Community Science Institute
Partnering with Communities to Protect Water

What's Lurking in the Lake?
Uncovering the Science of Harmful Algal Blooms

Edith B. Ford Memorial Library
Ovid, New York
Wednesday, July 16 @ 5:30 – 7:30 pm

Alyssa Johnson
Cayuga Lake Harmful Algal Bloom Monitoring Program Coordinator,
Outreach and Programs Coordinator

Agenda

- **Community Science Institute**
- "HABs 101"
- HABs and Health
- Cayuga Lake HABs Monitoring Program
- CSI's HABs Database
- Get Involved/Stay Informed
- Acknowledgements & Q&A

Community Science Institute

Community Science Institute
Partnering with Communities to Protect Water

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 inspire and empower communities to safeguard water resources by cultivating scientific literacy through volunteer water quality monitoring, certified laboratory analyses, and education.

CSI Staff

Grascen Shidemantle

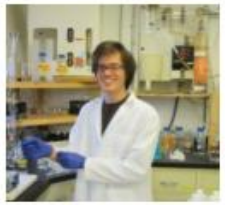
Executive Director

Alyssa Johnson

Outreach and Programs Coordinator
Cayuga Lake "HABs" Monitoring Program Coordinator

Katia Appel

Office Administrator



Noah Mark

Technical Laboratory Director

Seth Bingham

Water Quality Scientist

Dan Pascucci

Water Quality Scientist

Adrianna Hirtler

Biomonitoring Program Coordinator

Bill George

Data Entry Specialist

Rama Hoetzlein

Database Developer

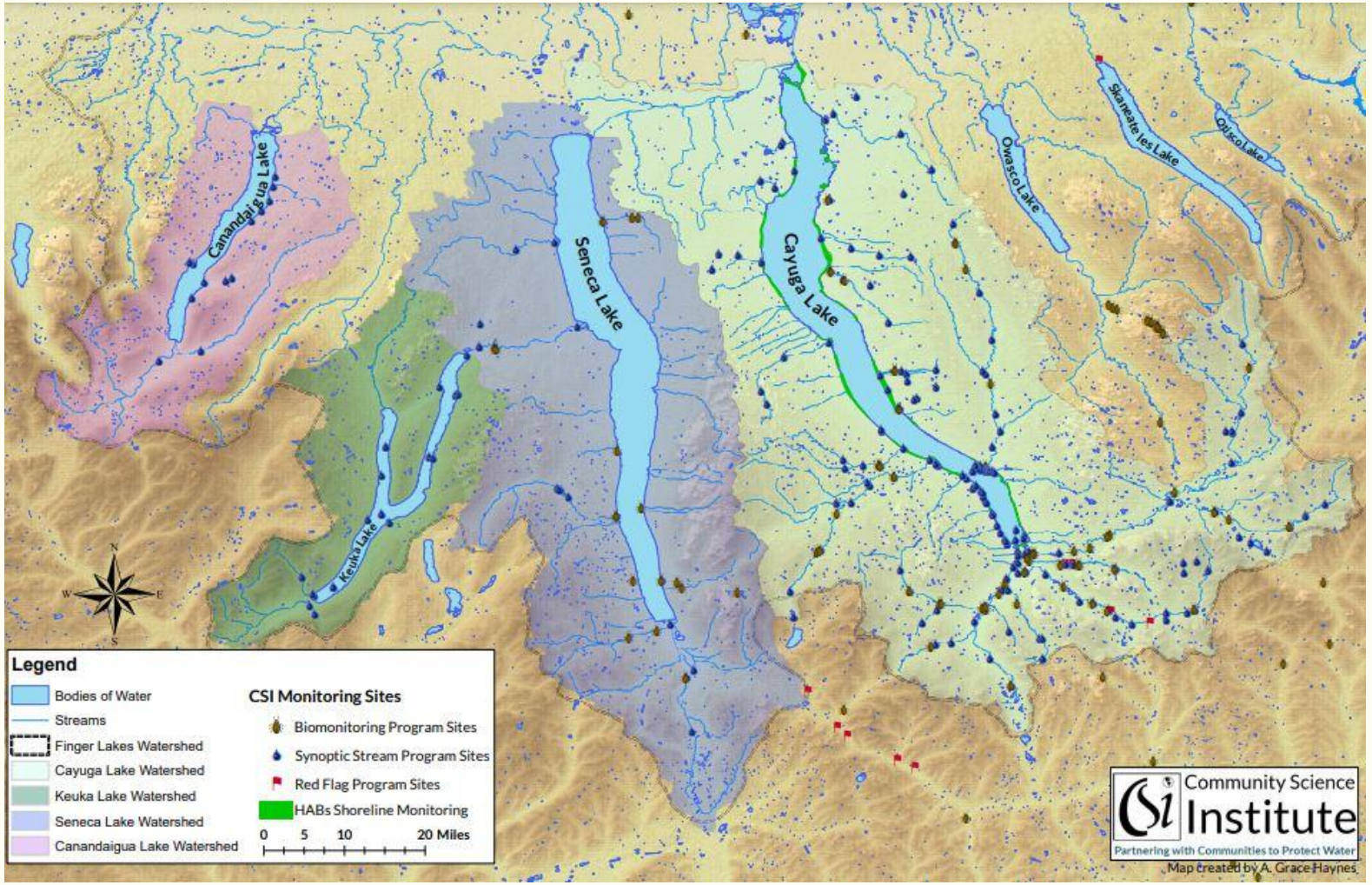
CSI's Water Monitoring Partnerships

1. Synoptic Stream and Lake Monitoring

2. Biomonitoring

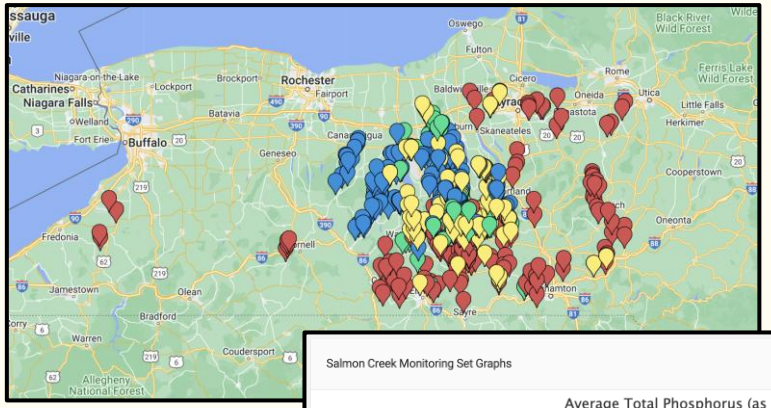
3. Harmful Algal Bloom (HAB) Monitoring

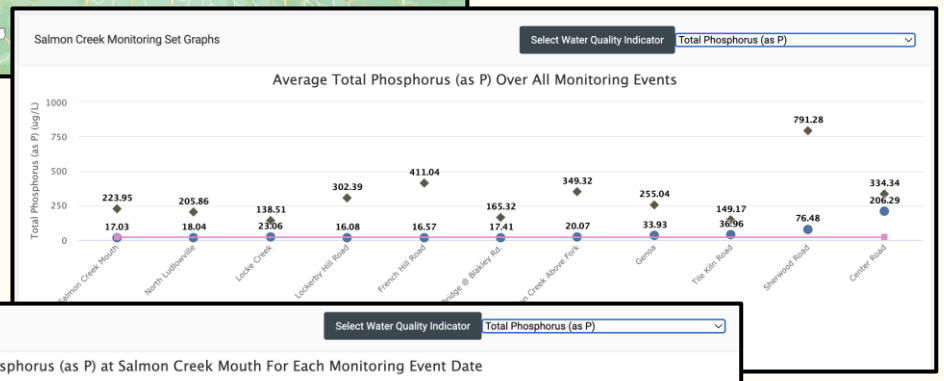
CSI recruits, trains, and coordinates over 250 volunteers!

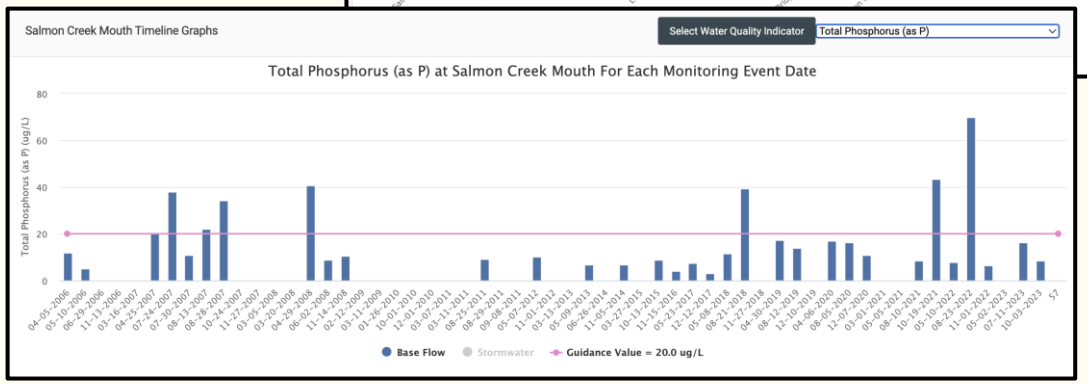


CSI's Water Quality Database

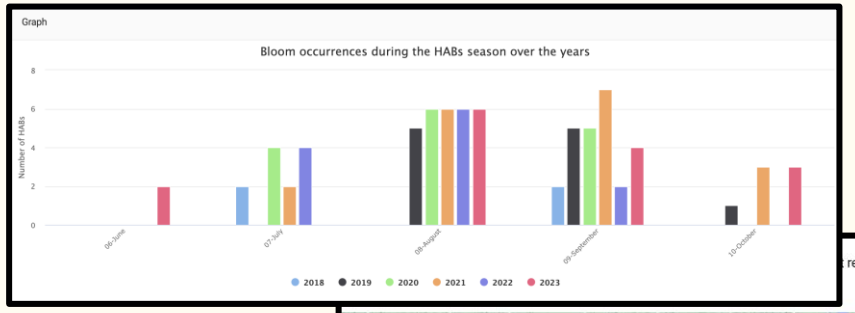
Stream and Lake Chemistry

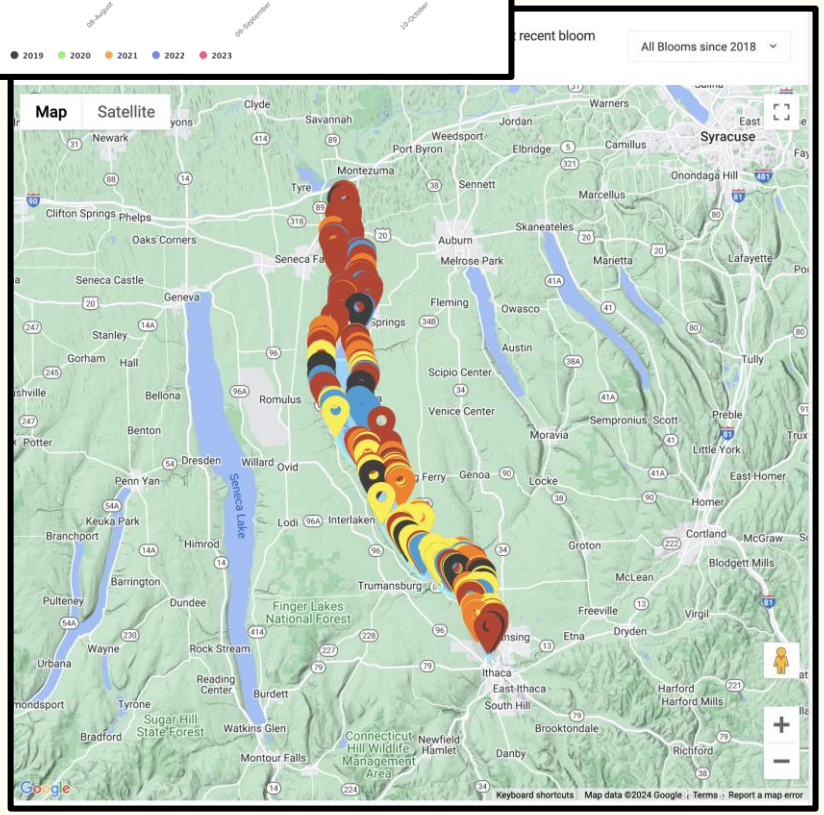






Harmful Algal Blooms





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HABs 101: What is a HAB?

H: Harmful

- Human & Animal Health, Economics, Aesthetics, Ecological

A: Algal

- Freshwater HABs refer to **cyanobacteria**
- Not true algae

B: Bloom

- Proliferations of cells, dense concentrations

HABs 101: What is a HAB?

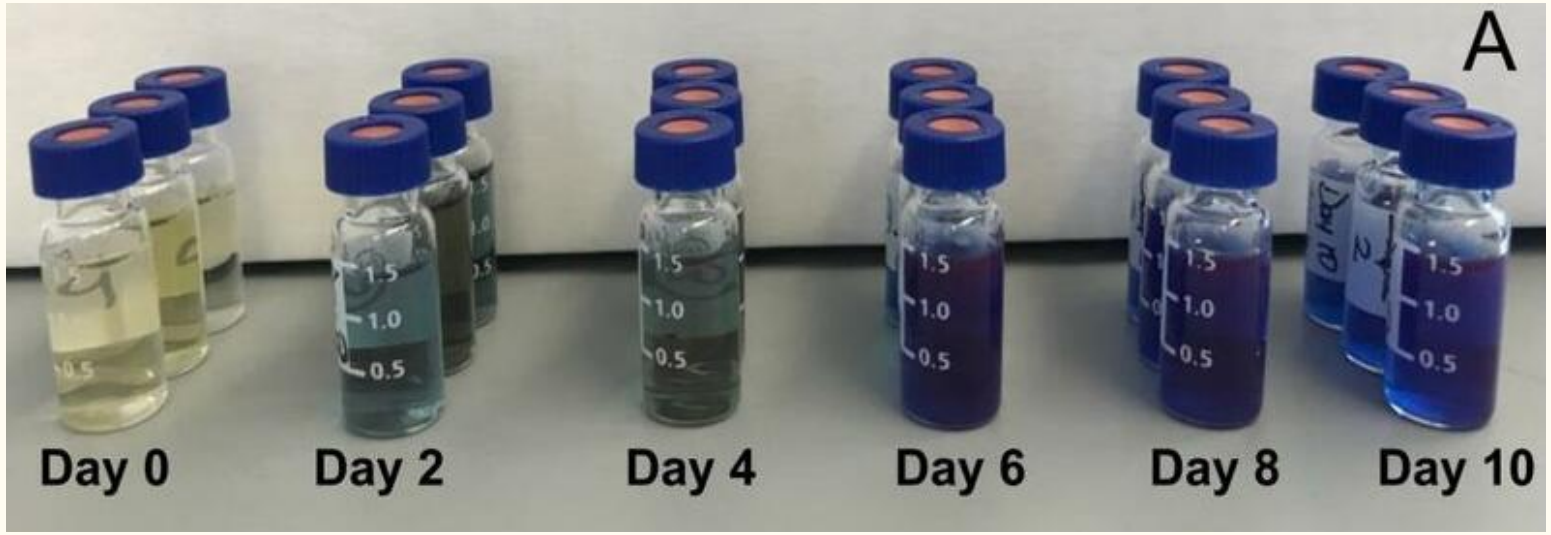
Other terms/names used to refer to the HABs we experience on the Finger Lakes:

- Blue-green algae
- Cyano-HABs
- Blooms
- Toxic algal blooms
- Cyanobacterial blooms
- Harmful blue-green algae

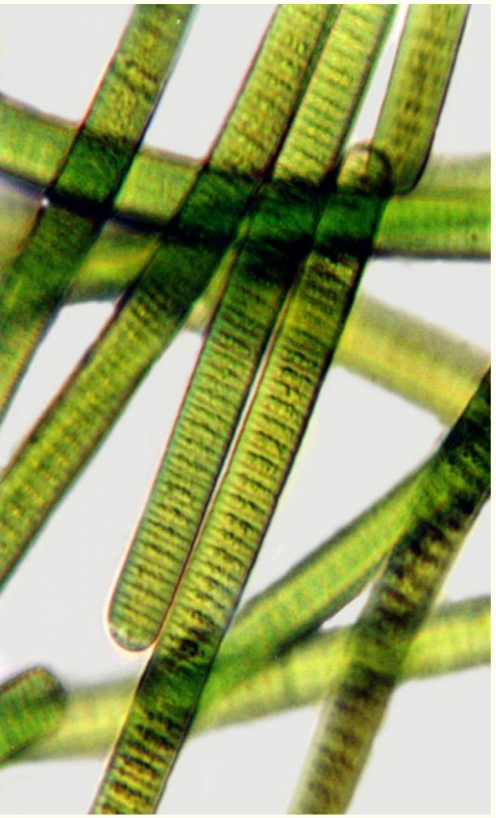
HABs 101: What is a HAB?

Contains two pigments:

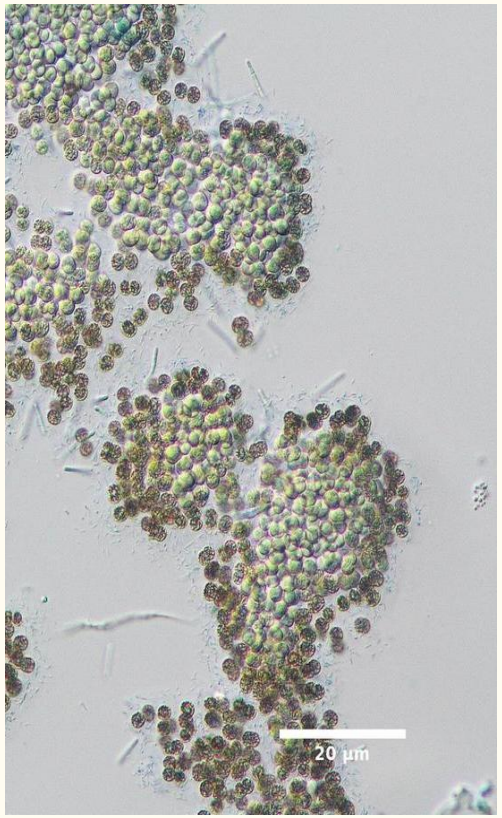
- Chlorophyll
- Phycocyanin



What are cyanobacteria?

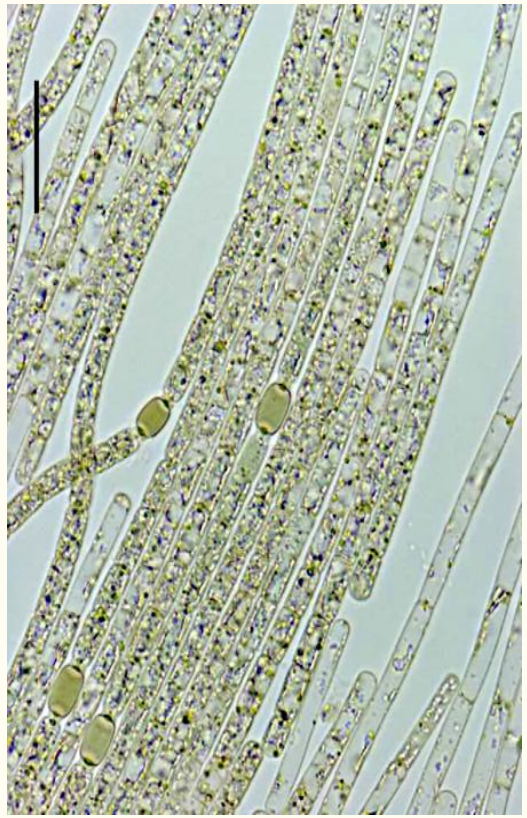


Oscillatoria



Microcystis

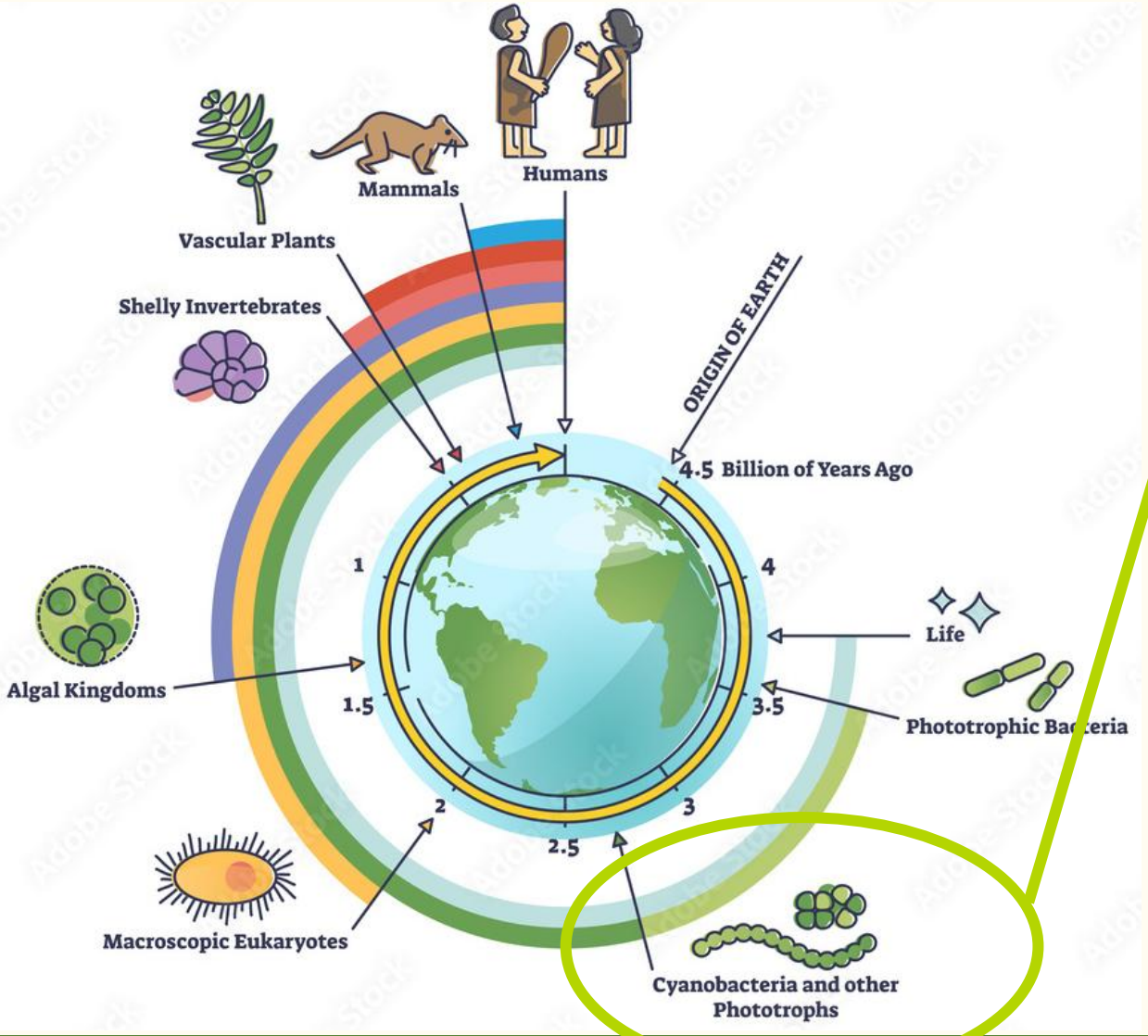
Woronchinia



Aphanizomenon

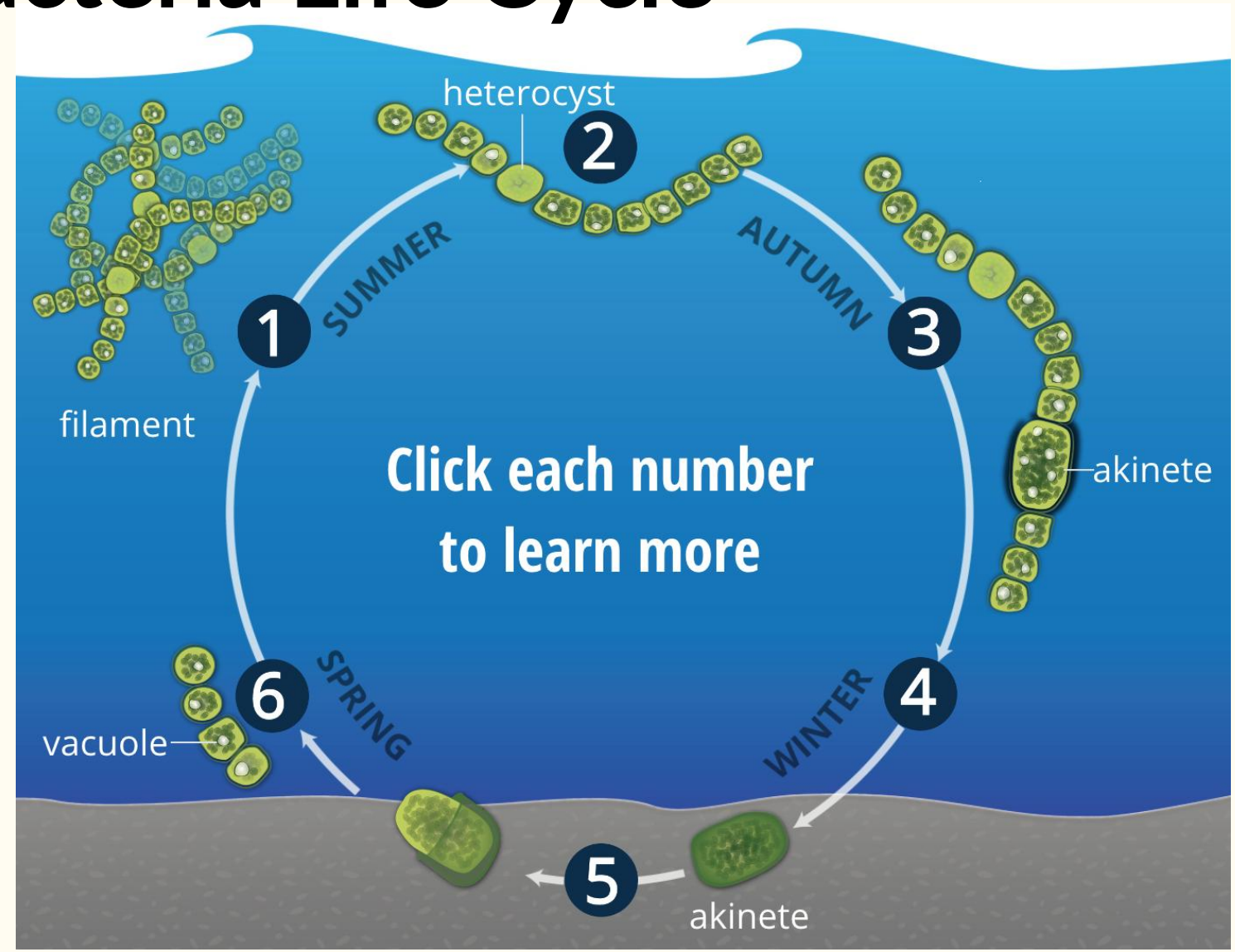
Dolichospermum

Evolution of Life on Earth

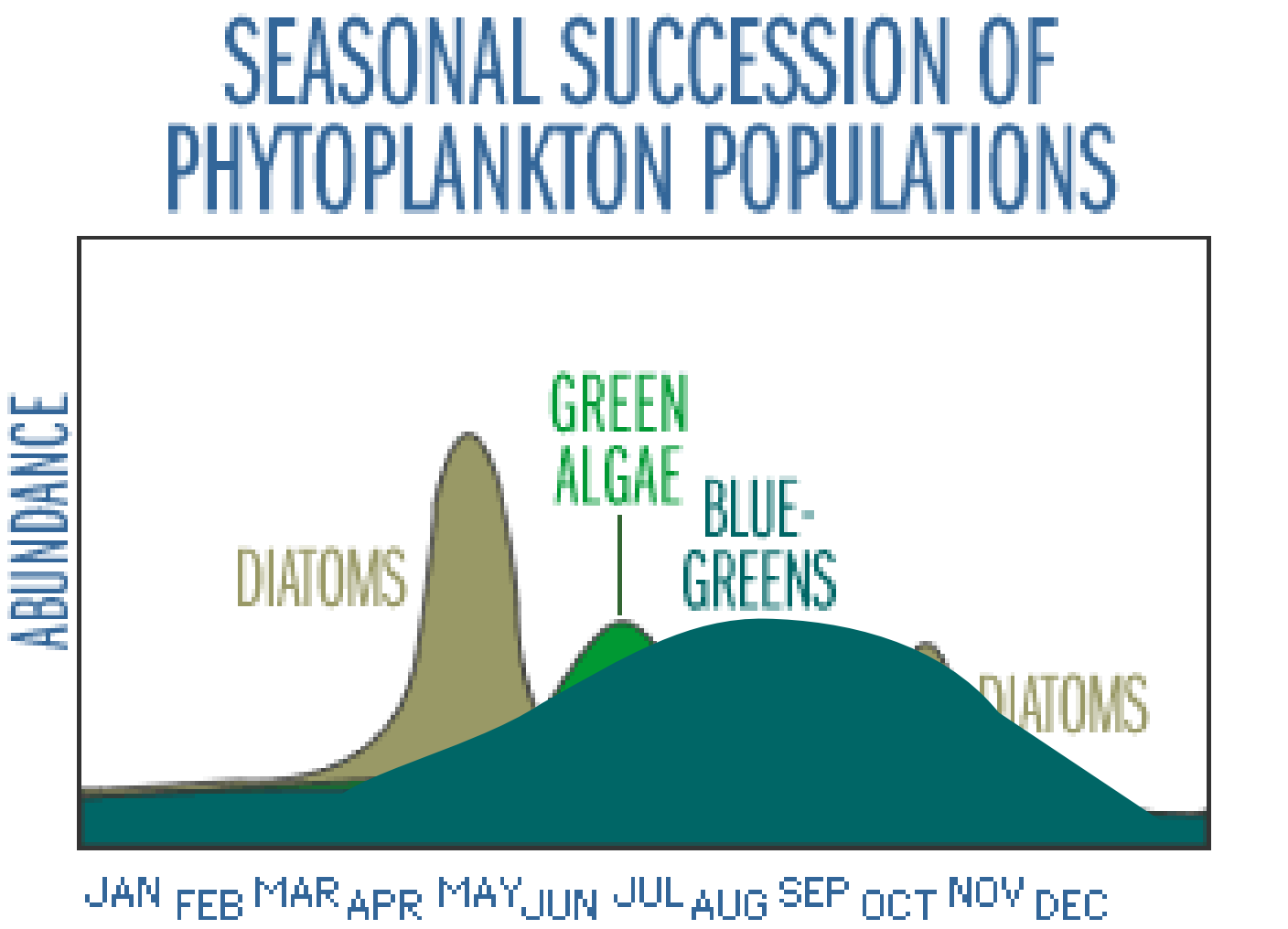


Cyanobacteria are organisms that were hugely important in the history of life on Earth, long before we started thinking about HABs, long before **we** even existed.

Cyanobacteria Life Cycle



Conducive Conditions for a HAB:



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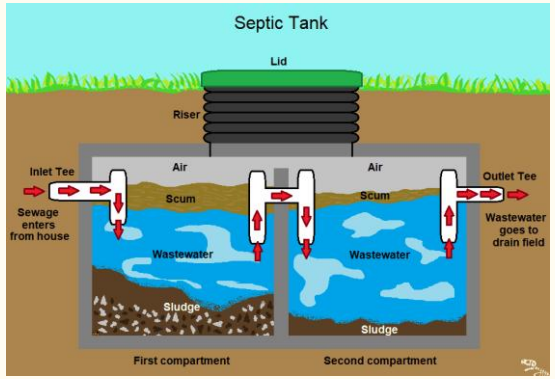


HABs Identification

Rake/Stick/Paddle Test

- Use a sturdy “tool” to lift the plant/scum out of the water.
- Paint-like coating on it, it is likely cyanobacteria.
- If the water does not part when disturbed, it’s likely cyanobacteria.
- If the stick lifts out strands of material, which may resemble hair, it’s most likely

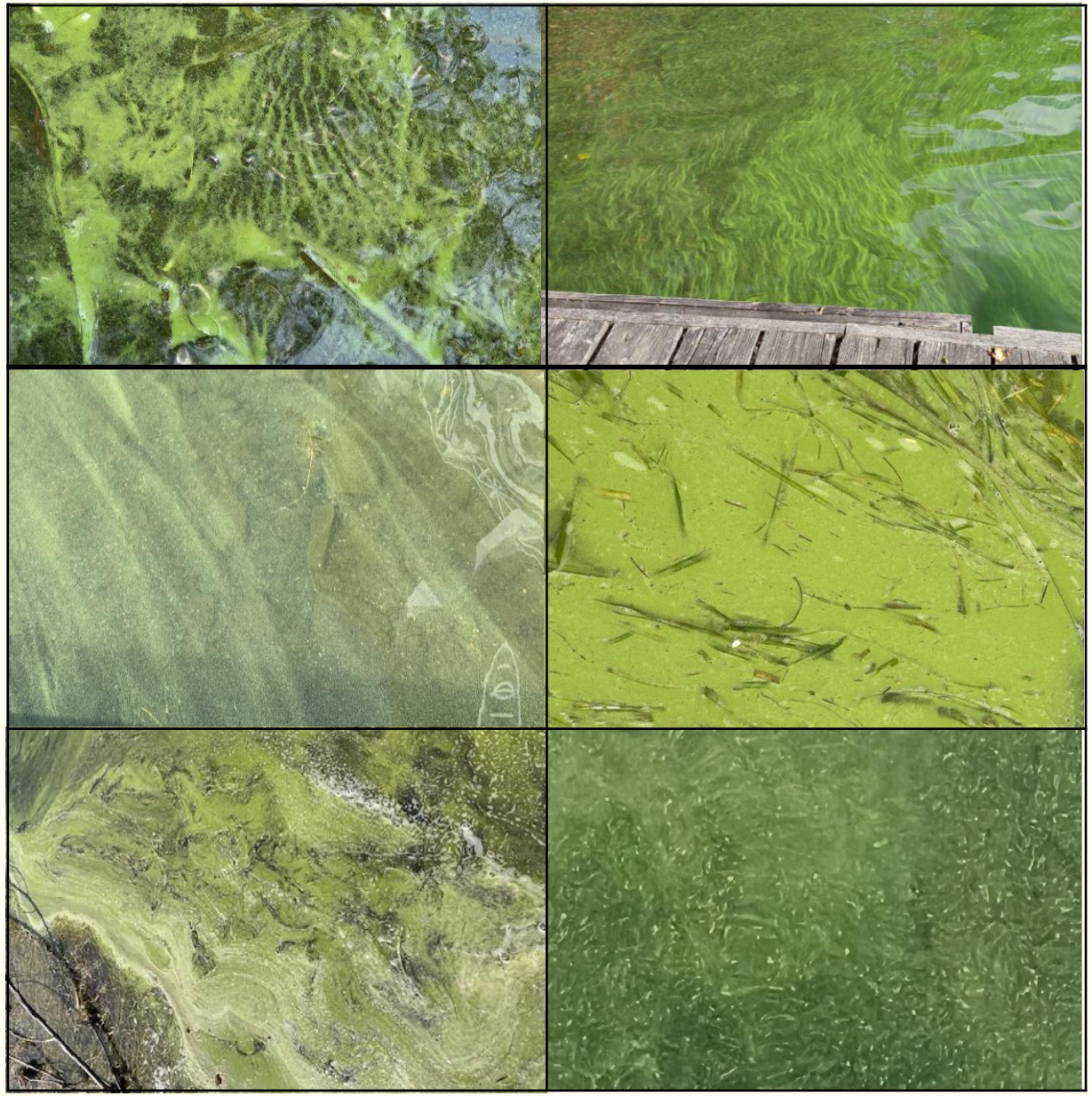
Jar Test

- Scoop the suspected HAB into a clear glass jar
- Place in refrigerator for ~1 hour
- HABs rise to the top!

HABs Identification

Physical characteristics:

- Floating blooms: surface scum
- Oily sheen
- Spilled or frothy paint paint
- Foamy, marbled
- Speckling/tiny dots
- Variety of colors
- Floating Clumps
- Can create a “scum line” on docks, shore, etc.



Summer 2024 – Cayuga Lake


Summer 2024 – Cayuga Lake

Summer 2024 – Cayuga Lake

Summer 2024 – Cayuga Lake

Canandaigua Lake

HABs Identification: Clumps

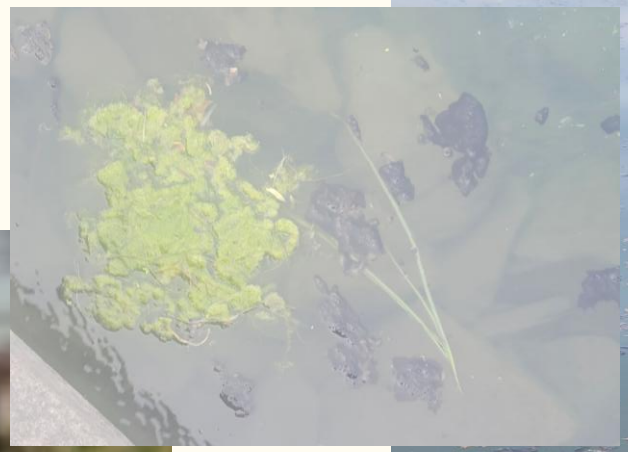
Physical characteristics:

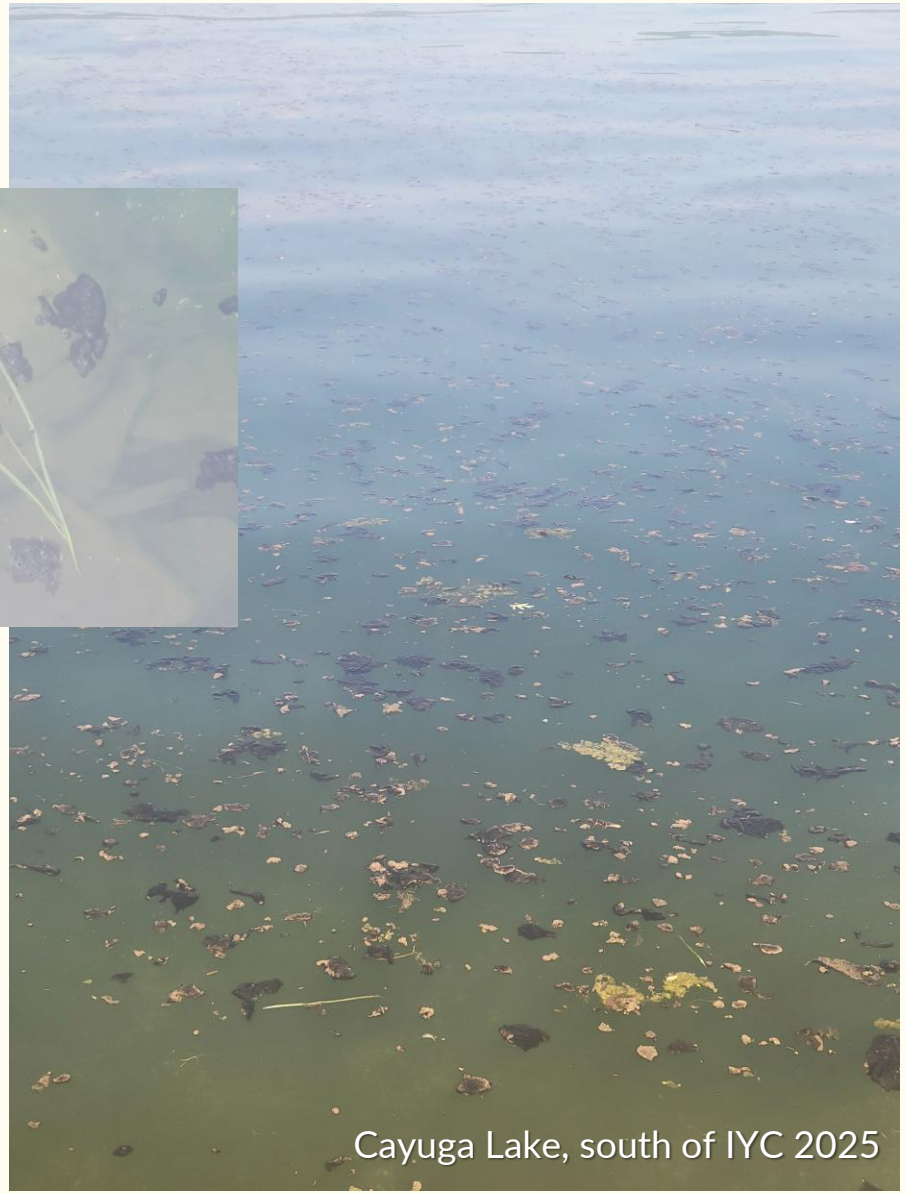
- Floating clumps found floating on the surface of the water
- Dislodged from the lake bottom (benthic)

HABs Identification: Clumps

Physical characteristics:

- Often confused with goose poop



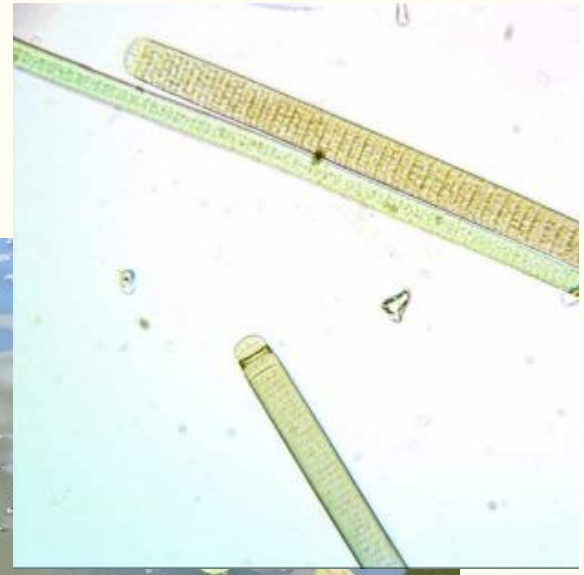


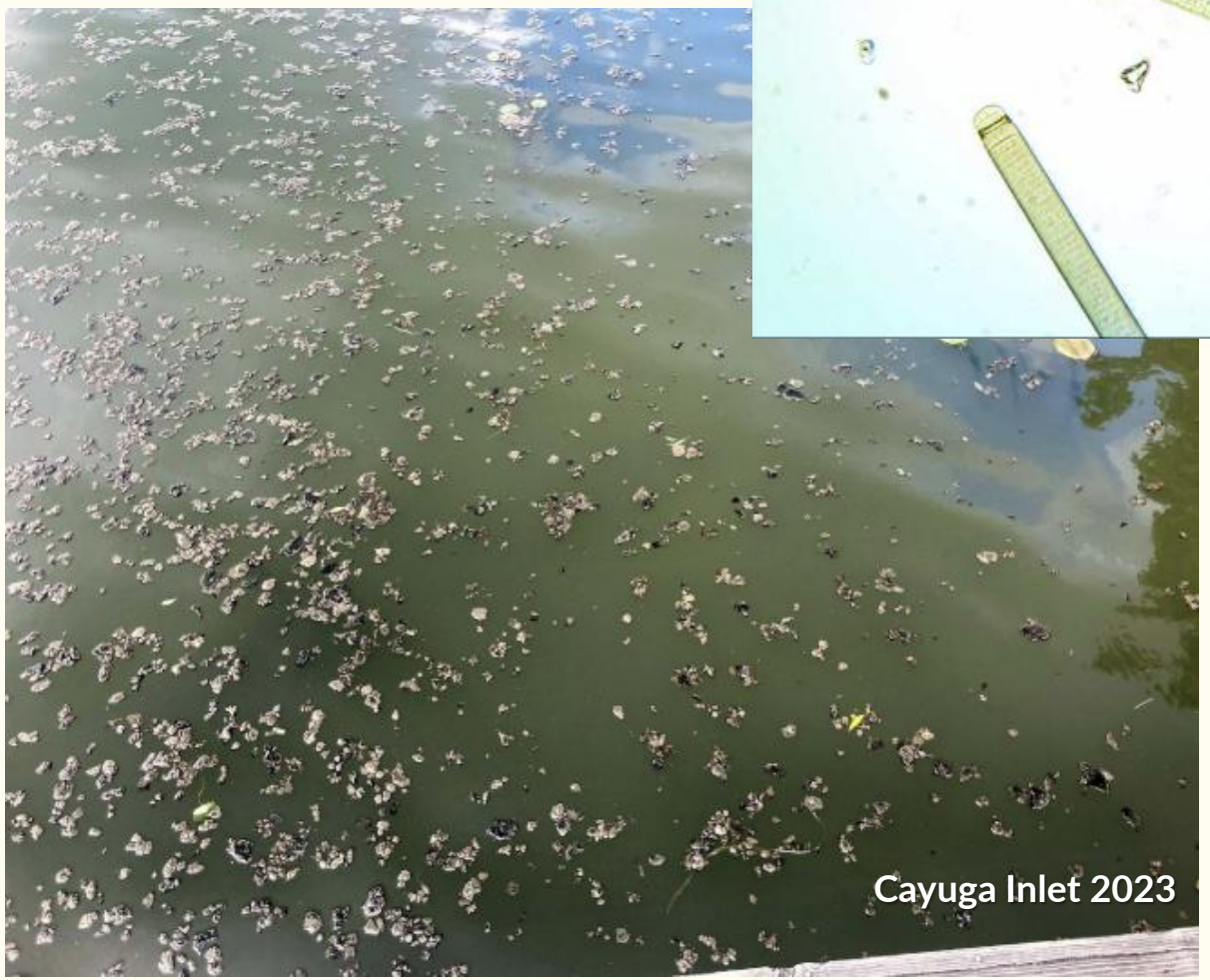
Cayuga Lake, south of IYC 2025

2024 Pilot Study: HAB Clumps

- Found in Cayuga Inlet and Southern half of Cayuga Lake in 2022, 2023 and 2024
- The clumps do not look like the “typical” HABs
- 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.
- In 2024, CSI invited volunteers to help report and sample these clumps
- Continuing in 2025

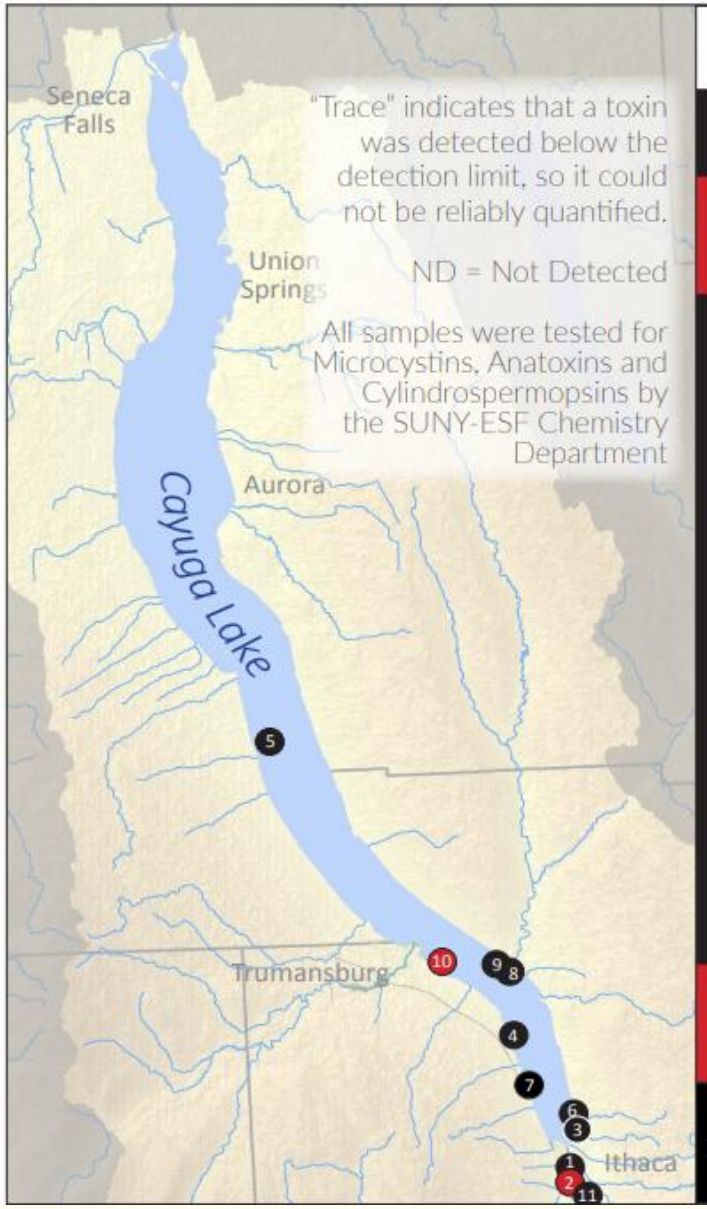
Order Oscillatoriales





Cayuga Inlet 2023

2024 Toxin Analysis of Benthic Cyanobacteria Clumps in Cayuga Lake



	Toxin results	Date	Latitude	Longitude	Location
1	ND	6/26/23	42.451327	-76.509745	Ithaca Farmer's Market dock
2	Anatoxins 3.424 µg/g	6/19/24	42.442883	-76.511762	Cayuga Inlet across from Deep Dive
3	ND	6/19/24	42.471473	-76.503798	East Shore Park
4	Trace Anatoxins (<0.044 µg/g)	7/12/24	42.49487	-76.53679	Open water near outfall of Glenwood Creek
5	ND	7/12/24	42.633056	-76.686944	Open water north of Lively Run Creek
6	ND	7/14/24	42.472490	-76.504185	East Shore Park
7	ND	7/15/24	42.482194	-76.533695	Private west shore beach
8	ND	8/7/24	42.538568	-76.549924	Near Myer's Point swimming area
9	ND	8/13/24	42.3219	-76.330	South side of Salt Point
10	Anatoxins 1.349 µg/g	8/27/24	42.53749	-76.58387	Open water south of Taughannock
11	ND	9/5/24	42.436366	-76.512617	Flood Control Channel near Wegmans

Not a HAB

Pollen:

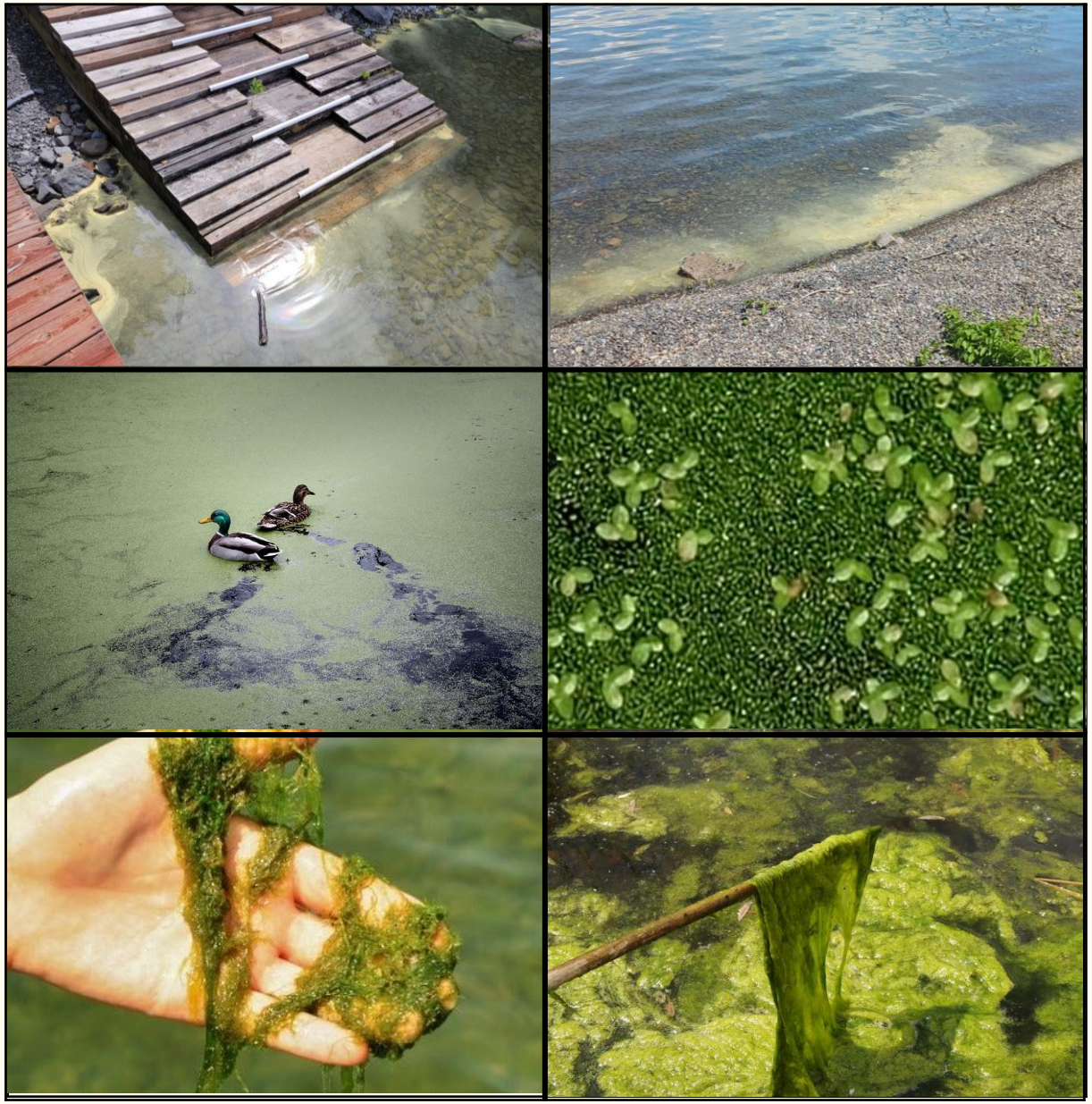
- Bright yellow
- Breaks up easily if you swirl the water
- Most common May-June (when trees are flowering)
- NOT harmful

Duckweed/Watermeal

- The tiniest plants on earth
- “Tiny lily pads”
- Will separate in the water
- NOT harmful

Other Algae (filamentous)

- Creates dense mats
- Long, stringy/hair-like strands
- Can build up on the shore
- NOT harmful



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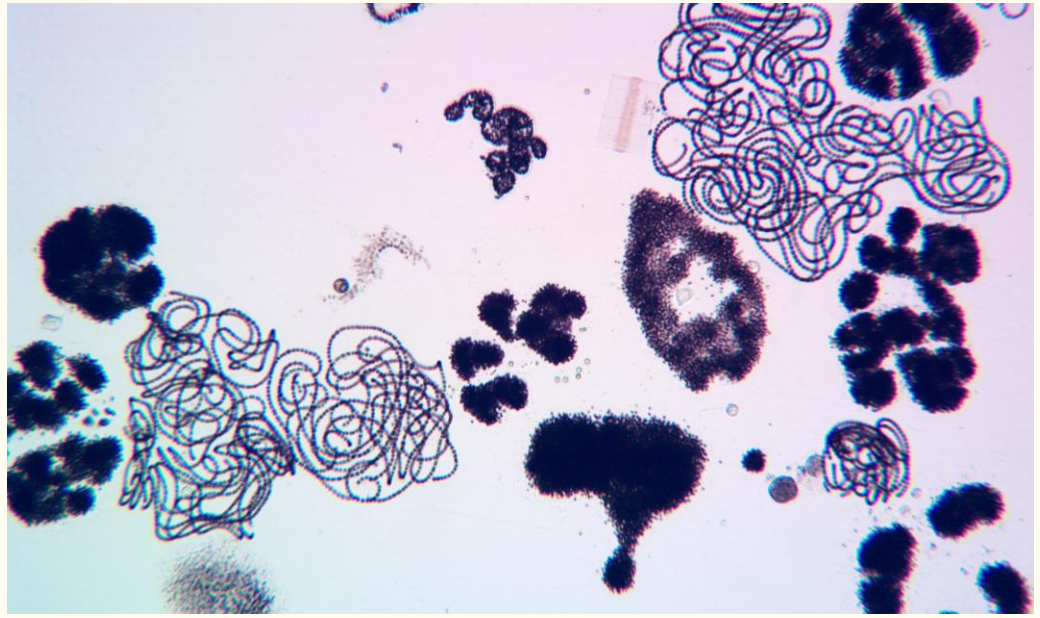
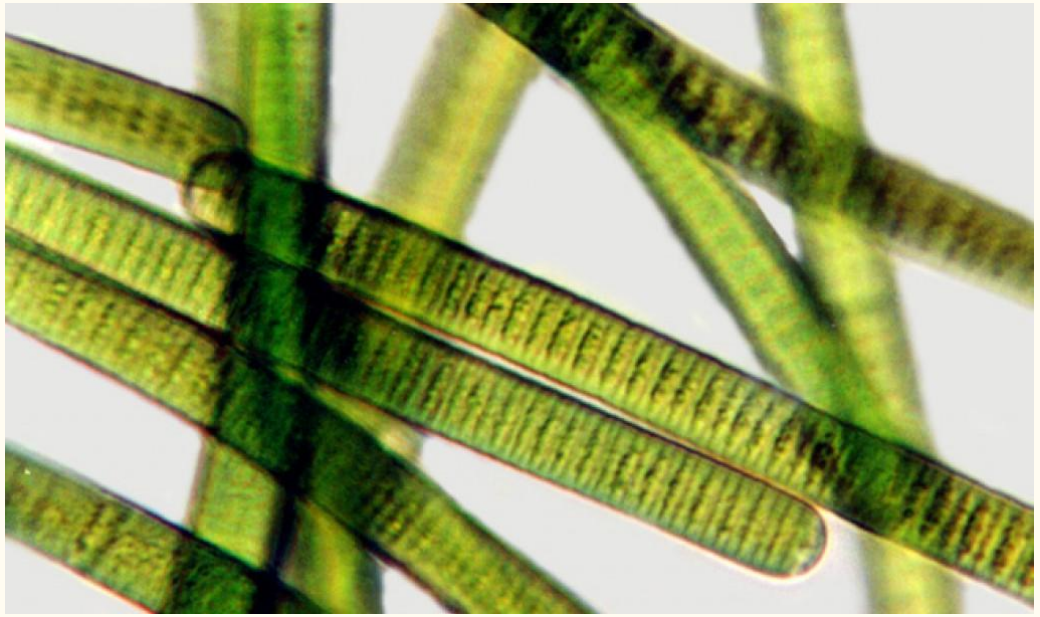
HABs and Health

Cyano-toxins:

- Produced by most cyanobacteria
- No visual cues that toxins are present
- Toxin production not well understood
- Can not determine toxicity by LOOKING at a HAB

- **Types found in Cayuga Lake:**
  - Microcystins
    - Hepatotoxin- liver
    - Most common in Cayuga Lake
    - Associated with *Microcystis sp*. and *Dolichspermum sp*.
  - Anatoxins
    - Can affect the nervous system, respiratory function
    - Detected in “clumps”
    - Associated with *Oscillatoriales*





Routes of Exposure to HABs Toxins:

Acute vs. Chronic

1. Dermal
2. Inhalation
3. Consumption

ANY health effects should be reported to your local county department of health!

Routes of Exposure: Dermal

skin contact during swimming, boating, fishing, etc.

Routes of Exposure: Inhalation

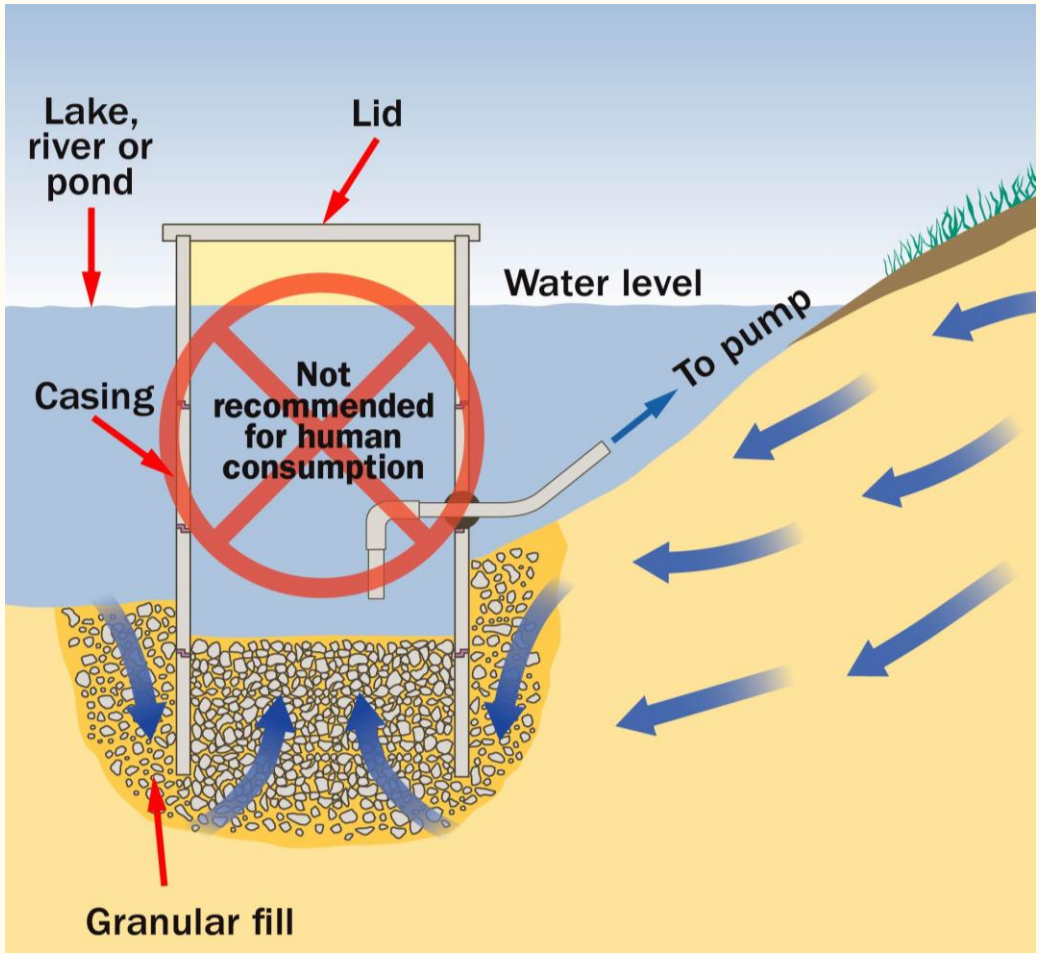
aerosols created during household use or recreation

Routes of Exposure: Inhalation

aerosols created during household use or recreation

Routes of Exposure: Consumption

incidental swallowing, sourcing drinking water from the lake via a beach/shoreline well



What to do if you or a loved one is exposed:

Humans:

- **Rinse off** yourself, children, and animals with clean water if exposed to blooms or surface scums, or water that is noticeably discolored.
- **Stop using the water** and consider medical attention if people or animals have symptoms and might have been exposed
- **Report any symptoms** to your local department of health harmfulalgae@health.ny.gov

What to do if your pet is exposed:

Livestock/pets:

- Protect your pets and livestock by keeping them away from water that has signs of a HAB.
- Take action if your pets or livestock go near or into water with a HAB
- If your pets or livestock have been in the water, immediately wash them off with clean water to keep them from licking cyanobacteria off their fur.
- Call a veterinarian if your animal shows any of these signs:

Loss of energy
Loss of appetite
Vomiting
Stumbling and falling
Diarrhea
Convulsions
Excessive drooling/foaming
Tremors and seizures

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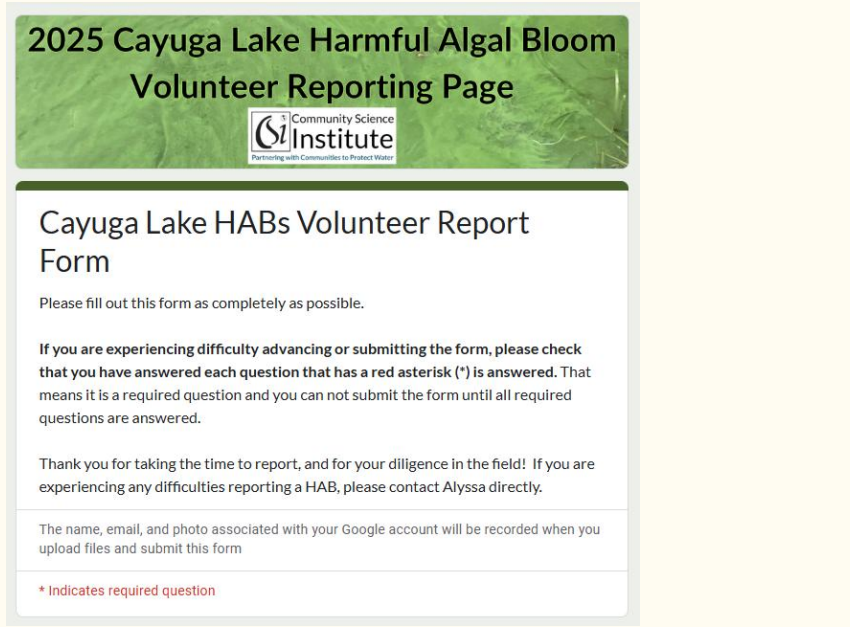
Cayuga Lake HABs Monitoring Program

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 /Online Report Form



Cayuga Lake HABs Monitoring Program

Changes to the program in 2025:

- No longer collecting samples for EVERY single report (or as near possible)
  - Repetitive data since 2018
  - Logistical nightmare
  - Very time consuming

Things staying the same in 2025:

- Volunteers are monitoring all around Cayuga Lake and submitting reports
  - This is following NYSDEC's protocol
  - Pictures must be included as "proof"
- Community members can assist with reporting even easier than years prior!

Are any samples being collected in 2025?

- Yes! From 14 "priority" sites identified by the DOH in the surrounding counties
- Each has some kind of public health implication
  - Regulated or Unregulated swimming area
  - Regulated water supply

Priority Shoreline Areas for HABs Sampling in 2025

Sites determined by each respective County Department of Health

Cayuga County

1. Cayuga Marina & Outfitters, Cayuga
2. Harris Park, Cayuga
3. Frontenac Park, Union Springs
4. Long Point State Park, Aurora

Seneca County

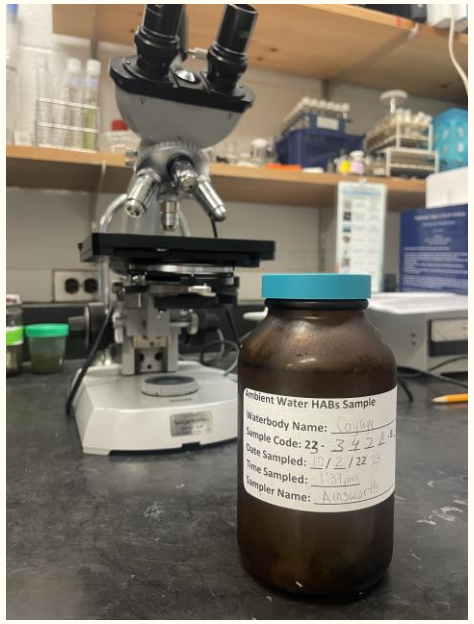
1. Seneca Falls Water Treatment Plant, Seneca Falls
2. Thirsty Owl Wine Company, Ovid
3. Sheldrake Point, Ovid
4. O'Malleys & Cayuga Shoreline, Interlaken
5. Spotted Sandpiper, Trumansburg

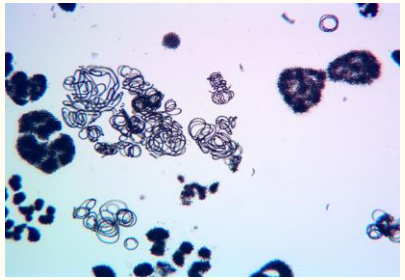
Tompkins County

1. Salt Point Preserve, Lansing
2. Lansing Harbor, Lansing
3. Bolton Point Intake, Ithaca
4. East Shore Park, Ithaca
5. Ithaca Yacht Club, Ithaca

Cayuga Lake HABs Monitoring Program

Microscopy is performed to confirm presence of cyanobacteria

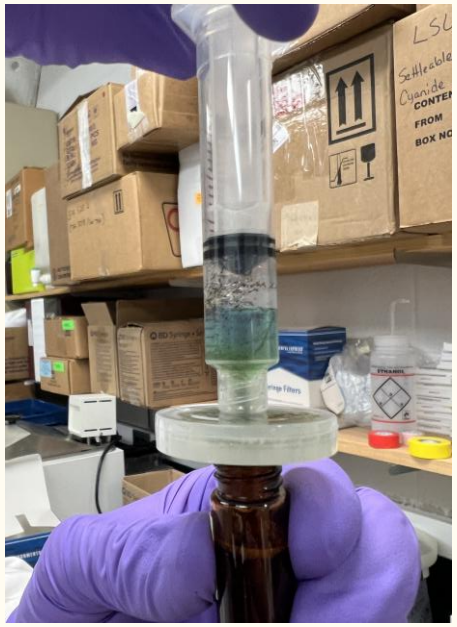




HAB samples are analyzed to:

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

Samples are analyzed in CSI's state certified lab



Cayuga Lake HABs Monitoring Program

CSI alerts local DOH, posts HAB report/results on the database, and uploads to NYHABs

Seneca County Health Department

Cayuga County Health Department

TOMPKINS COUNTY Whole Health

Partner Organizations & Agencies

Partner Organizations & Agencies

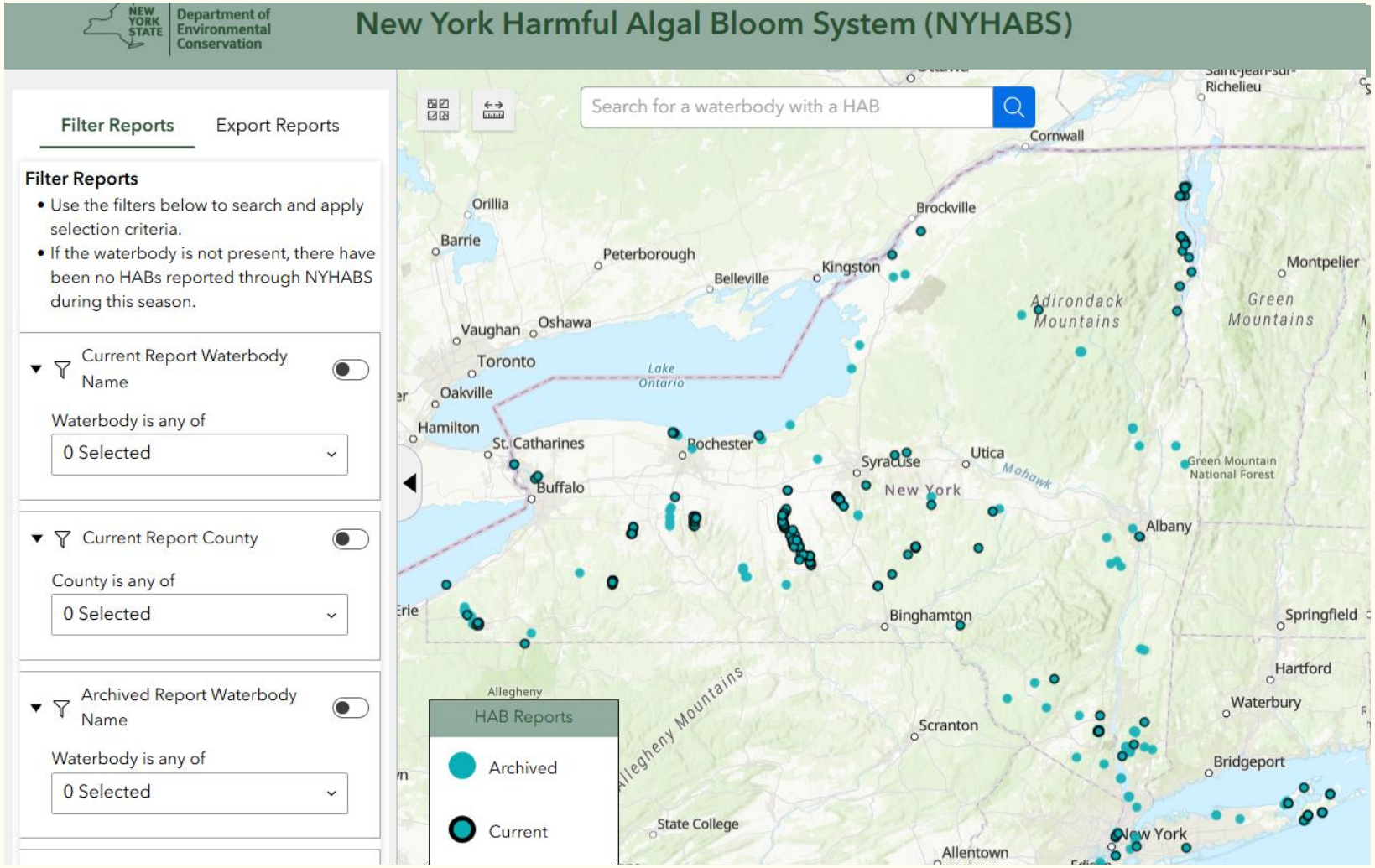
- Interagency collaborative effort (DEC, OPRHP, DOH)
- Operates NYHABS with DOH and OPRHP and issues bloom notifications
  - Health concerns & drinking water treatment overseen by local operators and DOH
  - Regulated swimming areas (beaches) have a protective response protocol based on visual observations

Partner Organizations & Agencies

NYHABS Map

6/24/25 @ 4:30 pm

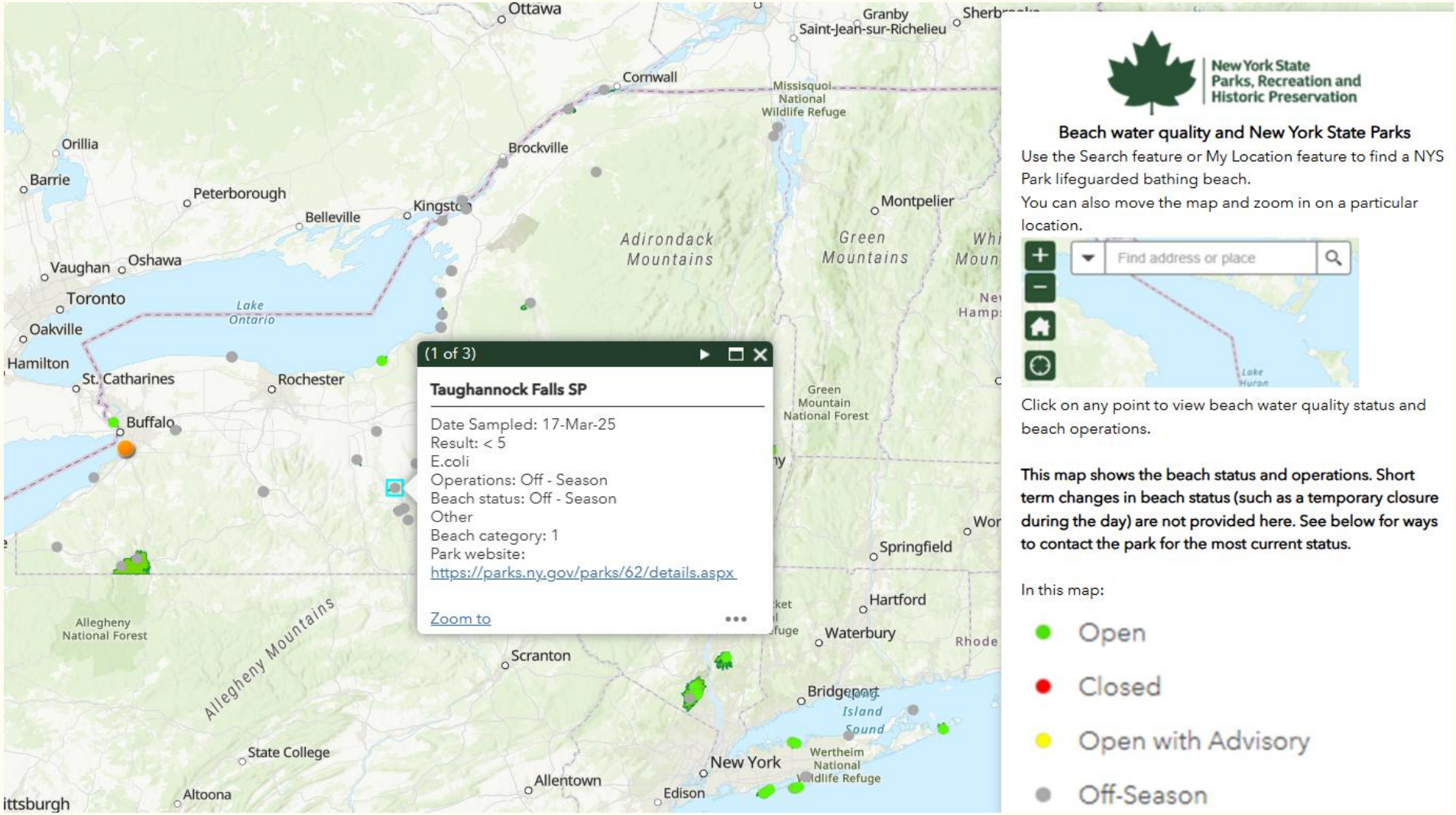
7/16/25 @ 2:00 pm



Partner Organizations & Agencies

OHPRP Beach Closure Map

7/16/25 @ 3:07 pm



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CSI's HABs Database

Community Science Institute

- Database Home
- About the Database
- Streams and Lakes Chemistry
- Download Streams and Lakes Data
- **Harmful Algal Blooms (HABs)**
- Download Harmful Algal Blooms
- Regional Groundwater Baseline
- Download Groundwater Data

Welcome to the Cayuga Lake Harmful Algal Blooms (HABs) Database

What is a Harmful Algal Bloom (HAB)?
A harmful algal bloom (HAB) occurs when aquatic microorganisms, primarily cyanobacteria on Cayuga Lake, grow rapidly under favorable conditions. These blooms have the potential to impact the public health with regard to recreation (swimming) and consumption.

Purpose of this Database
This database is designed to:
a) Quickly alert you to recent reports of cyanobacteria blooms (HABs)
b) Provide detailed information about each HAB reported
c) Make it possible to analyze long-term patterns of HABs occurrences.

Background
The Cayuga Lake HABs Monitoring Program was launched in 2018, recording HABs and their location, approximate size, density, genera of cyanobacteria it contained, and concentration of microcystin (a toxin created by the most commonly detected genera of cyanobacteria on Cayuga Lake). The reporting of bloom occurrences in this database is organized by geography and by areas of recreational interest, for example, parks and boat launches. Thus, Cayuga Lake is divided into 34 shoreline segments and four open water segments for a total of 38 segments used to track HABs spatially along the shore and in the open water of Cayuga Lake.

How to Use
Navigate the map to see HABs by geography. To view most recent suspicious and confirmed HABs click All, Year or Month at the top right. To view additional data select From/To dates and click Filter. Up-to-date information about a bloom, and the segment where it was reported, can be obtained by clicking the pins on the map or the list below.

More Info & Reporting a HAB
Click here for more information about our Cayuga Lake HABs Monitoring

HARMFUL ALGAL BLOOMS (HABs) DATABASE

From Date: To Date:

2025-05-17 2025-07-16 Filter All Year Month

Number of HABs: 66

Map Satellite

Bloom Code:25-3408-B1
Date:July 15, 2025
Segment: Lakeshore Segment Northeast 7: Wells College Boathouse

Community Science Institute's Harmful Algal Bloom Database-

FREE AND ACCESSIBLE TO THE PUBLIC!

CSI's HABs Database

25-3439-B1
25 = Year
34## = Zone
B# = The # bloom reported from that zone

NYSDOH Contact Limits:

Drinking water 0.3 µg/L

Recreation: 4 µg/L

Harmful Algal Bloom (HAB) Event Information

Bloom Code 25-3439-B1

Where

Water Body	Cayuga Lake
Latitude and Longitude	42.6402, -76.69222
Segment	Lakeshore Segment Southwest 10: Lively Run to Sheldrake Point
County	Seneca
Extent	Large Localized

When

Bloom Reported	July 08, 2025 05:15 PM
Bloom Sampled	July 08, 2025 05:25 PM
Microscopic Examination	July 09, 2025

What

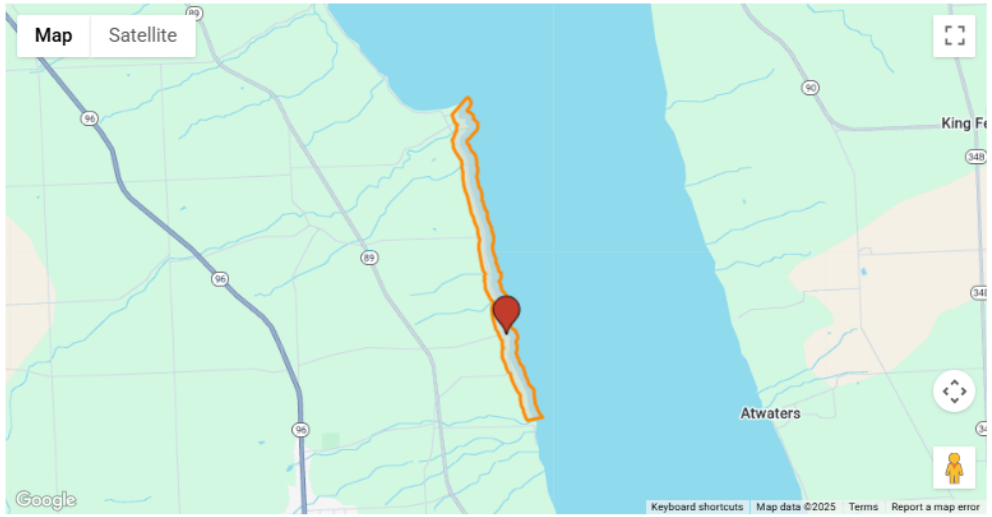
Bloom Genera [1]

Microscopy	Present	Dominant
Dolichospermum	✔	✔

Bloom Chemistry

Total Microcystin and Nodularins (EPA 546) [2]	4.46 ug/L

Map of HAB event



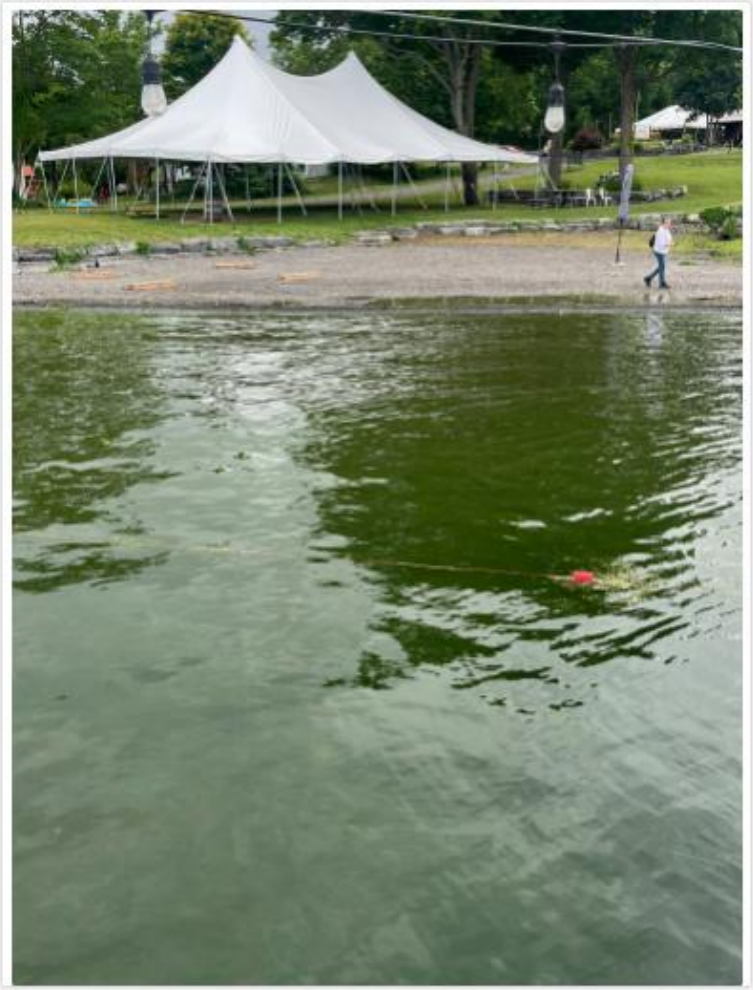
Bloom Description

Volunteer reports: Overcast/ 75 degrees /calm /one dead fish @ Cayuga Shoreline Part of western shoreline bloom event

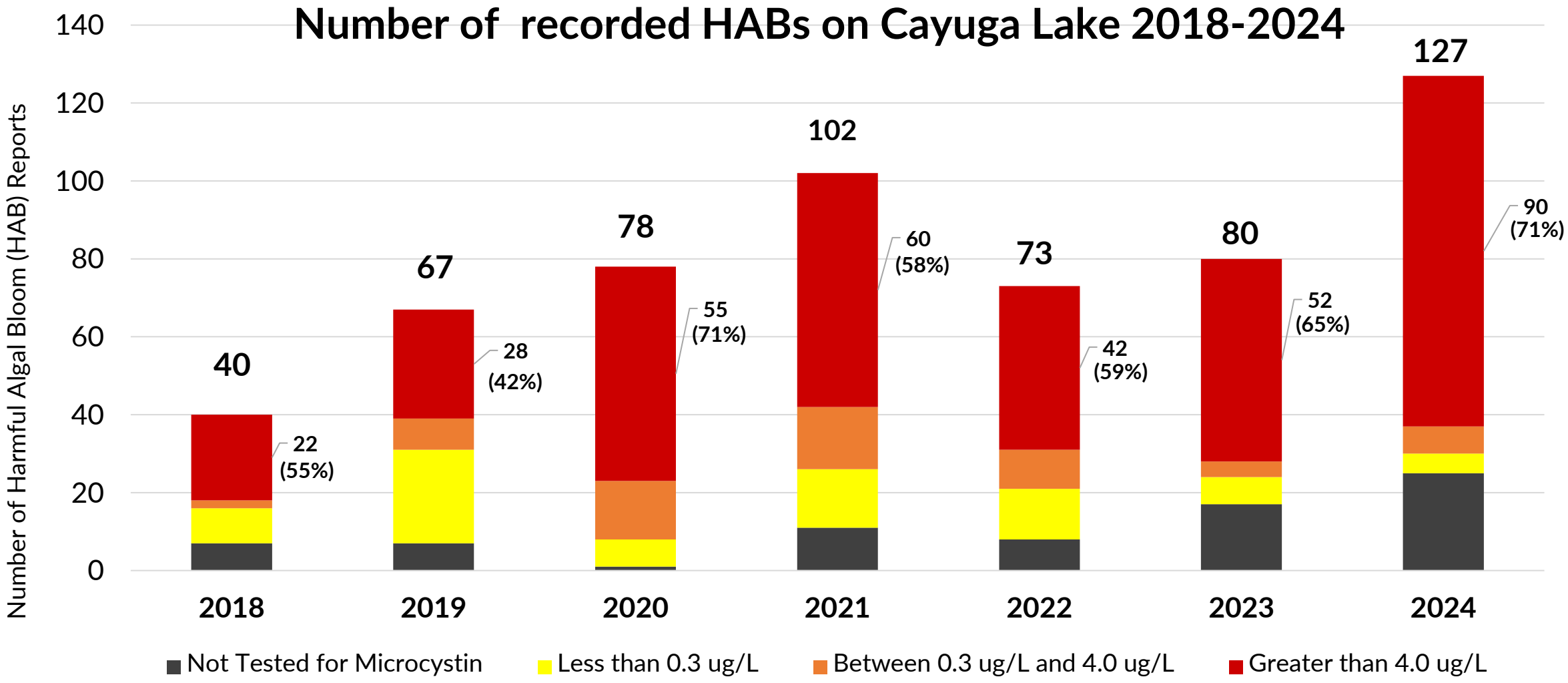
Weather

Weather	Cloudy
Wind speed	
Wind direction	

CSI's HABs Database



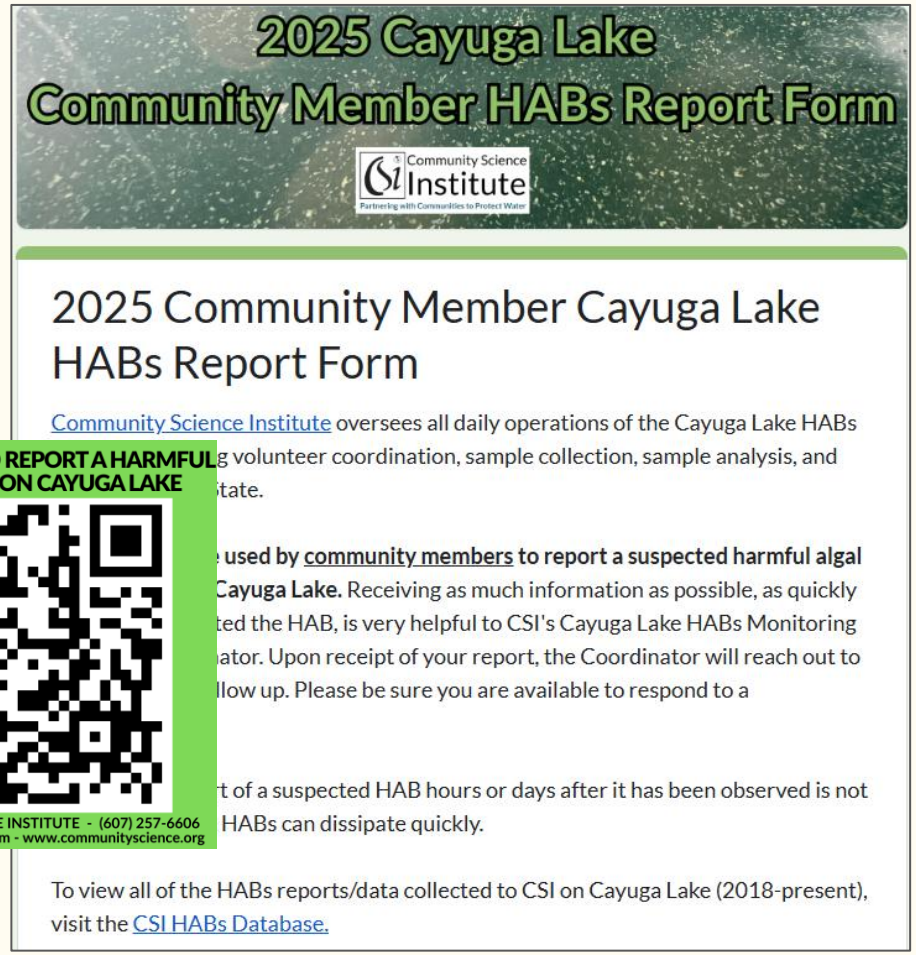
CSI's HABs Database



Agenda

- *Community Science Institute*
- *"HABs 101"*
- *HABs and Health*
- *Cayuga Lake HABs Monitoring Program*
- *CSI's HABs Database*
- **Get Involved/Stay Informed**
- Acknowledgements & Q&A

Get Involved/Stay Informed:



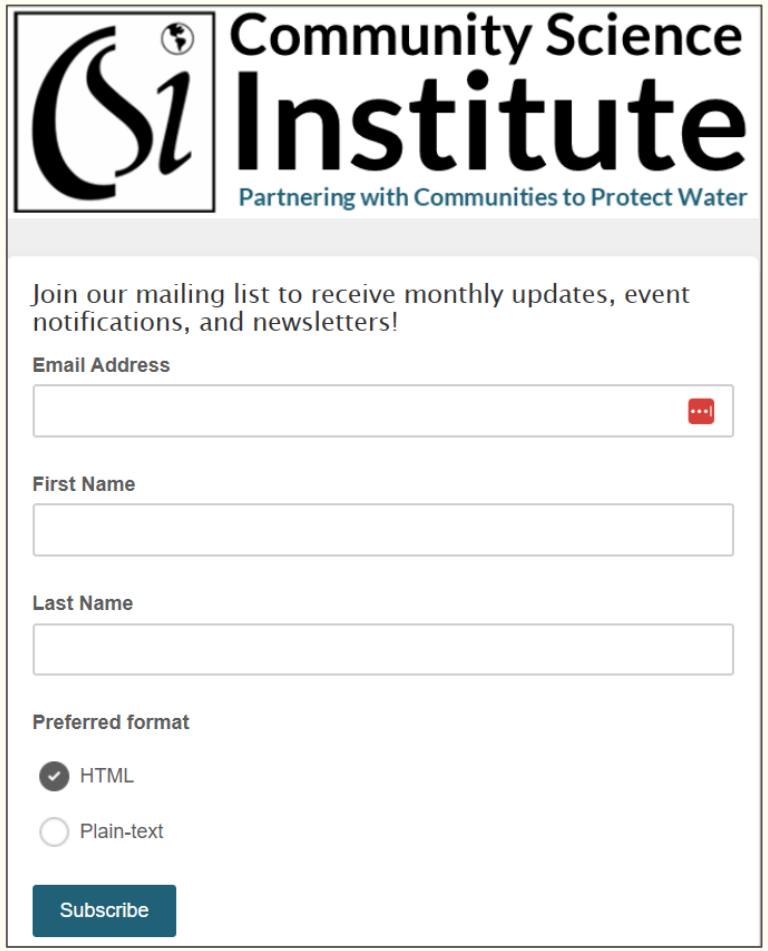
SCAN QR CODE TO REPORT A HARMFUL ALGAL BLOOM ON CAYUGA LAKE

COMMUNITY SCIENCE INSTITUTE - (607) 257-6606
HABsHotline@gmail.com - www.communityscience.org

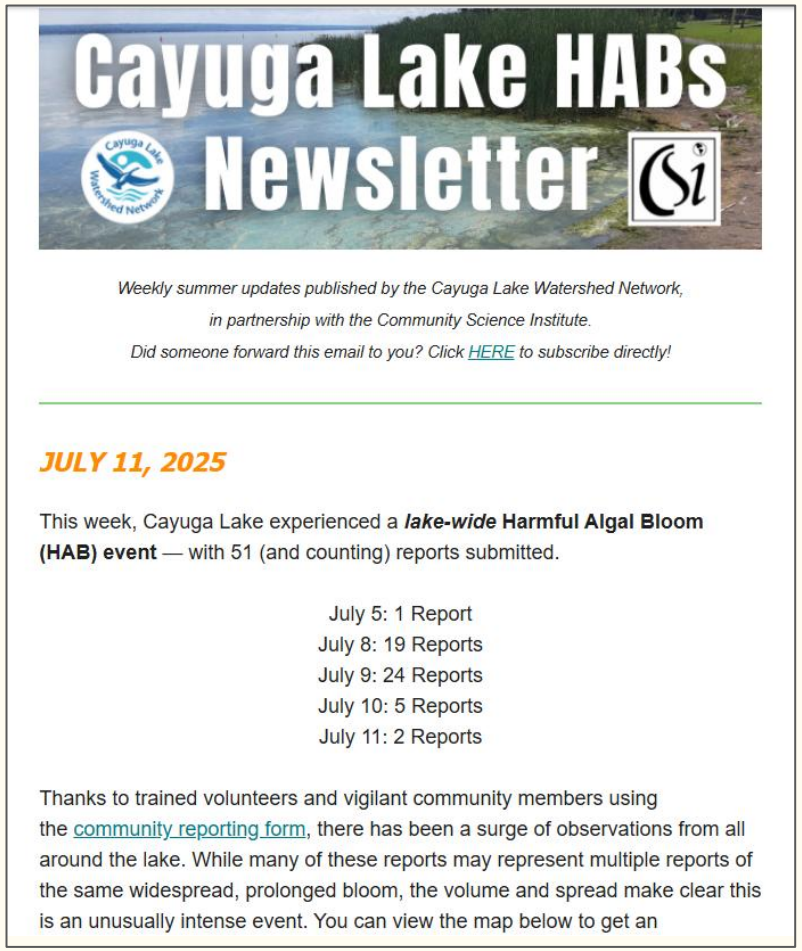
Or email HABsHotline@gmail.com

Get Involved/Stay Informed:

CSI's Monthly Email Updates

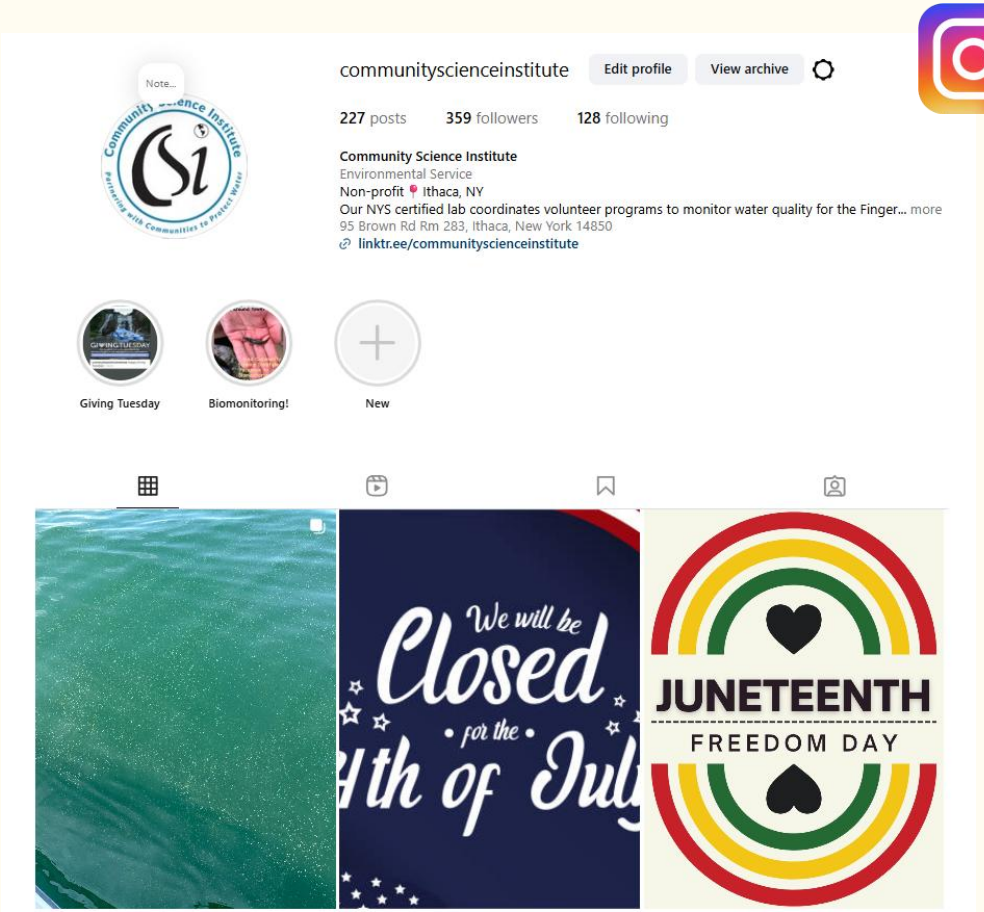


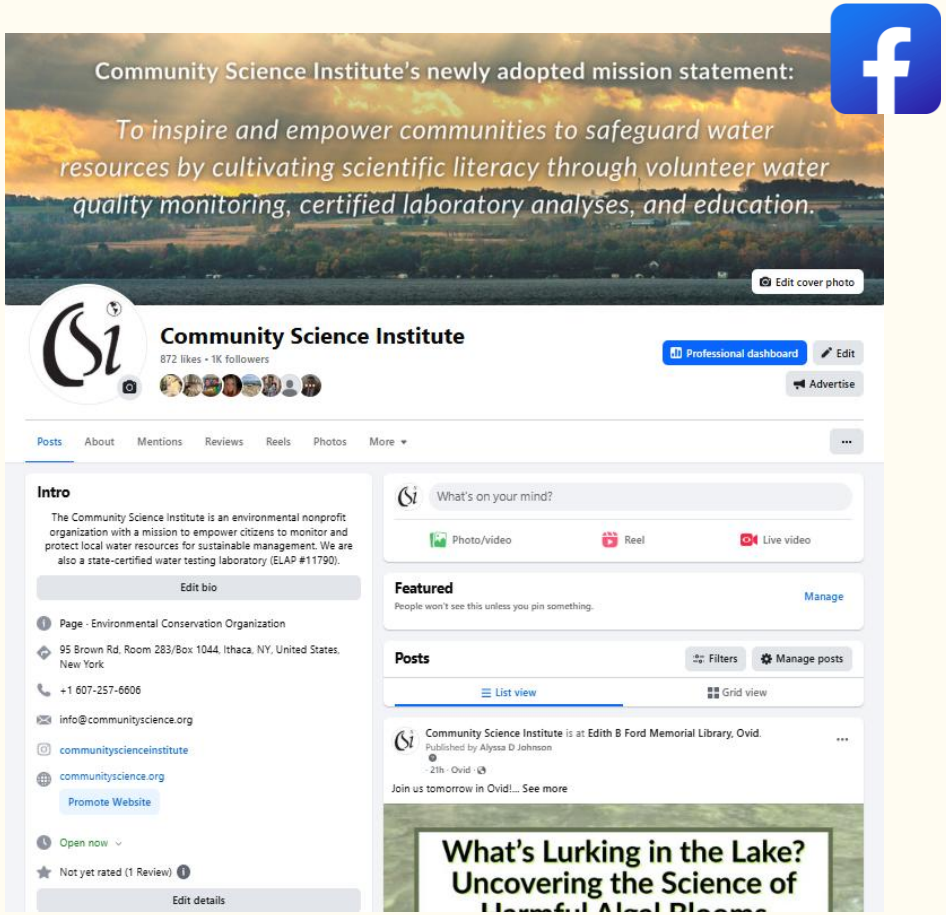
CLWN Weekly Updates to the Public



Get Involved/Stay Informed:

Follow CSI on Social Media





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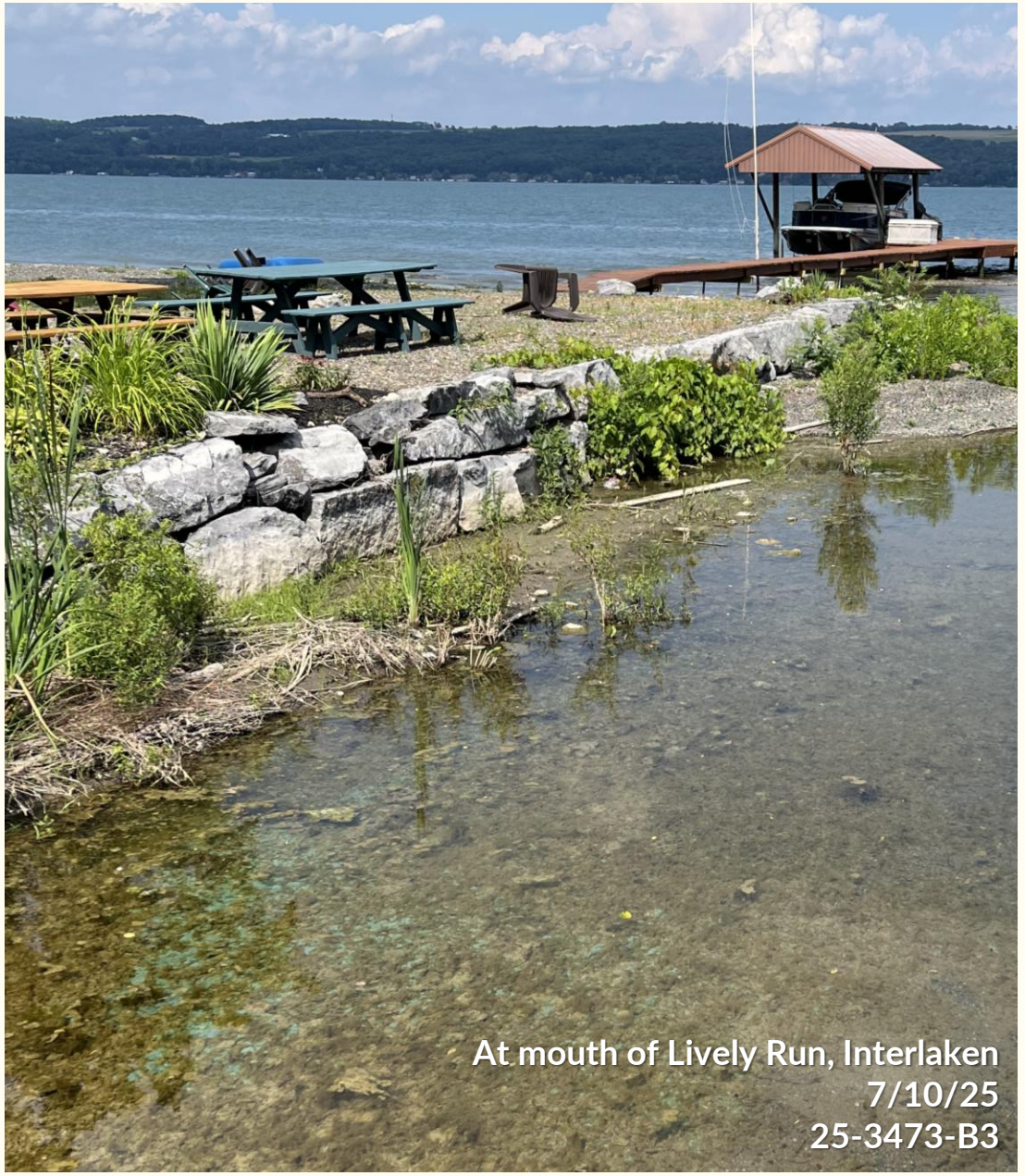

At mouth of Lively Run, Interlaken
7/10/25
25-3473-B3

Acknowledgements

CSI Staff Past and Present

- Grascen Shidemantle, Executive Director
- Noah Mark, Laboratory Director
- Adrianna Hirtler, Biomonitoring Coordinator
- Rama Hoetzlein, Database Developer

Programmatic Support

Seneca County Health Department

Cayuga County Health Department

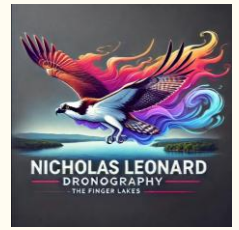
Tompkins County Whole Health

Cayuga Lake Watershed Network

Discover Cayuga Lake

Department of Environmental Conservation, New York State

New York State Parks, Recreation and Historic Preservation



CSI Members & NEW Business Members

Fingerlakes Wealth Management

Farmer Group

gimme!

Burg Shur-Save

Inn at Taughannock Falls

ALL 104 DEDICATED HABs HARRIERS & CARRIERS!!!

Questions?

Alyssa Johnson

alyssa@communityscience.org

607-257-6606

95 Brown Road/Suite 283

Ithaca, NY 14850

North end looking SE towards Cayuga
7/11/25
Photo: Nicholas Leonard Dronography

To HAB or Not to HAB?

✕ **NOT** a HAB (probably)

To HAB or Not to HAB? Test your ID skills:

HAB ✓

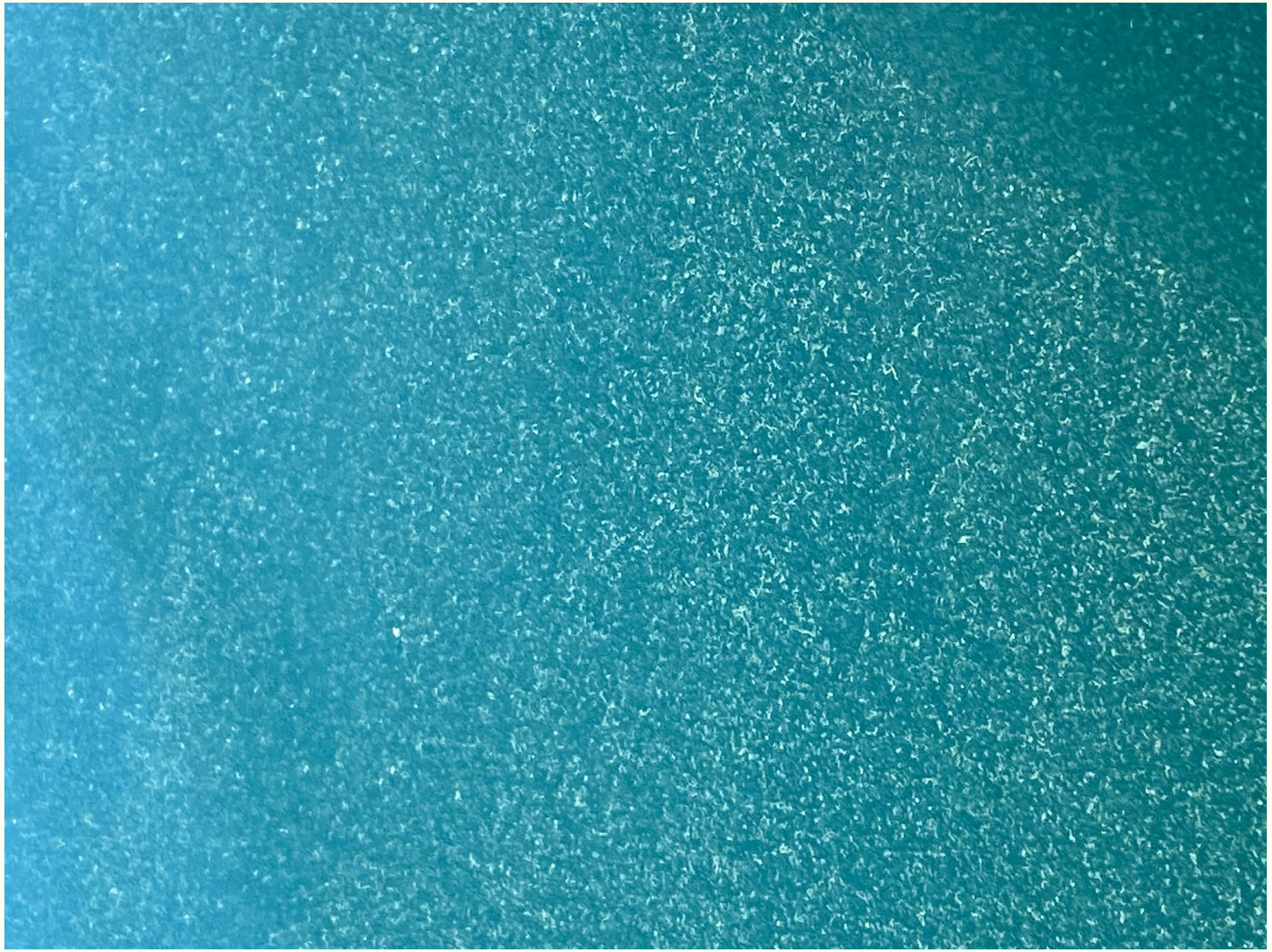
To HAB or Not to HAB?

✕ **NOT** a HAB

To HAB or Not to HAB?

HAB ✔

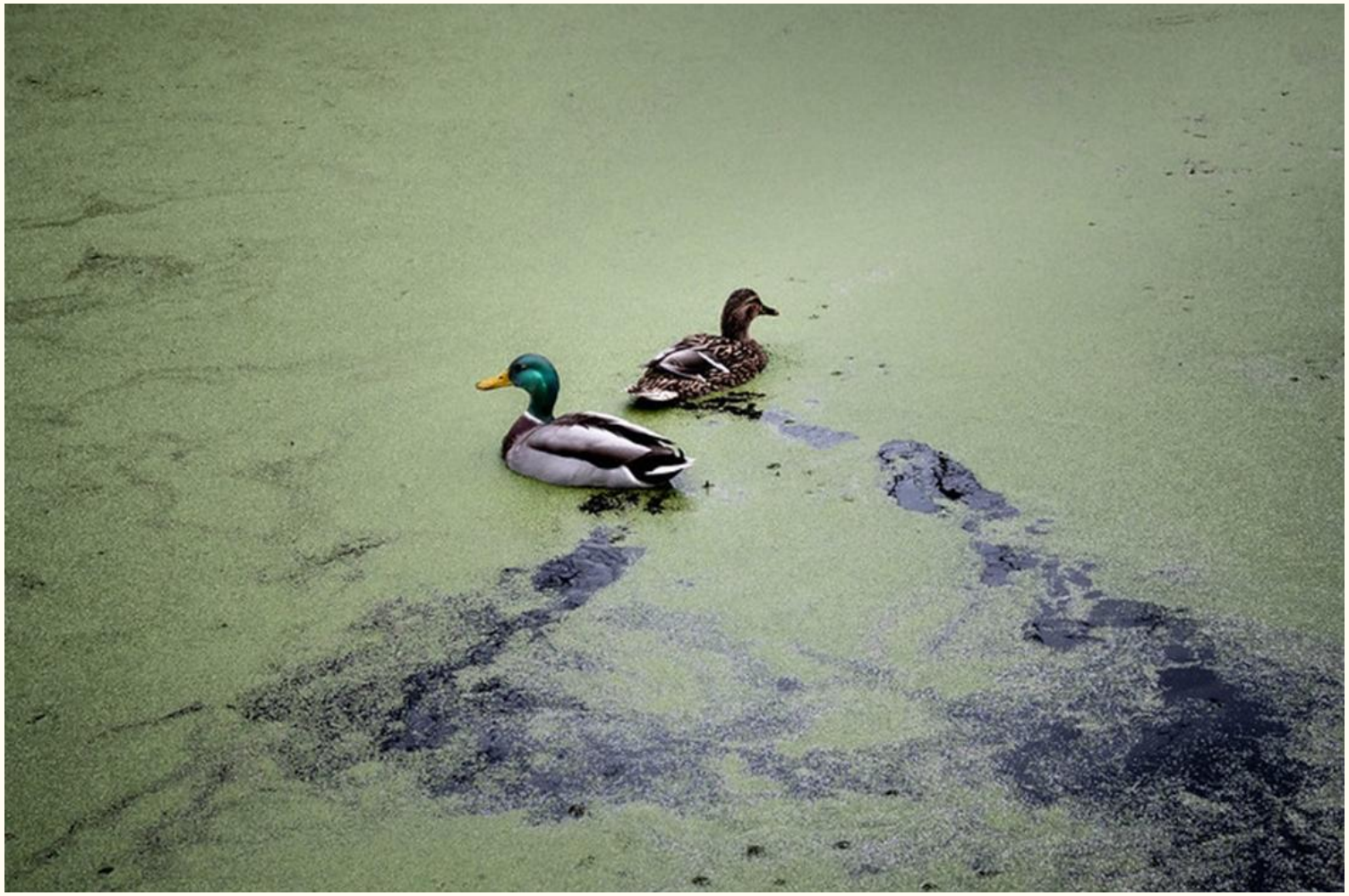
To HAB or Not to HAB?



HAB ✓

To HAB or Not to HAB?

✕ **NOT** a HAB



To HAB or Not to HAB?

HAB ✔

To HAB or Not to HAB?

✗ **NOT** a HAB

To HAB or Not to HAB?

HAB ✓

To HAB or Not to HAB?

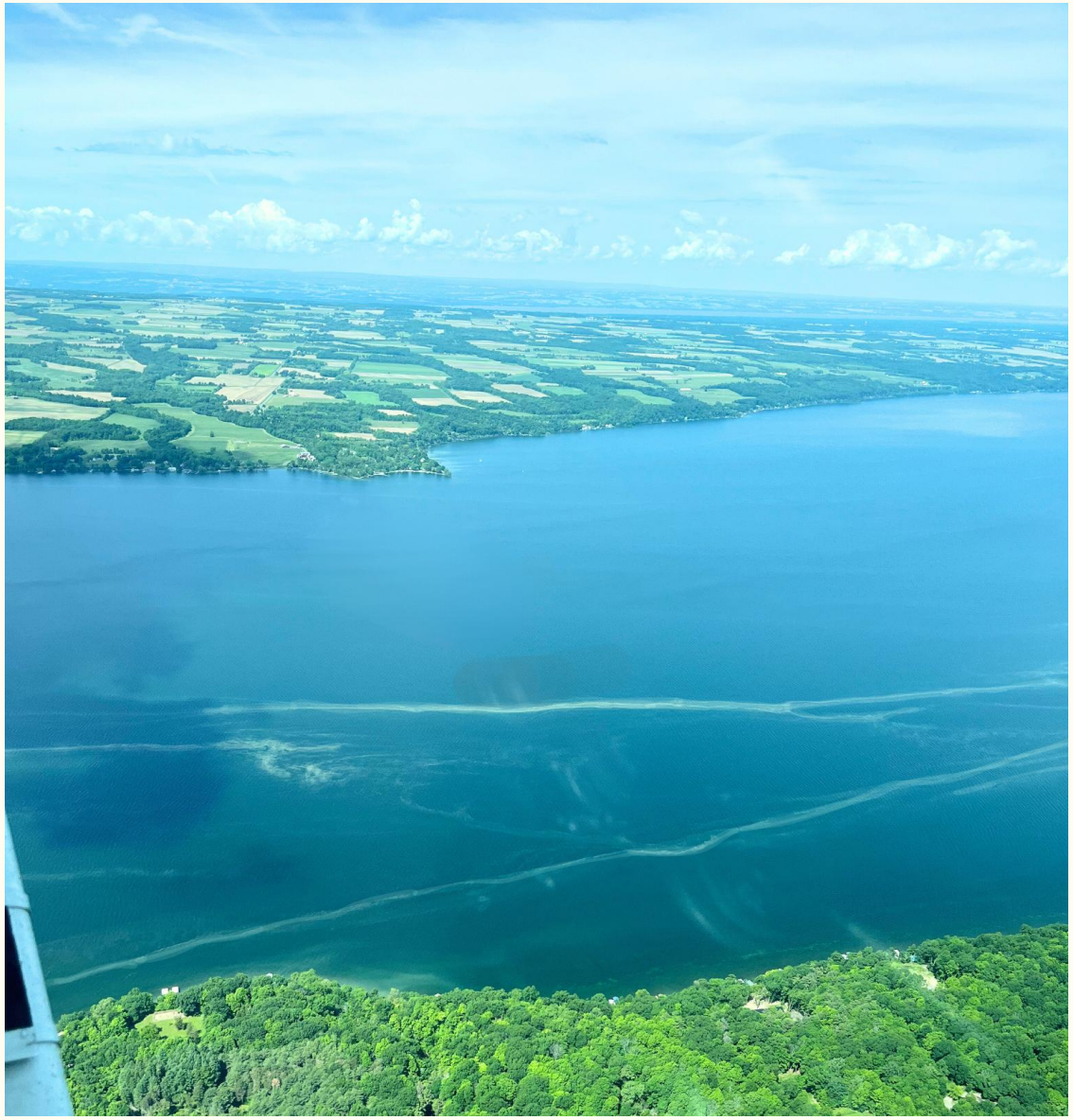
✗ **NOT** a HAB

To HAB or Not to HAB?

HAB ✓

To HAB or Not to HAB?

✗ **NOT** a HAB



Agenda

- *Community Science Institute*
- *Partner Organizations & Agencies*
- *"HABs 101"*
- *Cayuga Lake HABs Monitoring Program*
- *2024 Monitoring Season in Review*
- **Get Involved!**
- Acknowledgements & Q&A