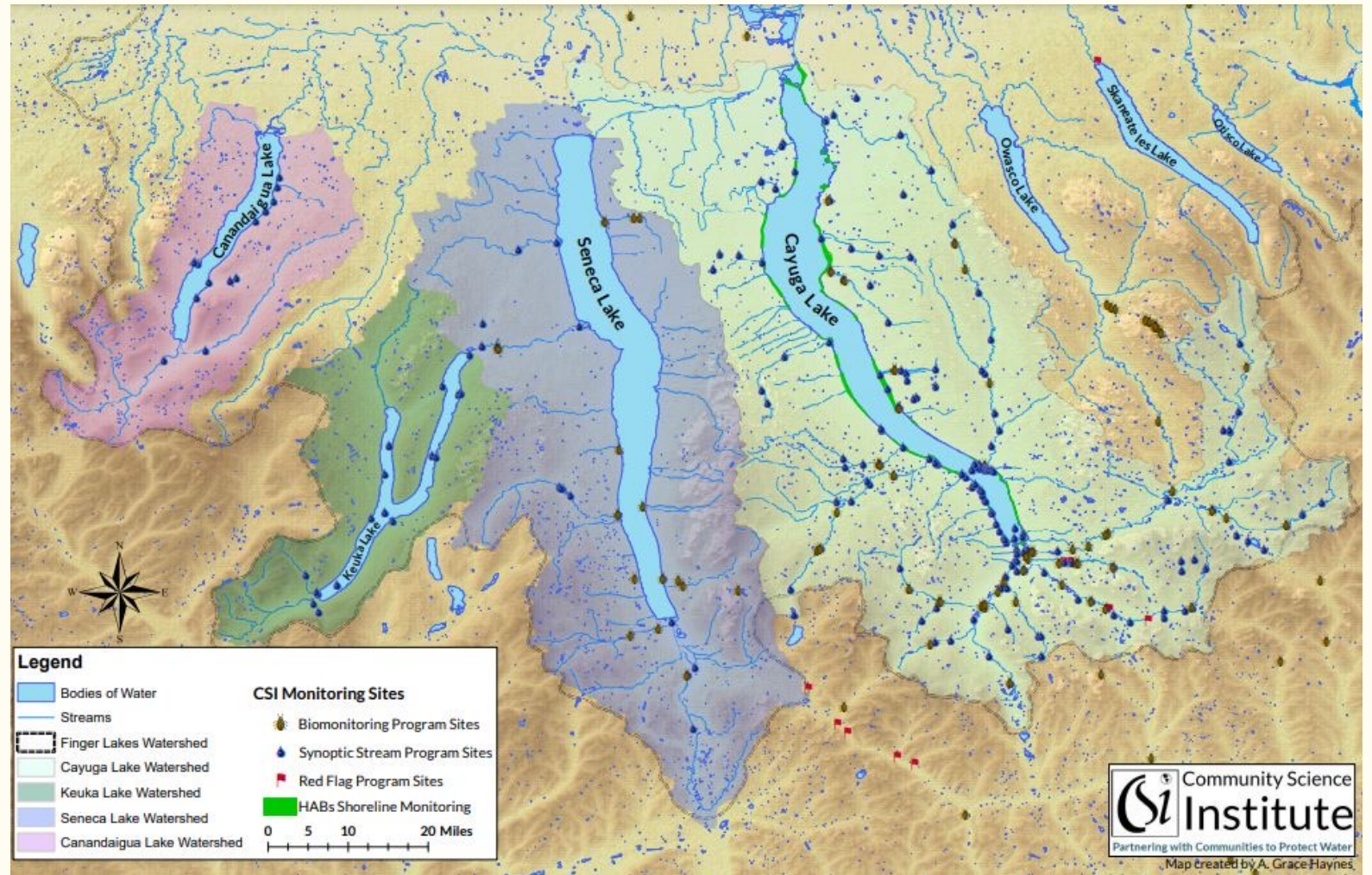
CSI's Mission

To foster and support environmental monitoring in partnership with community-based volunteer groups in order to better understand our shared natural resources and how to manage them for long-term sustainability and protection.

CSI's Water Monitoring Partnerships

1. Synoptic Stream and Lake Monitoring
2. Red Flag Monitoring
3. Biomonitoring
4. Harmful Algal Bloom (HAB) Monitoring

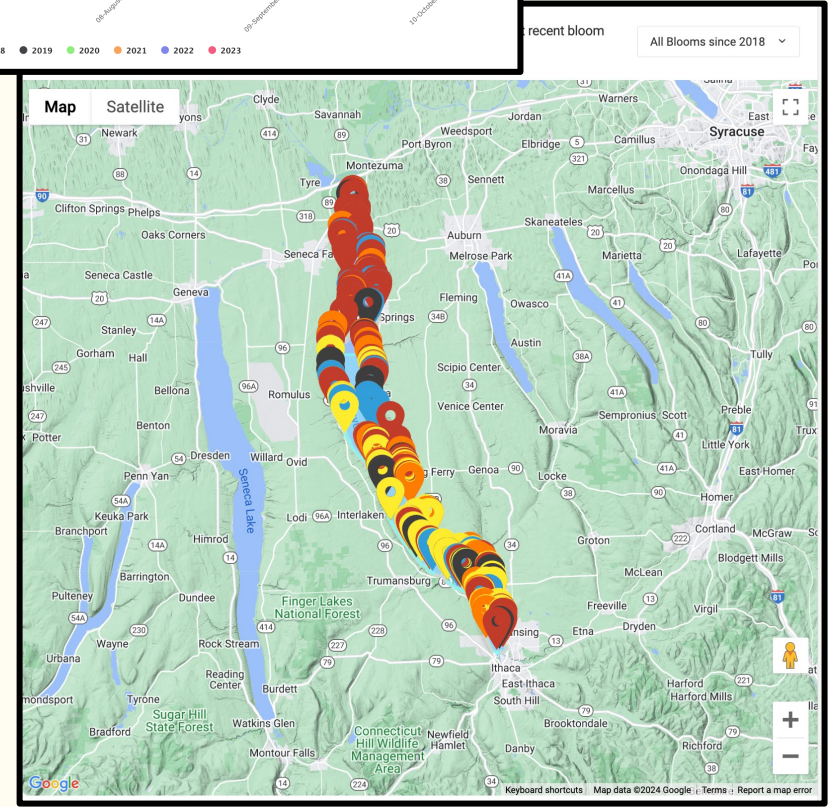
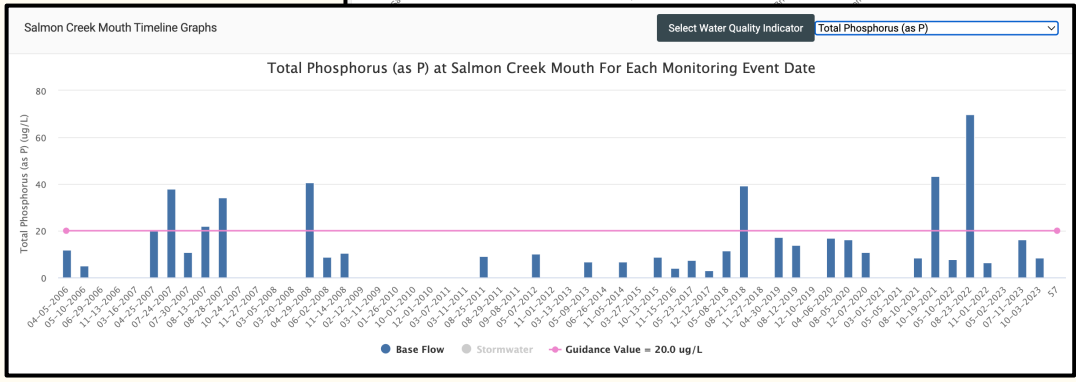
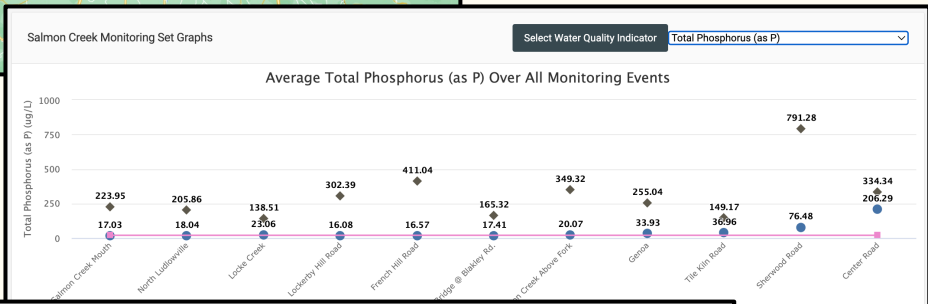
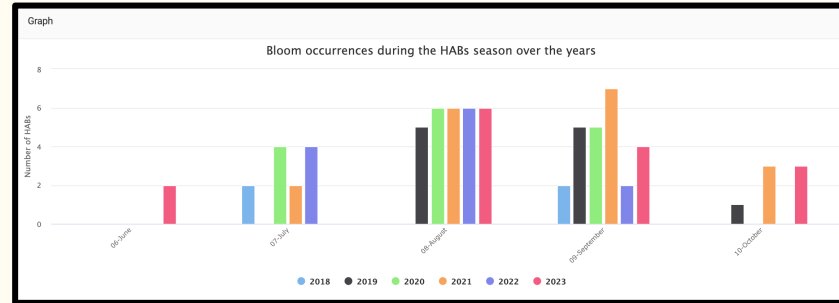
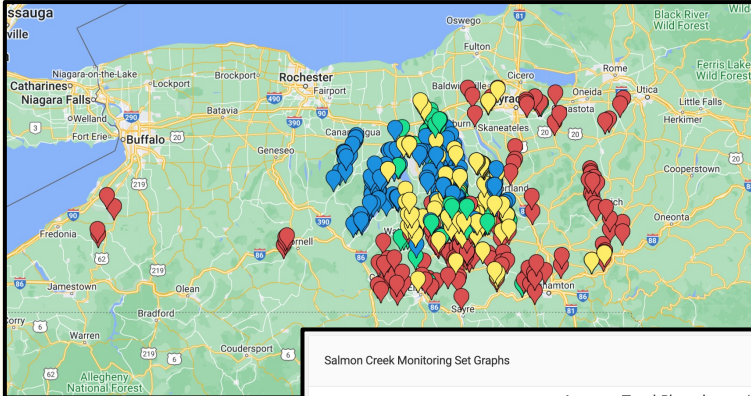
CSI recruits, trains,
and coordinates over
250 volunteers!



CSI's Water Quality Database

Harmful Algal Blooms

Stream and Lake Chemistry



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Harmful Algal Blooms (HABs)

H = Harmful

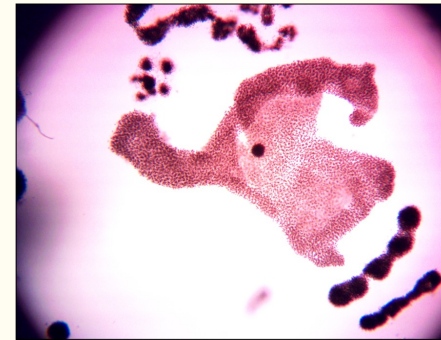
Produce cyanotoxins (e.g. microcystin, guanitoxin, saxitoxin, cylindrospermopsin, etc.)

A = Algal

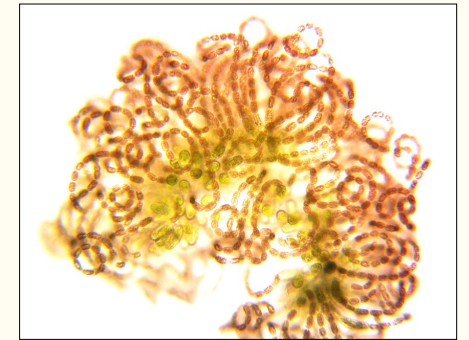
Actually cyanobacteria, not algae!

B = Bloom

Explosive growth



Microcystis sp.



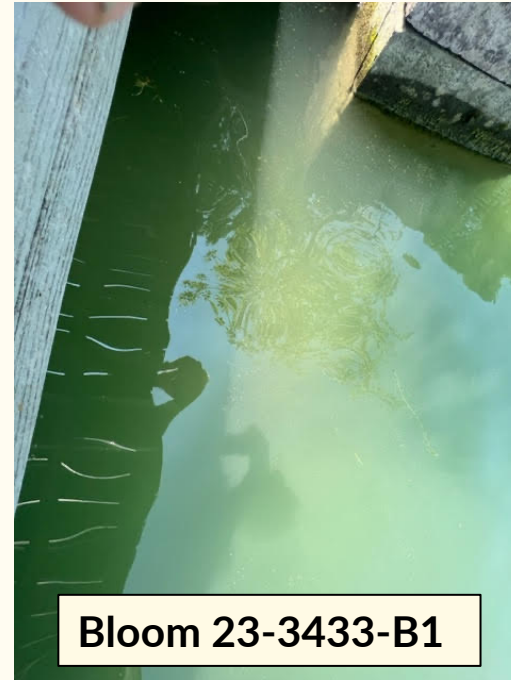
Dolichospermum sp.

Harmful Algal Blooms (HABs)



Know it!

Avoid it!



Report it!

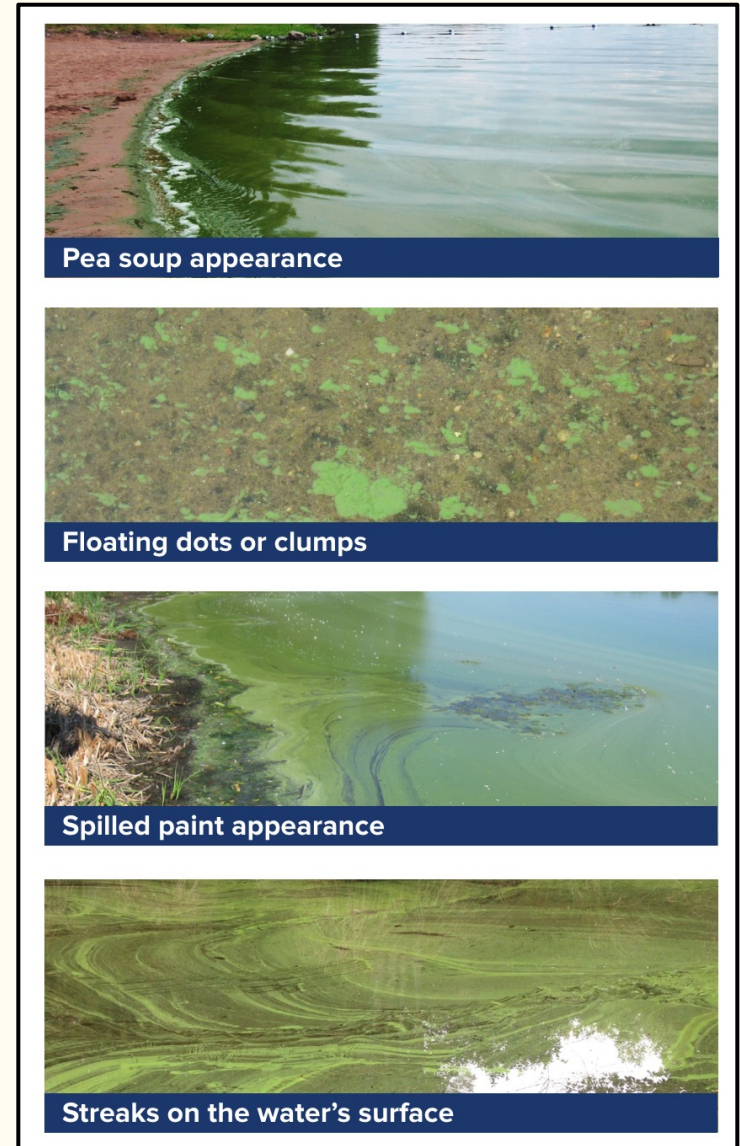
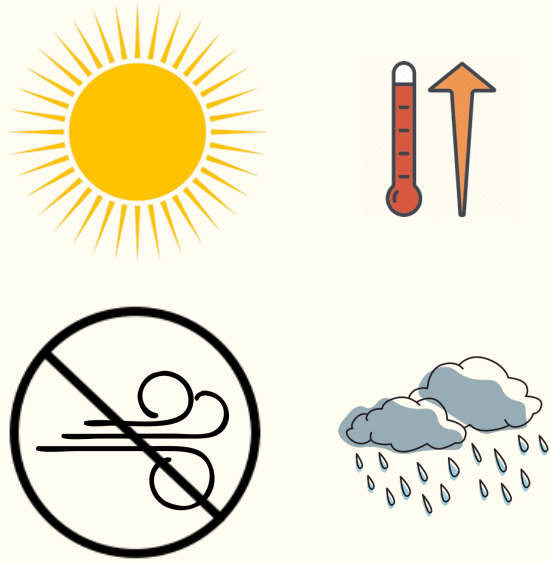


Image from Cayuga Lake HABs Action Plan

Harmful Algal Blooms (HABs)

Contributing factors to HAB formation:

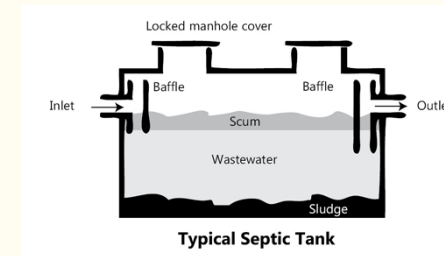
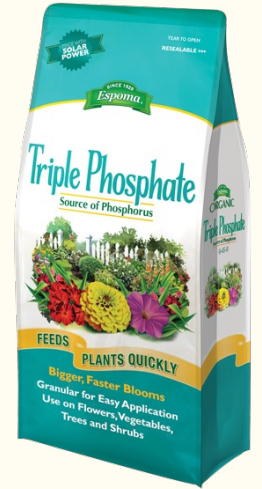


Weather



Randy Westbrook, U.S. Geological Survey UGA1299199

Invasive Species



Nutrients

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Cayuga Lake HAB Monitoring Program



Alyssa Johnson
Cayuga Lake HABs
Monitoring Program
Coordinator

Purpose: Collect actionable data on cyanobacteria blooms, protect public health, and relay bloom information and testing results quickly and efficiently.

HABs Harriers perform weekly shoreline surveys for HABs



Blooms are reported to CSI via HABs Hotline



Samples are analyzed in CSI's state certified lab



Alerts public to HABs



The Cayuga Lake HABs Monitoring Program is led by CSI in collaboration with CLWN and DCL

Cayuga Lake HAB Monitoring Program

HAB samples are analyzed to:

- Identify cyanobacteria genera
- Measure chlorophyll a (EPA 446.0 Rev. 1.2)
- Measure microcystin (EPA 546)

Bloom information is uploaded to CSI's **[NEW HABs Database](#)**

CSI reports all blooms to county health department officials and NYSDEC



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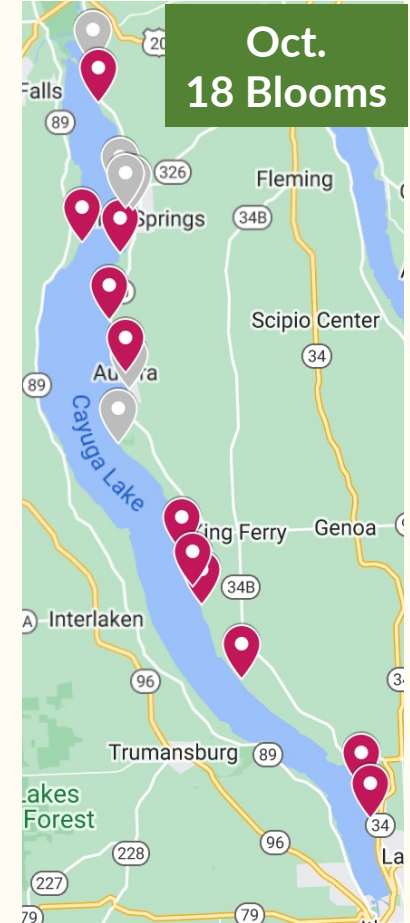
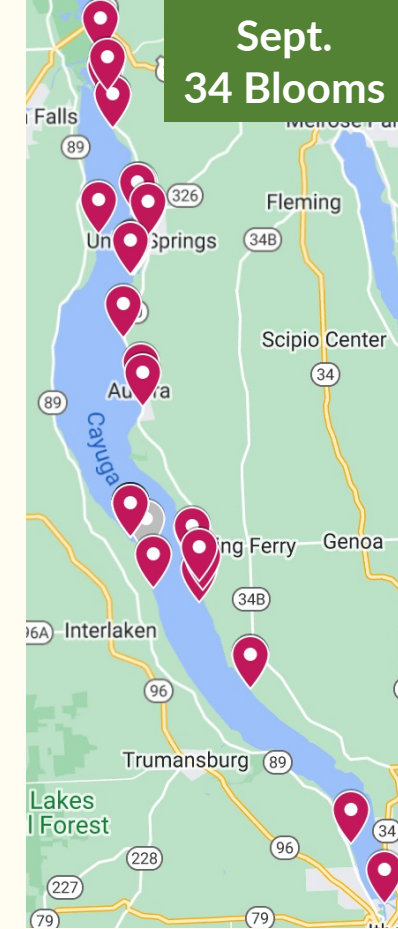
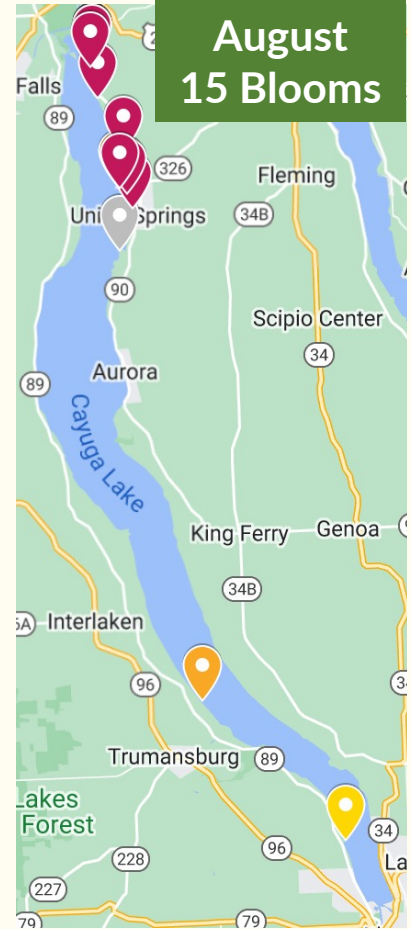
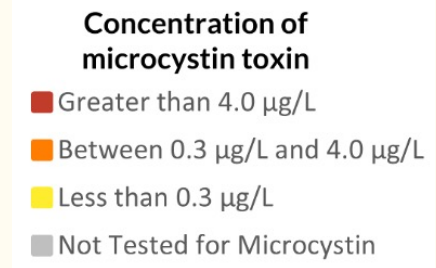
2023 Monitoring Season Fast Facts

- Number of volunteers: 85 HAB Harriers; 8 HAB Carriers
- Number of monitoring zones: 73
- Shoreline coverage: 50%
- HABs Reported: 80
- CSI received HABs reports from June 22, 2023 – October 26, 2023



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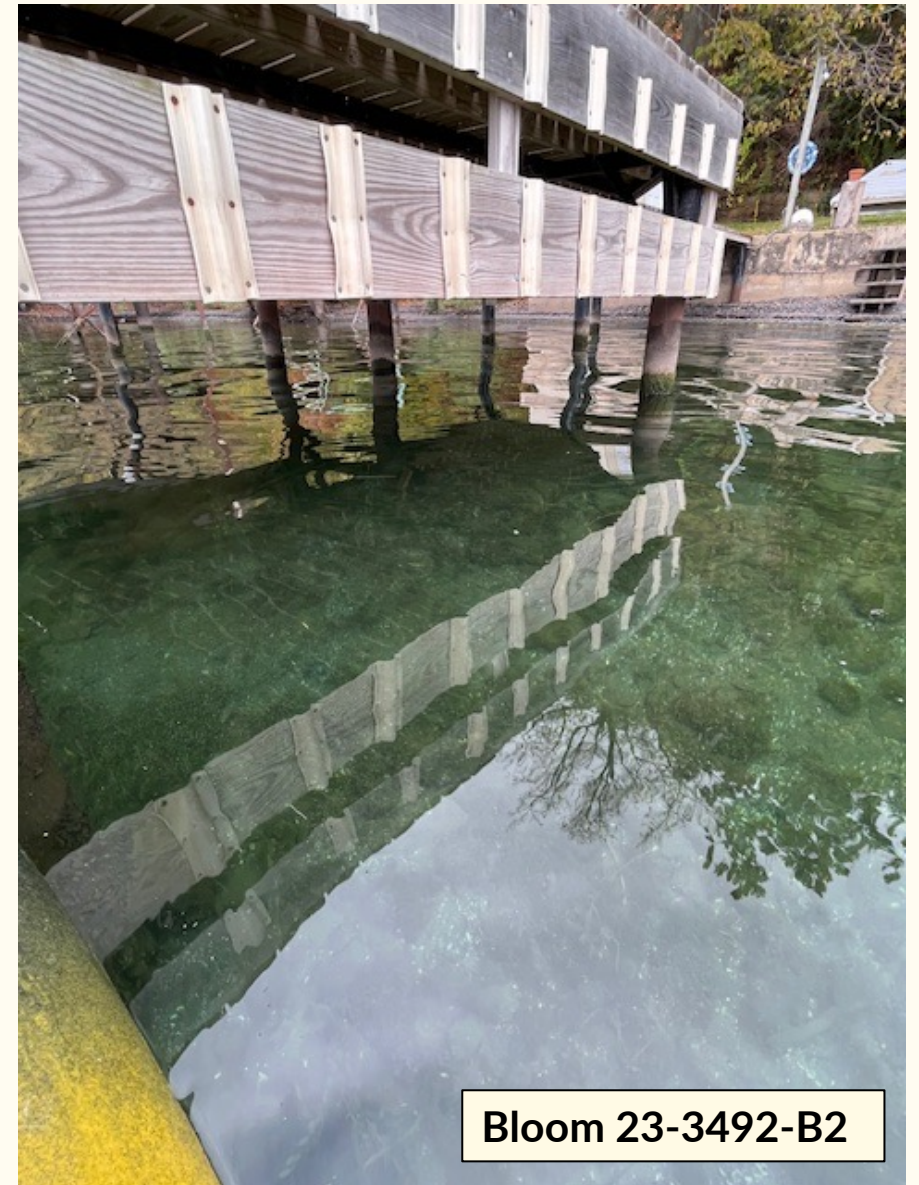
2023 Monitoring Season



-----Official DEC HABs Monitoring Season-----

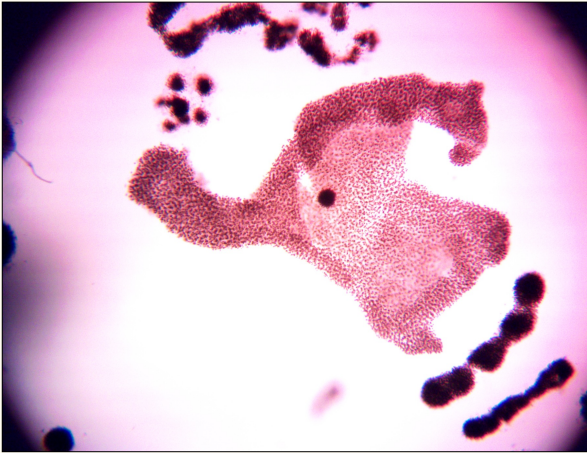
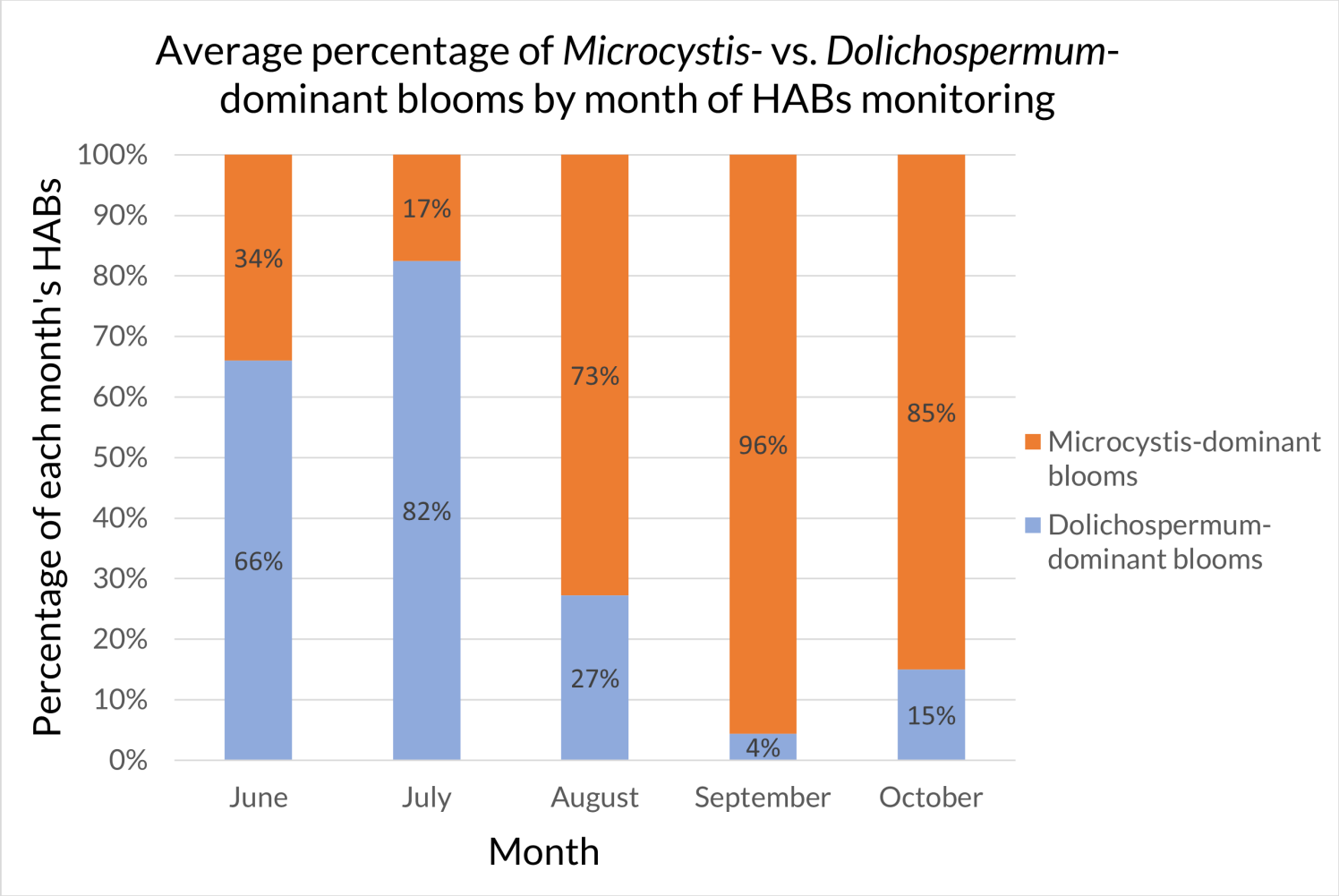
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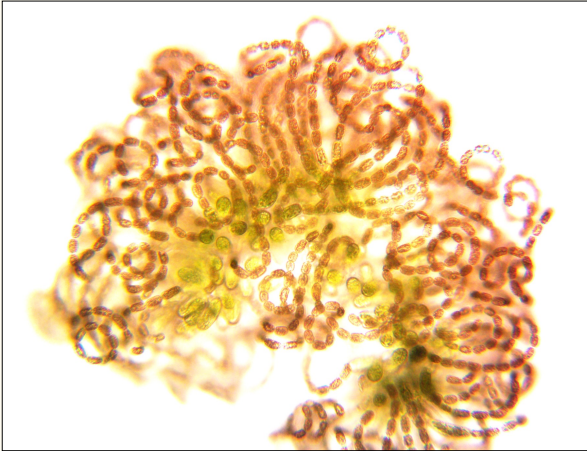


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HAB Monitoring 2018-2023

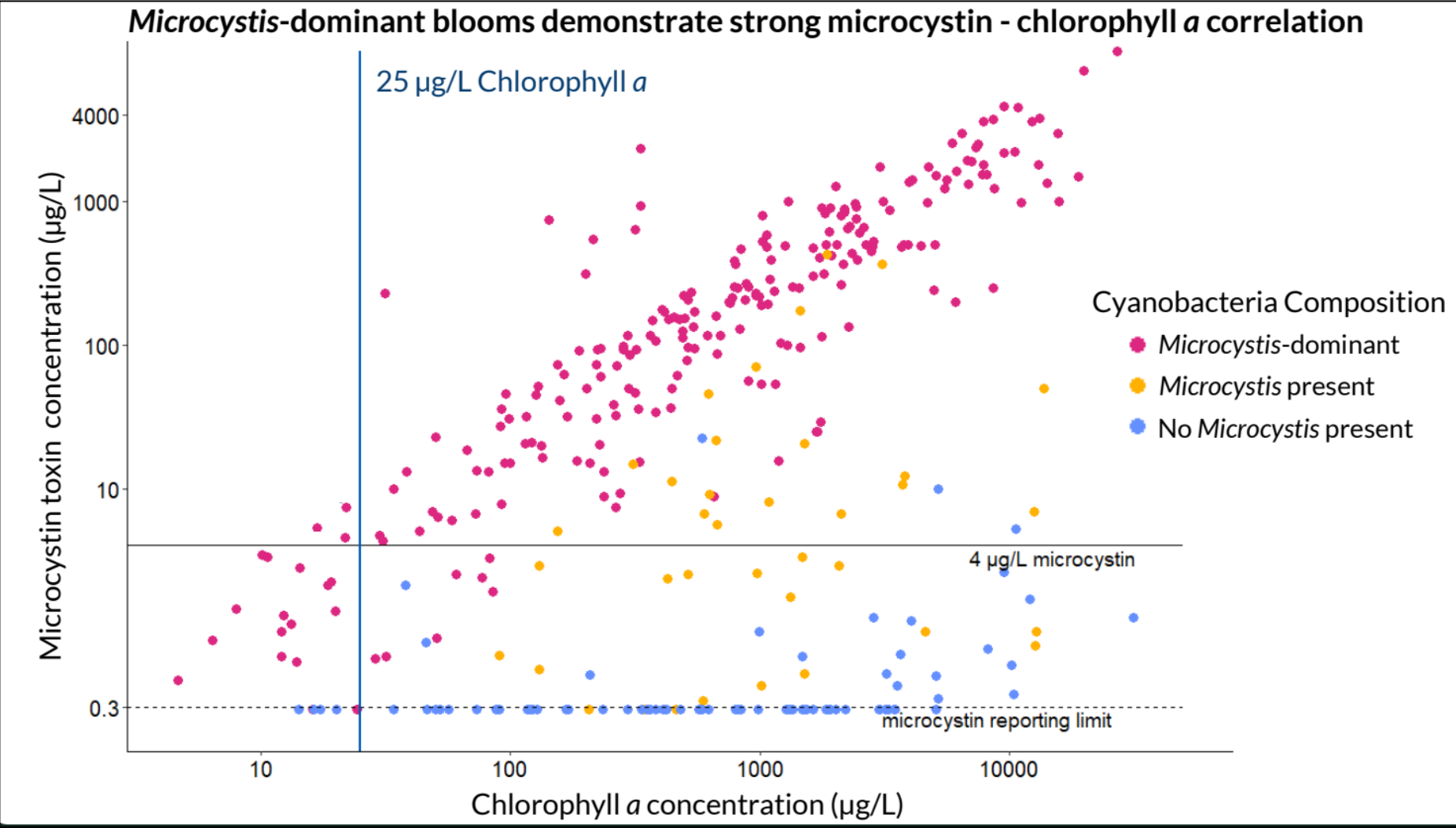


Microcystis sp.



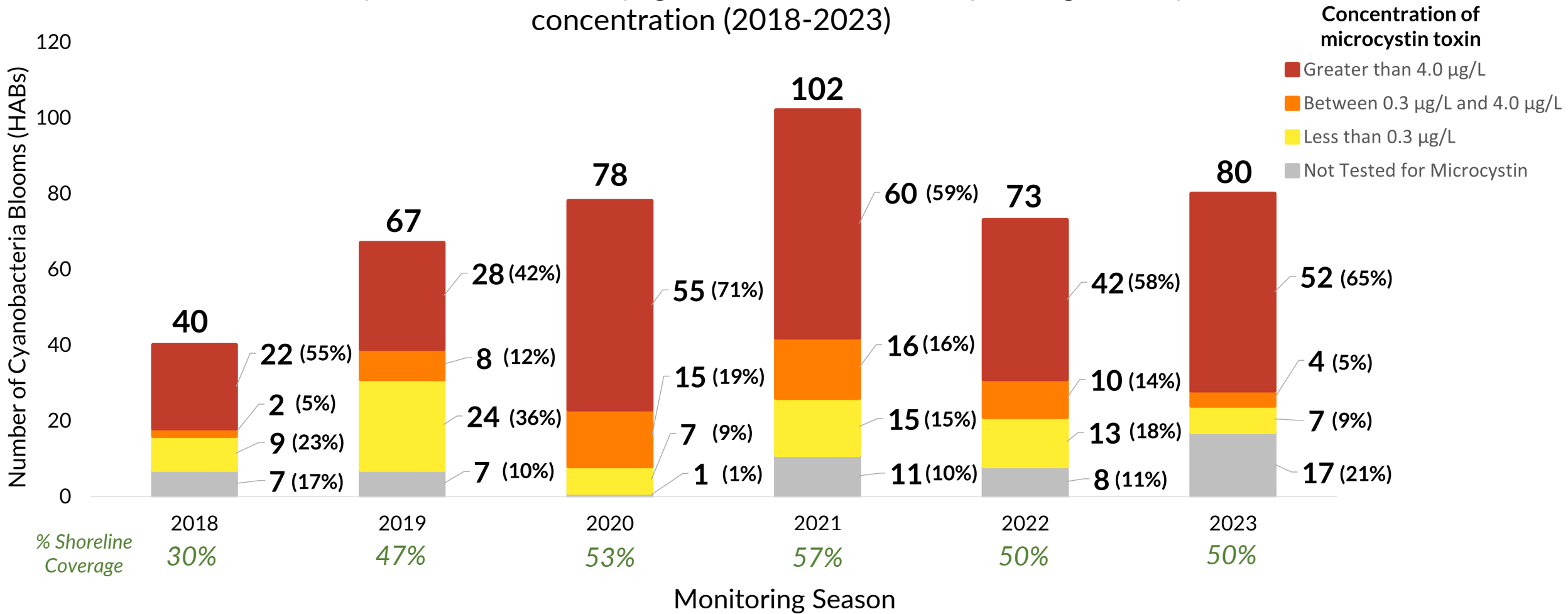
Dolichospermum sp.

HAB Monitoring 2018-2023



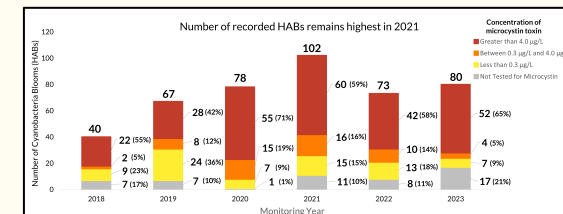
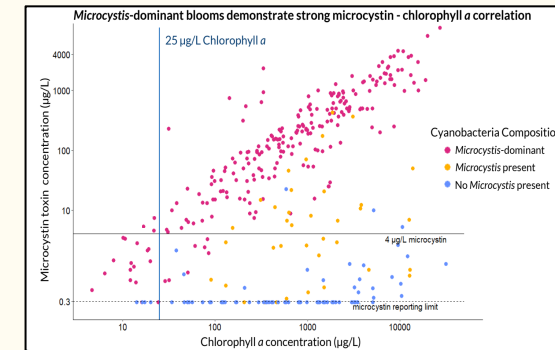
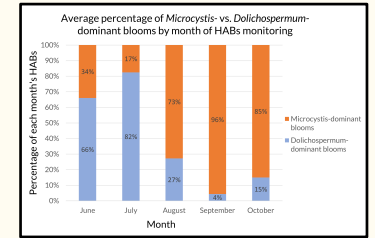
HAB Monitoring 2018-2023

Number of reported HABs on Cayuga Lake and their corresponding microcystin concentration (2018-2023)



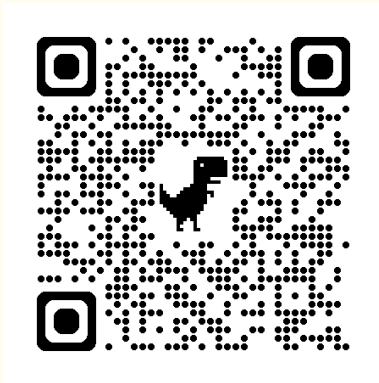
HABs Monitoring 2018-2023: Takeaways

- From June – July, Cayuga Lake HABs tend to be dominated by *Dolichospermum sp.*. From August to October, blooms tend to be dominated by *Microcystis sp.*
- Blooms that are *Microcystis*-dominant usually have higher levels of microcystin toxin than blooms that are **not** *Microcystis*-dominant
- There is a strong positive relationship between chlorophyll a and microcystin concentration in HABs that are *Microcystis*-dominant.
- Typically more than half of the HAB samples collected each year have microcystin concentrations greater than the contact recreation limit (4 ug/L)
- The number of HAB reports increased from 2018-2021, then plateaued in 2022-2023

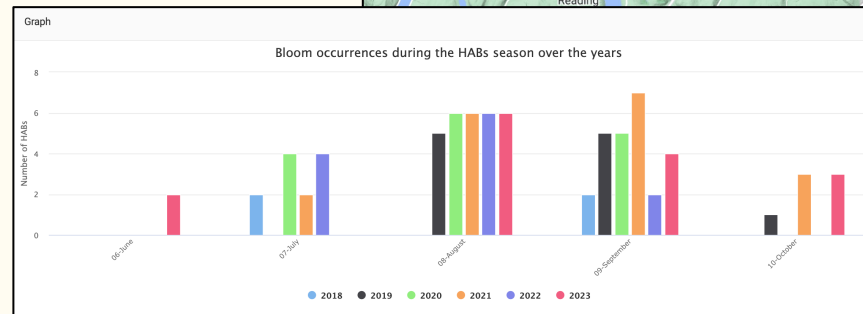
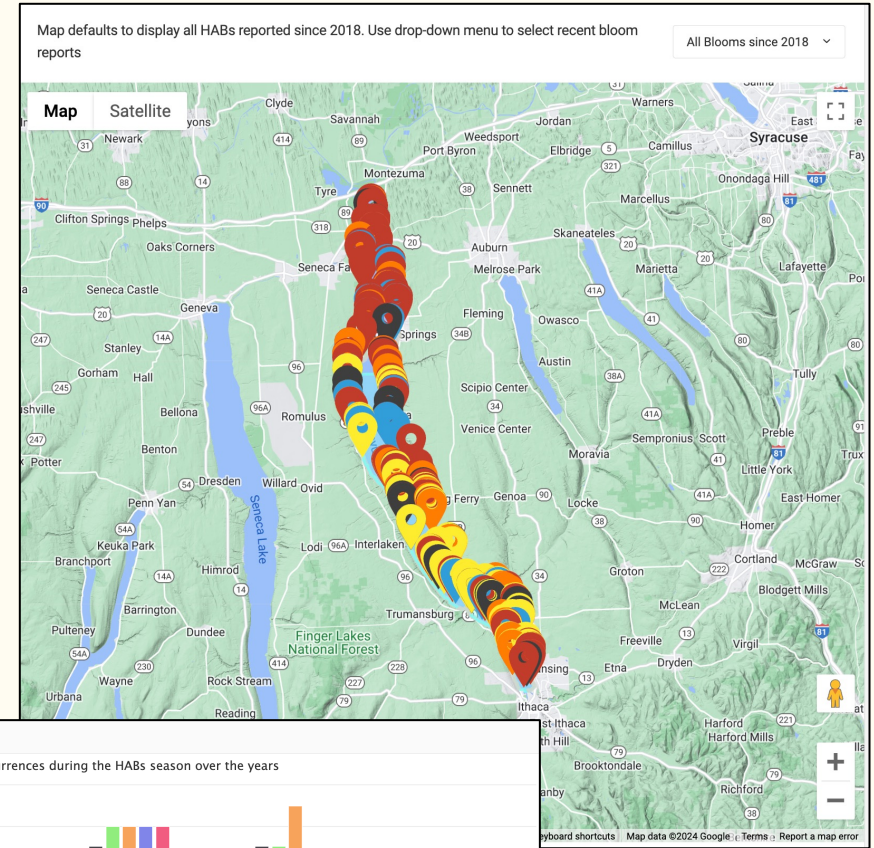


Want to see even more HAB data?

Visit CSI's HAB Database!



database.communityscience.org/hab



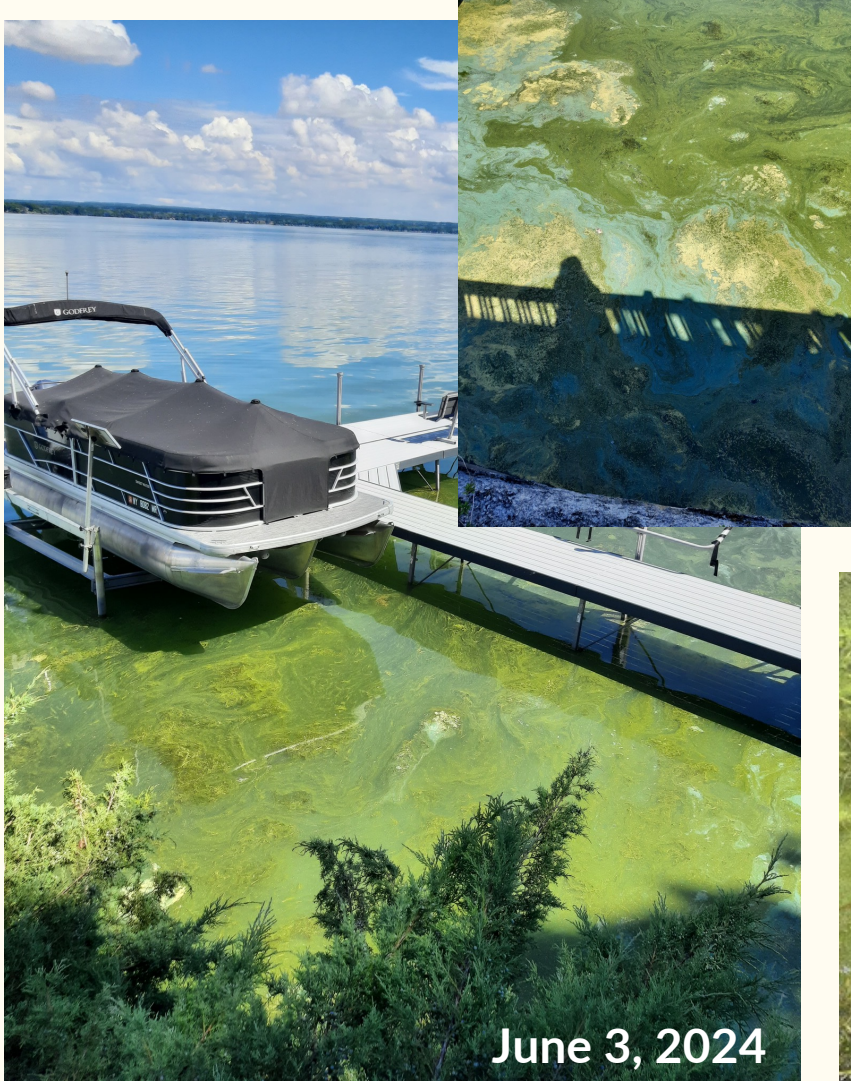
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2024 Monitoring Season



2024 Monitoring Season – Investigate HAB “Clumps”

- Found in Cayuga Inlet and Southern end of Cayuga Lake in 2022 and 2023
- The appearance of these clumps contradicts traditional HAB ID guidance
- One sample was collected in 2023 and tested for a suite of toxins by Greg Boyer’s lab at SUNY ESF. No toxins were detected.
- This summer, CSI is inviting volunteers to help report and sample these clumps

Order Oscillatoriales



2024 Monitoring Season – Trial new technology

In collaboration with the US Army Engineer Research & Development Center, CSI's lab will trial a rapid screening tool for microcystin toxin.



ELISA: 5-6 hours



VS.

Graphene-Based Sensor: 5-20 minutes



This goal is to make this tool commercially available in the future.

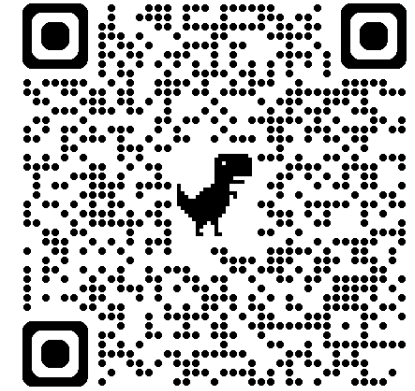
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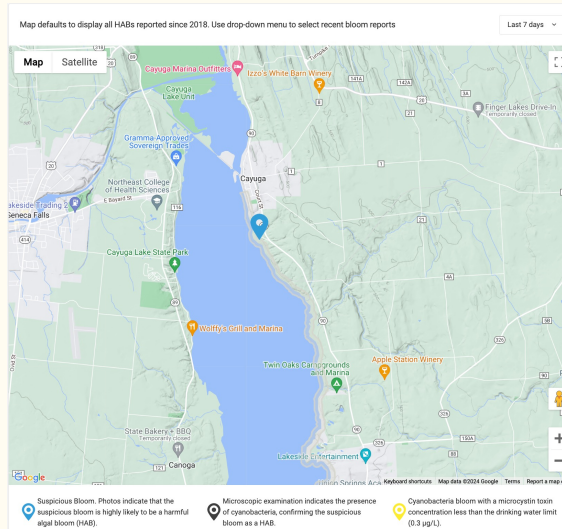


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Get Involved!



Volunteer



Explore CSI's HABS Database



Subscribe to CLWN's HABS Weekly Newsletter

Get Involved!

Engage with the organizations that make this work happen!



Become a member



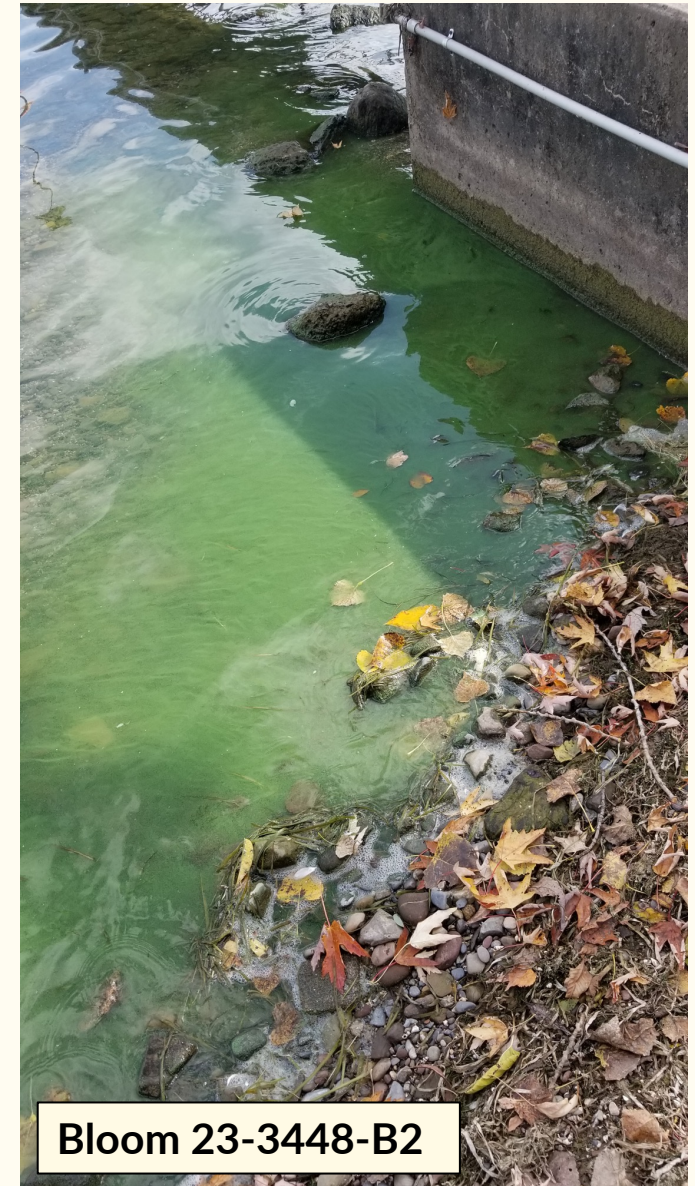
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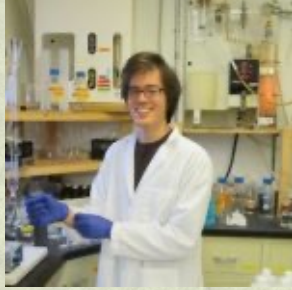
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Acknowledgements

CSI Staff Past and Present



Alyssa Johnson
Cayuga Lake HABs
Monitoring Program
Coordinator



Noah Mark
Laboratory
Director



Adrianna Hirtler
Biomonitoring
Program Coordinator



Dedicated volunteers!



Financial Supporters



Program Partners



CSI Members



Questions



**If you see a HAB on Cayuga Lake, report it here or to
habshotline@gmail.com!**