

The 2018 Cayuga Lake HABs Monitoring Program

Discussion of Season Results

Presented by Nathaniel Launer, *Outreach Coordinator*



Cyanobacteria on Cayuga Lake in 2018

The Community Science Institute documented 40 cyanobacteria blooms on Cayuga Lake this year that were confirmed.

- only 8 confirmed cyanobacteria blooms in 2017 (NYSDEC, 2017)
- impossible to say how much of this increase is due to improved monitoring

Of the 34 bloom samples tested for *microcystin* levels, 24 or 70% had microcystin toxin levels above acceptable limit of 4 ug/ L for ambient water set by NYS Department of Health.

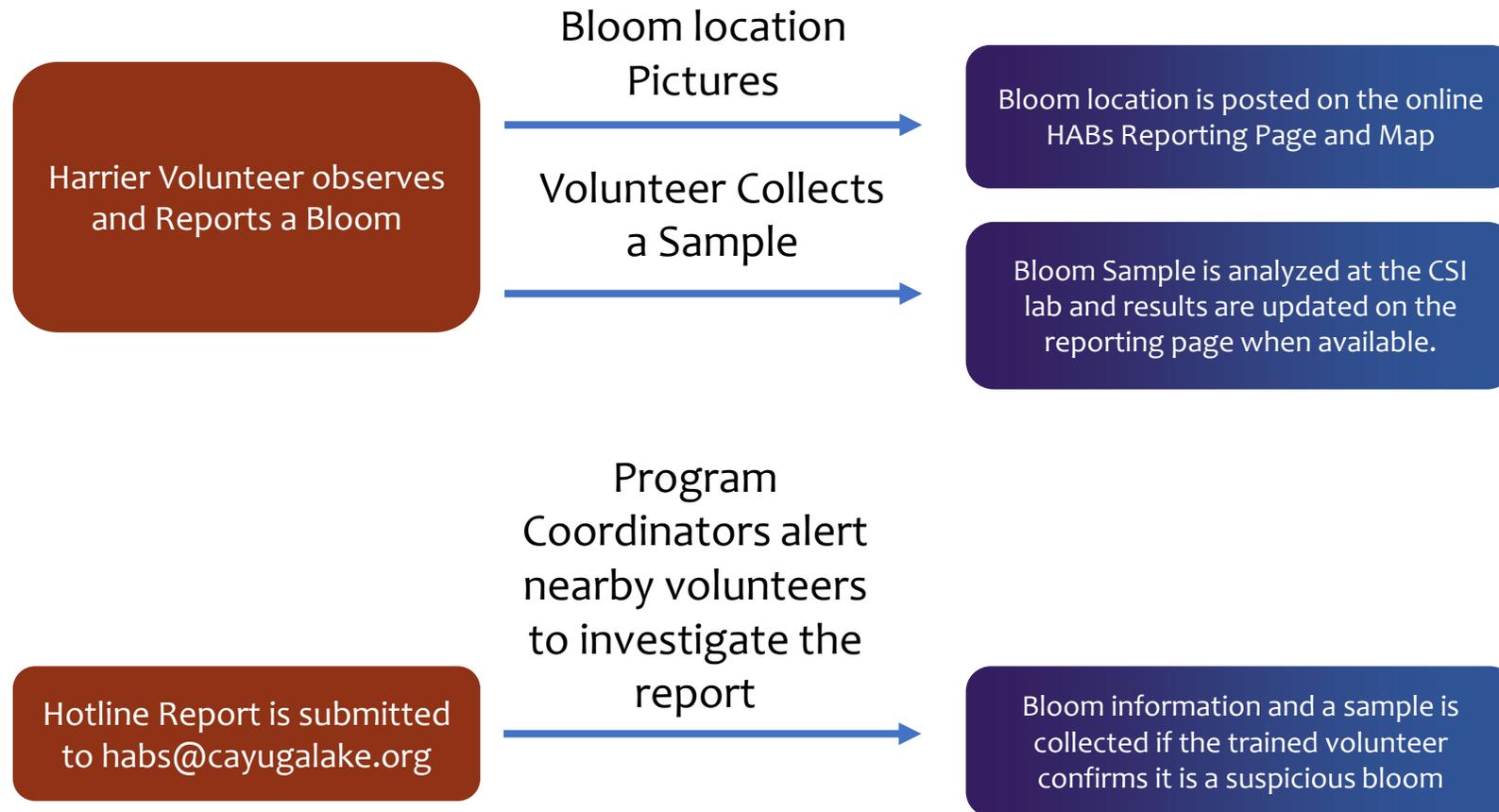
Why Monitoring/ What are we looking for?

Risk Assessment and Management

1. Assessing and communicating risk due to cyanobacteria blooms
2. Data collection to be used to support management



Suspicious Bloom Reporting Process



1. Risk assessment and communication

Bloom location is promptly posted on the HABs Reporting Page on the Community Science Institute website.

Analysis results are updated as soon as available: Whether cyanobacteria are present, level of microcystin toxin, and concentration of total chlorophyll a

Weekly emails summarizing recent HABs occurrences are sent to volunteers and stakeholders.

2018 Cayuga Lake Harmful Algal Bloom Information, Testing Results, and Resources

HABs Reporting Map

Please view the map in full screen mode so that you can see the full extent of information provided. Click on the broken box in the upper right hand corner of the map. This will open the full screen map in a new tab.

The attached map serves as an interactive catalog of all of the reported blooms on Cayuga Lake in 2018. Click on an icon to see important information including a picture of the bloom, location, and results when/if they become available. Yellow icons represent "suspicious" blooms, orange icons represent "confirmed" blooms, and red icons represent "confirmed with high toxins". Map results are cumulative. It's important to note the date of sampling because blooms are transient by nature and can disappear in as little as a day. We do not track bloom duration.

A note about the toxin microcystin:

Cyanobacteria (blue-green algae) may produce a variety of chemicals that are harmful to other species, including humans. The most common harmful chemical found in New York is microcystin. Detailed toxicity studies have not been performed, and there is not yet a consensus on acceptable exposure levels. The New York State Department of Health (NYSDOH) has set upper limits for public drinking water supplies at 0.3 ug/L or parts per billion (ppb) and for public swimming beaches at 4.0 ppb (EPA, 2017). The New York State Department of Environmental Conservation (NYSDEC) defines a "bloom with high toxin" as 20 ppb near the lake shore and 10 ppb in open water (NYSDEC HABs Program Guide, Section 3).

For more information check out our [info page](#) and resources from [last year's public forum on harmful algal blooms](#).

Confirmed with High Toxins Bloom 9/4/18 18-3416-B3

Confirmed with High Toxins bloom near Atwater Point on 9/4/18 at 1:15 PM. CSI ANALYSIS: Microcystin toxin - 374 ug/L, Total Chlorophyll a - 12028.0 ug/L.

25,000 + Views of the HABs Reporting Map

Bloom Information				Bloom Location Information		CSI Analyses (only including if samples are not invalid)				Sample sent to DEC contract lab?			
Queue#	Date Reported	Date Reported	Time Sampled	Date Sample Received	Location Description	Latitude	Longitude	Description	Analysis Date		Result in ug/L	Analysis Date	Result in ug/L
	7/22/18				Long Point State Park 7/2/18	42.7158	-76.7186	Sample not collected	7/30/18	348	7/30/18		
	7/22/18				Winged Pt. Just south of Olears Cove 7/2/18	42.7392	-76.7471	Sample not collected	7/30/18	1188	7/30/18		
376	9/4/18	18-3416-B3	18:00	7/30/18	10:00/18	16.46	7/30/18	0647 Rte 65, Remick, North of Olears Cove	42.7542	-76.7686	Daily exposure	7/30/18	348
377	9/4/18	18-3416-B3	18:00	7/30/18	15:00/18	17.96	7/30/18	Olears Cove Boat Launch	43.7447	-76.7673	Daily exposure	7/30/18	1188
378	9/4/18	18-3416-B3	18:00	7/30/18	14:00/18	16.26	7/30/18	2547 Lake Rd, Aroves, Between Long Point	42.7217	-76.7891	Daily exposure	7/30/18	773
379	9/4/18	18-3416-B3	18:00	7/30/18	12:55	12.55	7/30/18	107 Lanes #1, King Ferry, North of Moken	42.6247	-76.8494	Daily exposure	7/30/18	338
380	9/4/18	18-3416-B3	18:00	7/30/18	11:30	11.30	7/30/18	102 Lanes #2, King Ferry, North of Moken	42.5837	-76.8170	Daily exposure	7/30/18	334
381	9/4/18	18-3417-B3	18:00	7/30/18	10:00/18	18.00	7/30/18	Lansing Station Rd, Lansing	42.5879	-76.6720	Daily exposure	7/30/18	378
382	9/4/18	18-3417-B3	18:00	7/30/18	18:00	18.00	7/30/18	South of Long Point State Park 7/30/18	42.7132	-76.7360	Daily exposure	7/30/18	378



2. Supporting potential management strategies

When do cyanobacteria blooms occur on Cayuga Lake?

Which cyanobacteria genera are associated with microcystin toxin?

When do blooms have the highest toxin levels?

Where do blooms occur?

Data collected through monitoring supports risk assessment and risk management strategies.

When do blooms occur on Cayuga Lake?

In July, 16 cyanobacteria blooms were confirmed.

- only two of these blooms had toxin levels above 4 ug/ L.

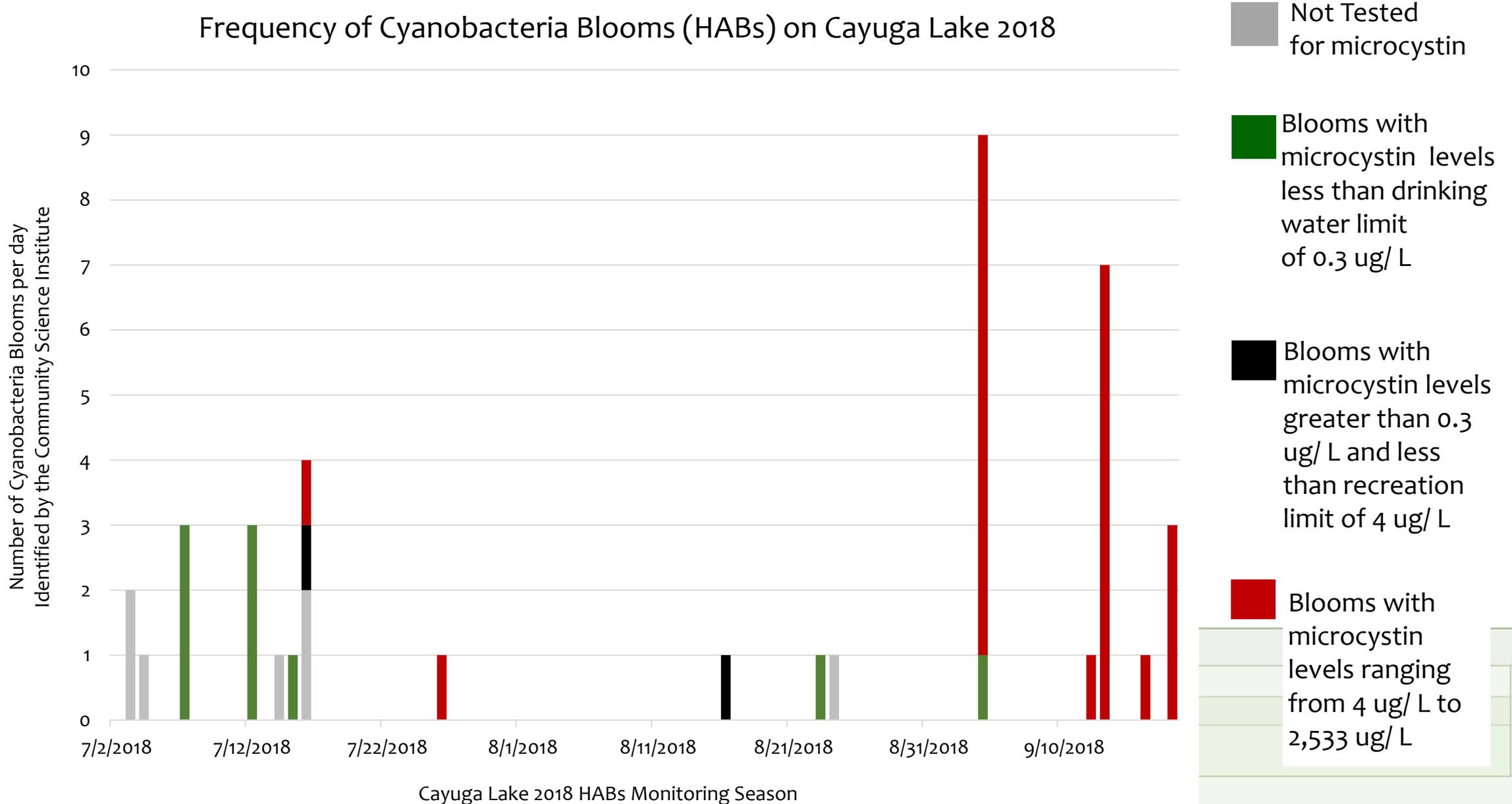
In August, 3 cyanobacteria blooms were confirmed.

- none of these had toxin concentrations above 4 ug/ L.

In September, 21 cyanobacteria blooms were confirmed.

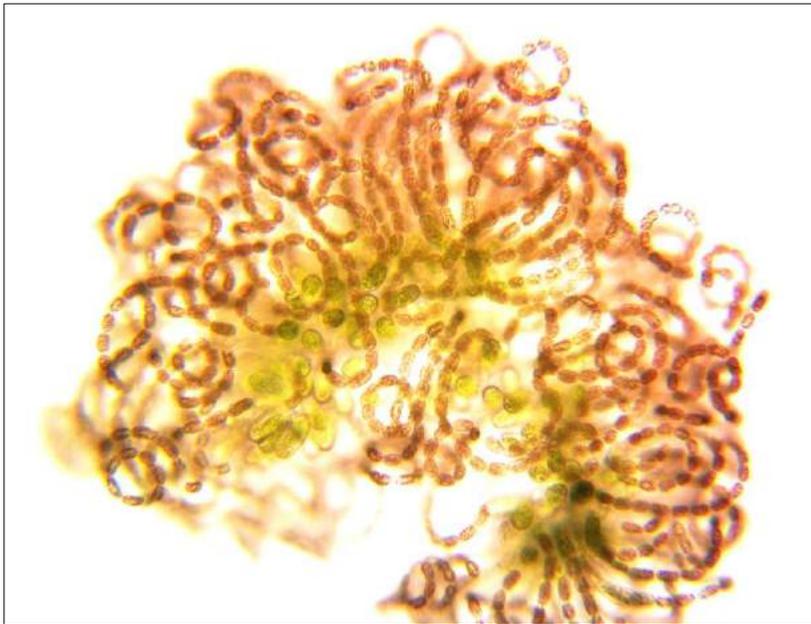
- 20 of these blooms had toxin levels above 4 ug/ L.

When did blooms occur on Cayuga Lake?



Which cyanobacteria genera were associated with microcystin toxin in 2018?

Most blooms with toxin levels above DOH limits were dominated by *microcystis*.

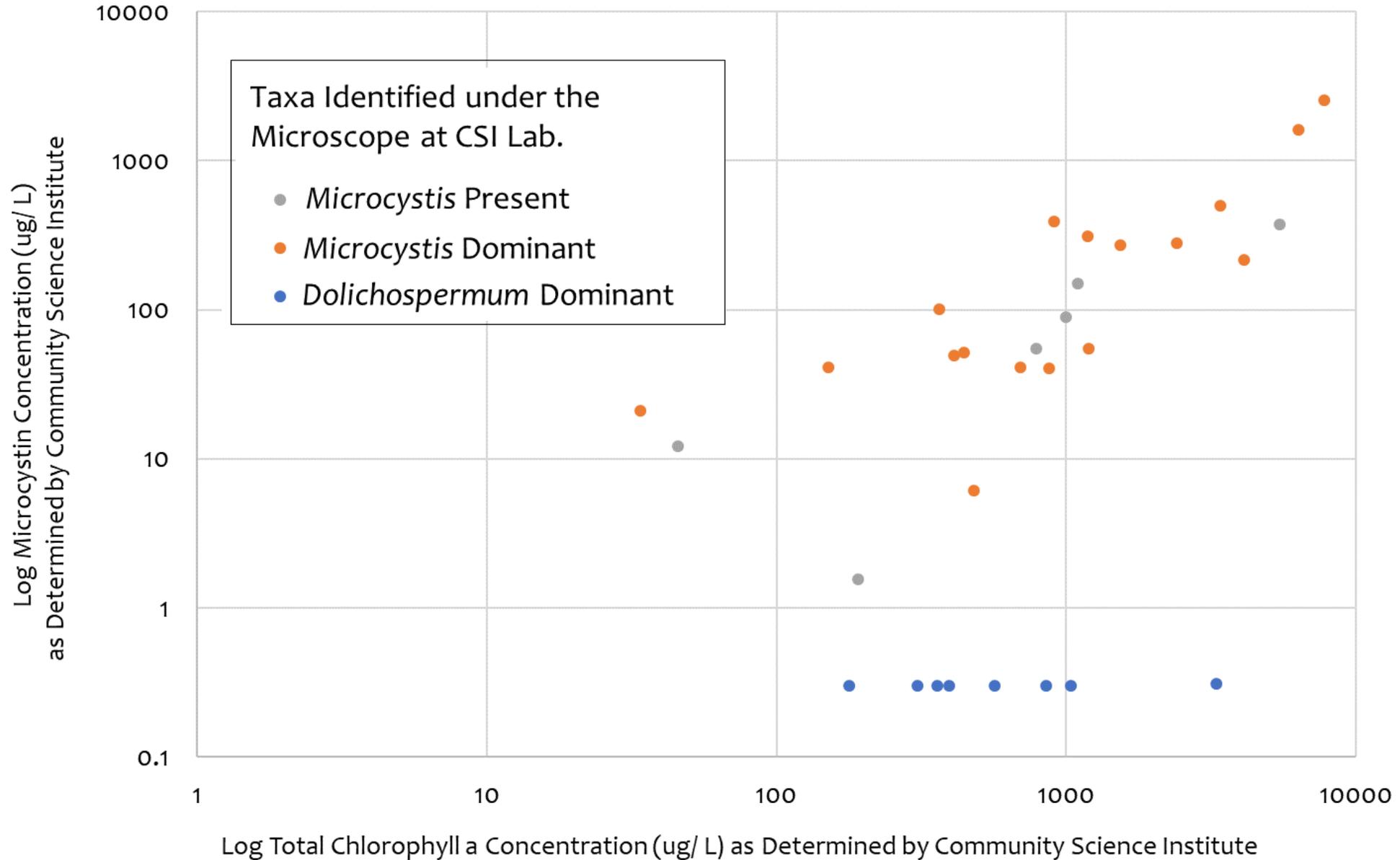


Eight of the ten blooms tested for *microcystin* by CSI in 2018 that were dominated by *Dolichospermum* had *microcystin* concentrations below 4 ug/ L.



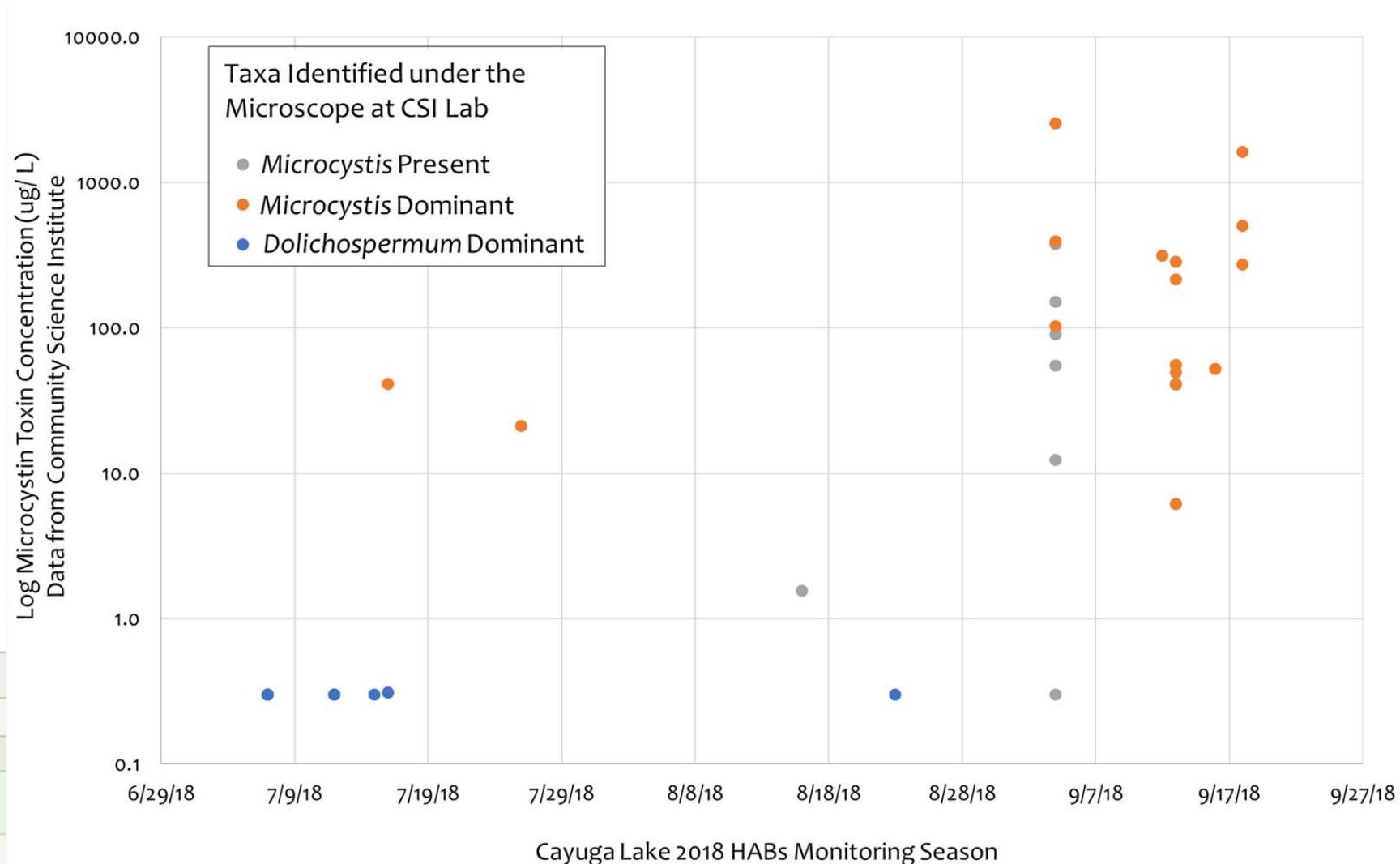
Of the 24 blooms tested for *microcystin* by CSI in 2018 that were dominated by *Microcystis*, 22 had *microcystin* concentrations above 4 ug/ L.

Microcystin Toxin Increased with Cyanobacteria Biomass when *Microcystis* Taxa were Present or Dominant



When did blooms have the highest toxin levels in 2018?

- blooms sampled in September had higher toxin concentrations than those sampled in July and August.



Mapping

Northwestern Quadrant

18 Volunteers

12 Bloom Samples Collected

Northeastern Quadrant

19 Volunteers

9 Bloom Samples Collected

Southwestern Quadrant

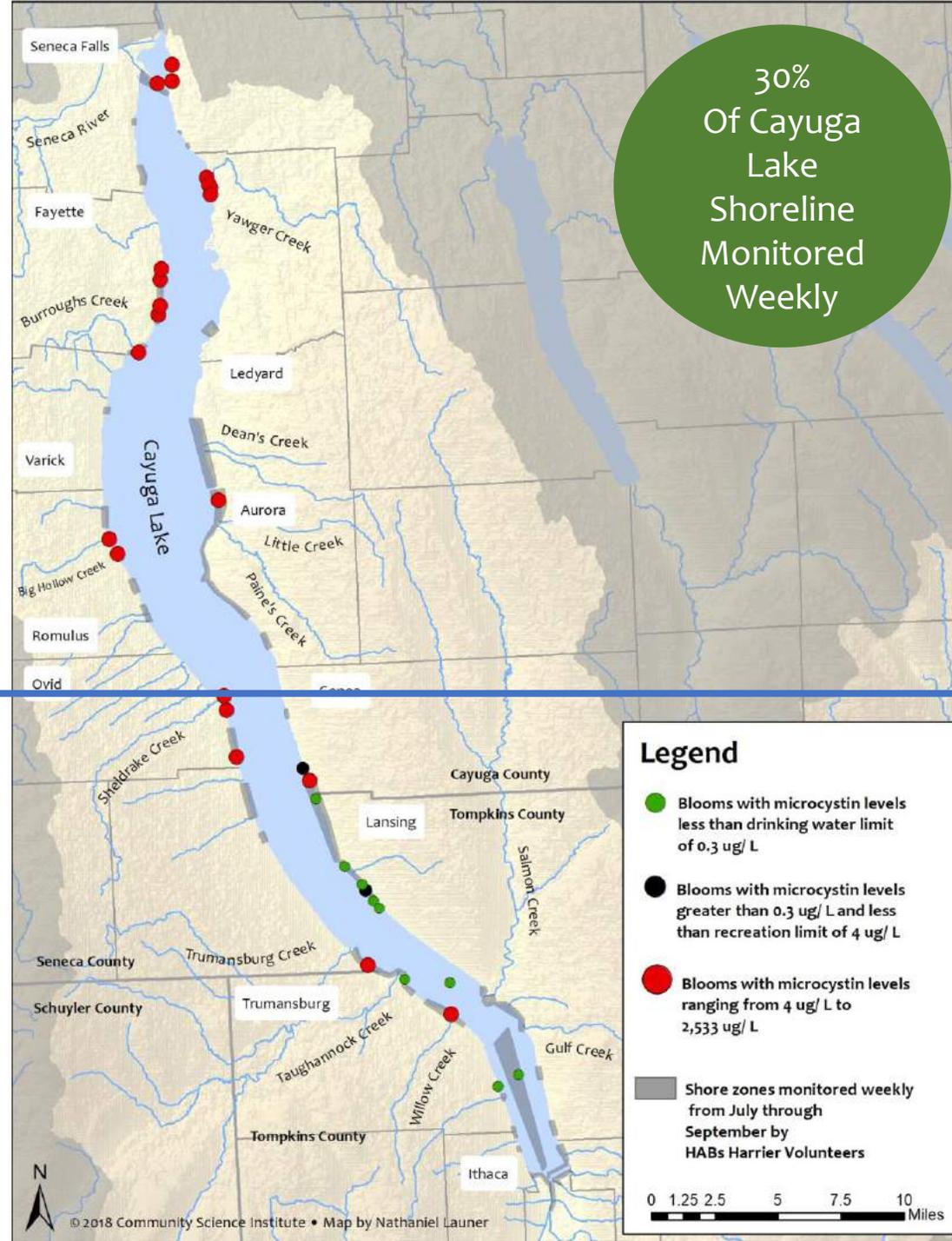
16 Volunteers

7 Bloom Samples Collected

Southeastern Quadrant

19 Volunteers

11 Bloom Samples Collected



Occurrence of confirmed cyanobacteria blooms on Cayuga Lake appeared to increase in 2018 compared to the previous year, though much of this may be due to improved monitoring efforts.

Nearly all blooms on Cayuga Lake in 2018 with toxin levels above state drinking water and recreation limits contained the cyanobacteria *Microcystis*.

A sharp rise in bloom toxin levels was observed in later summer months on Cayuga Lake in 2018.

On Cayuga Lake in 2018, 77% of the blooms with *microcystin* concentrations above 4 ug/ L occurred in the northern half of the lake.

Monitoring is essential for

1. Assessing the risk that cyanobacteria blooms may or may not present.
2. Data collection to support risk management

Thank You

We are here to help!

If you would like more information, please contact
the Community Science Institute at
info@communityscience.org or (607) 257-6606