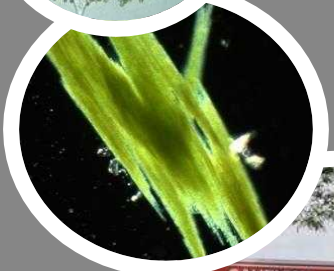
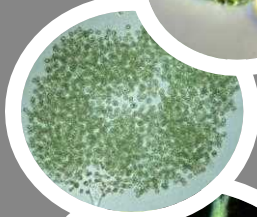
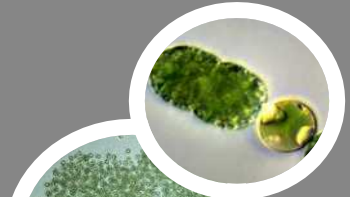


Three Years of Monitoring Harmful Algal Blooms (HABs) on Cayuga Lake



Nathaniel Launer
Outreach Coordinator,
Community Science Institute

The 2020 Monitoring Season

Over **90 HABs Harrier** volunteers participated in the program this year!

With **83 monitoring zones**, over **53%** of lake shoreline was monitored weekly, including State Parks, municipal lakefront parks, natural areas, and other public shoreline.

HAB Information and Reporting Guide brochures installed at **six** lakefront parks. More to be installed ahead of the 2021 season.

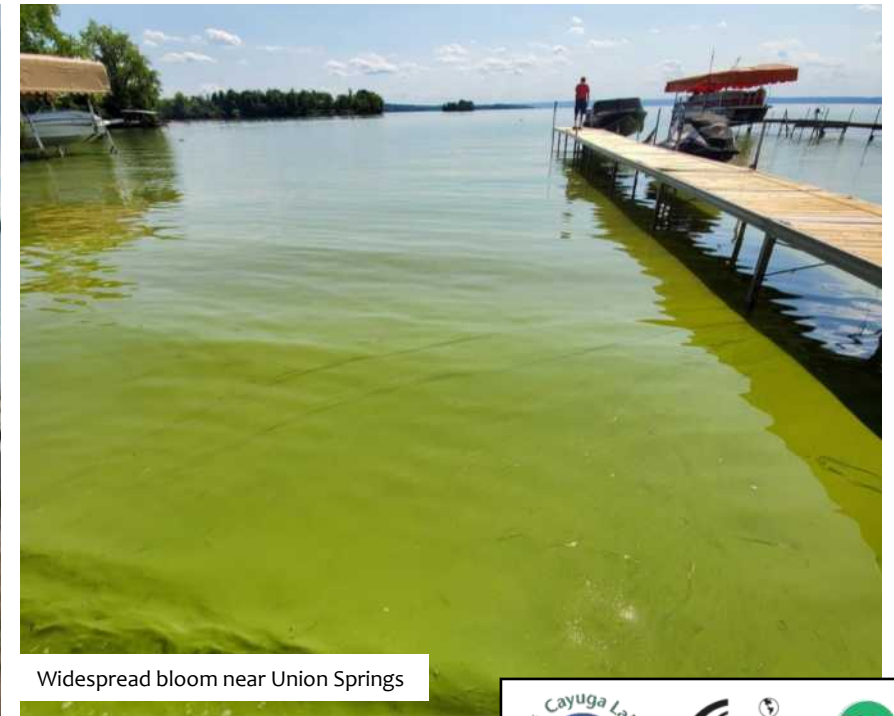
Over **40,000 views** of our Cayuga Lake HABs Reporting Page.



Bill Ebert collecting a late summer bloom sample

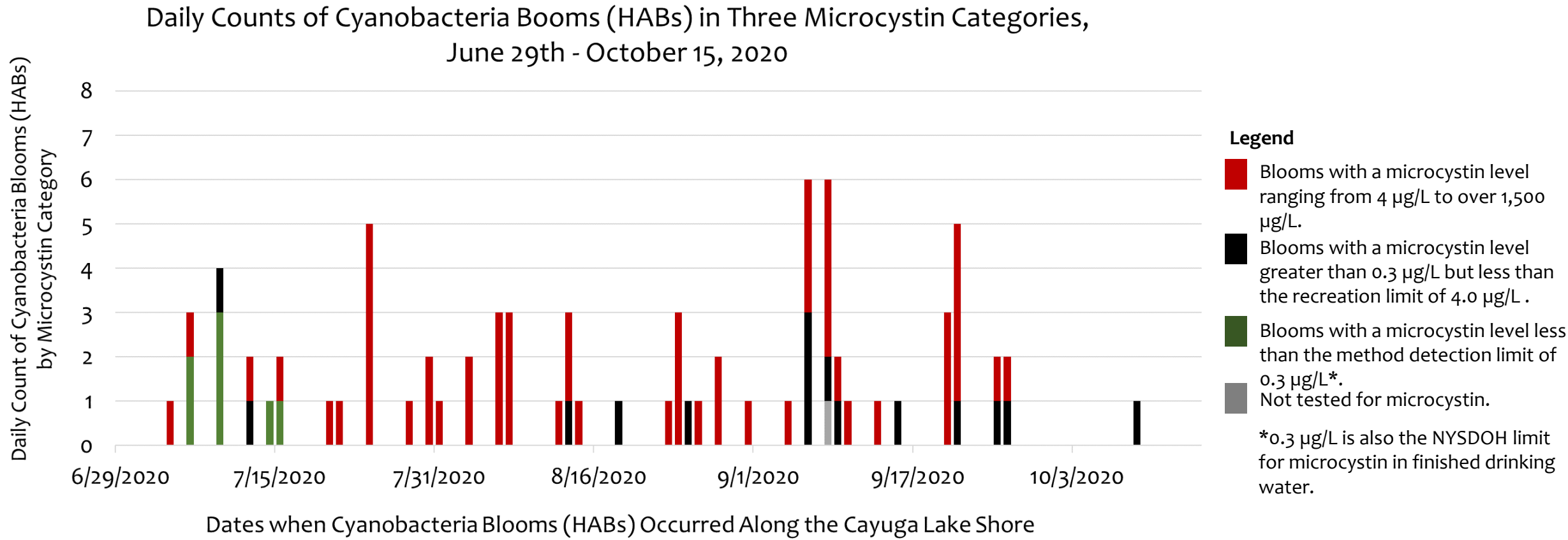


HABs Information and Reporting Guide installed at Harris Park in the Village of Cayuga



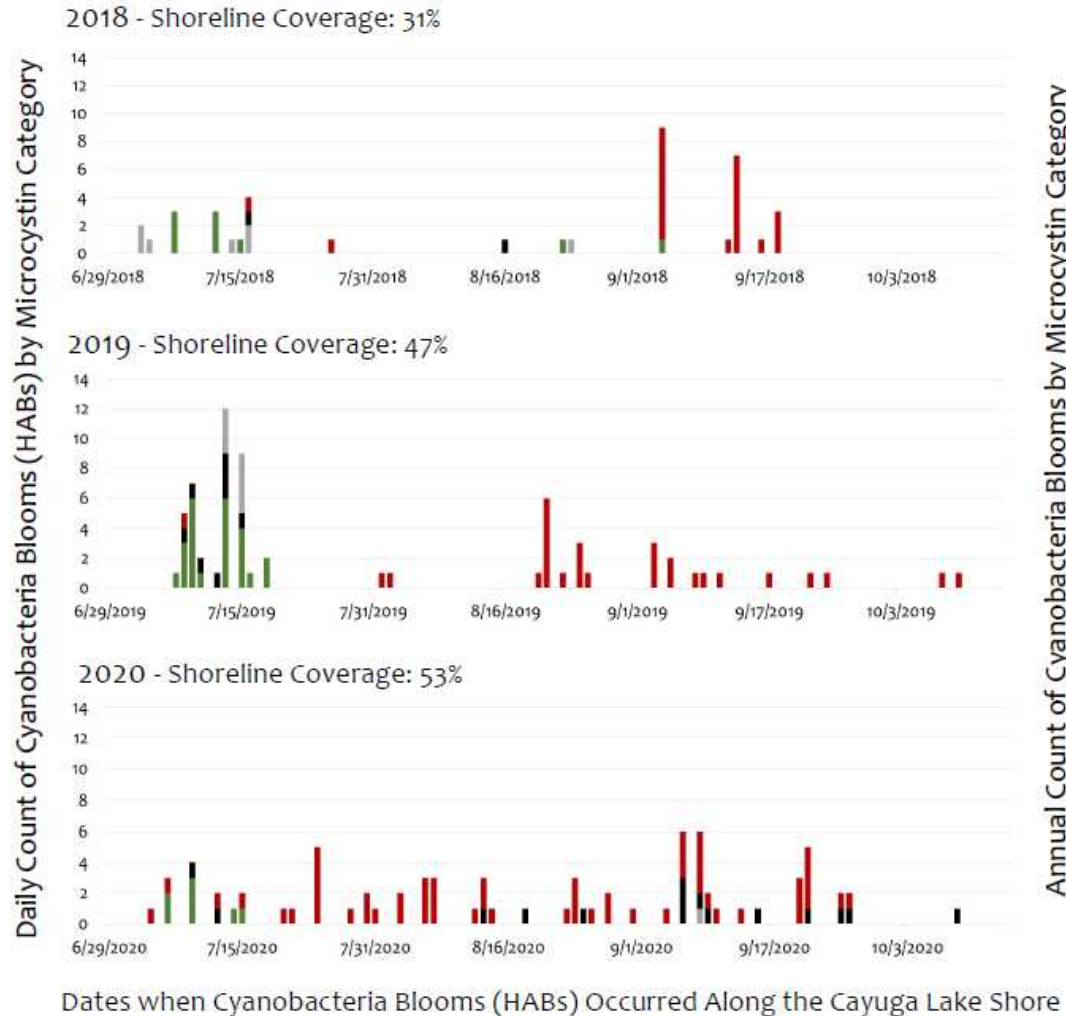
Widespread bloom near Union Springs

When did HABs Occur in 2020?



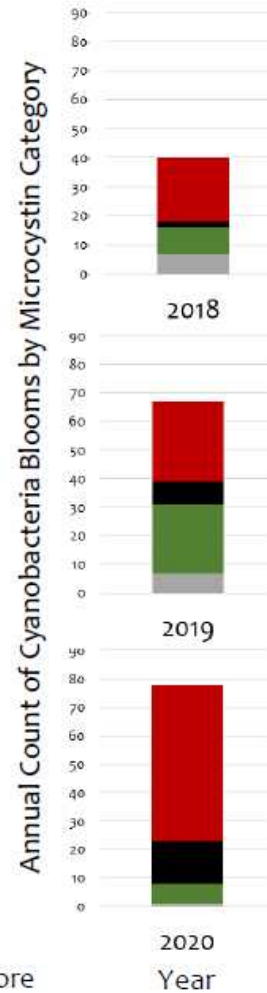
Multi-Year Patterns: Temporal Patterns

Daily Counts and Annual Totals of Cyanobacteria Blooms (HABs) in Three Microcystin Categories in 2018, 2019, and 2020



The temporal pattern of “high” microcystin blooms was different in 2020 compared to 2018 and 2019.

- In 2020 blooms occurred continuously throughout the summer.
- “High” microcystin blooms began occurring in early July

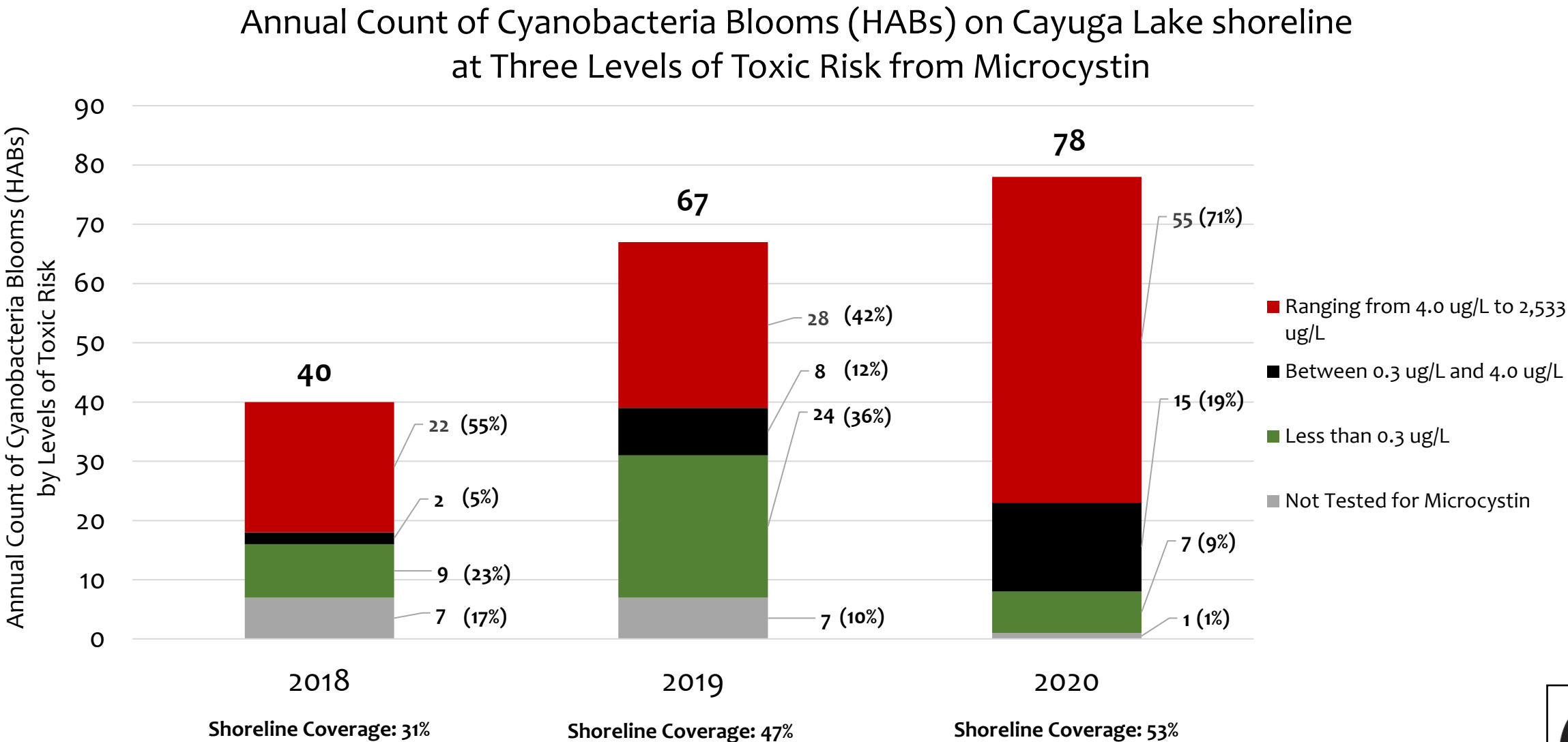


Legend

- Blooms with a microcystin level ranging from 4 µg/L to 2,533 µg/L.
- Blooms with a microcystin level greater than 0.3 µg/L but less than the recreation limit of 4.0 µg/L .
- Blooms with a microcystin level less than the method detection limit of 0.3 µg/L*.
- Not tested for microcystin.

*0.3 µg/L is also the NYSDOH limit for microcystin in finished drinking water.

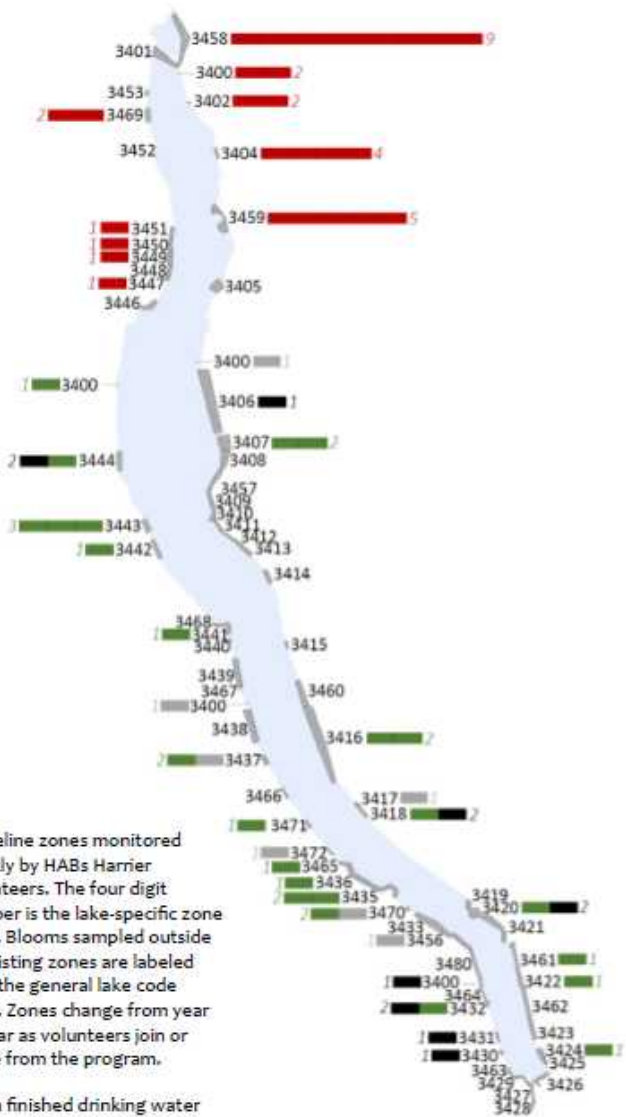
Multi-Year Patterns: An Increase of “High” Microcystin Blooms



Multi-Year Patterns: Spatial Patterns

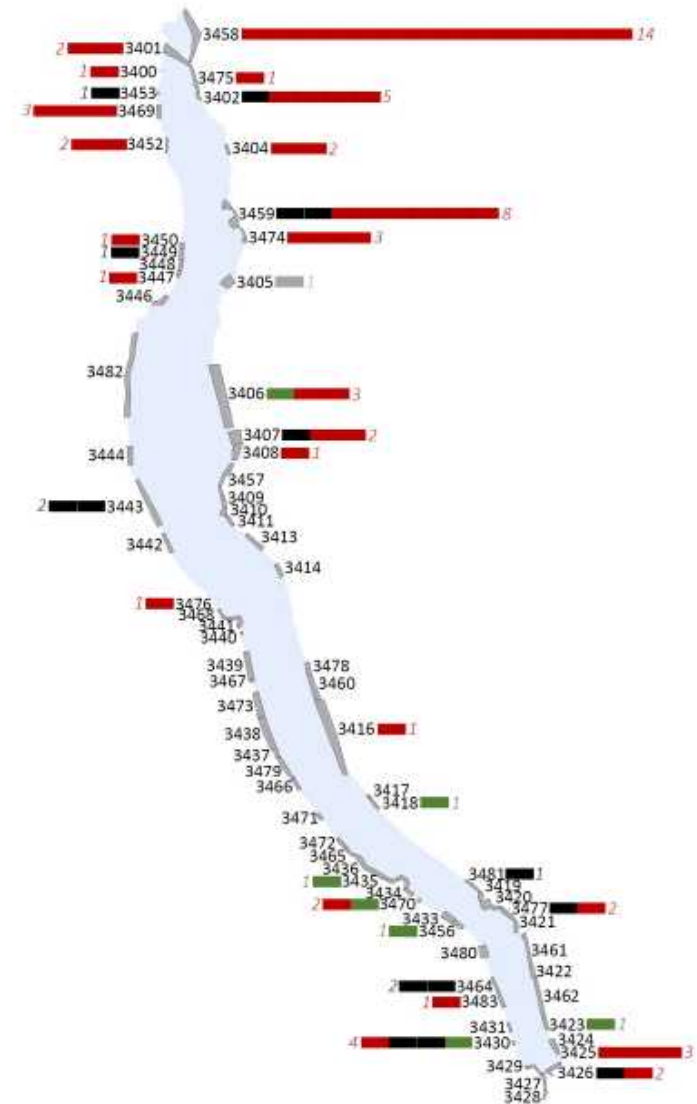
Annual Count of HABs for each Monitoring Zone by Microcystin Category in 2019

Figure 4a. The distribution of "high" microcystin blooms was characterized by a cluster along approximately 25 miles of northern shoreline in Cayuga and Seneca Counties.



Annual Count of HABs for each Monitoring Zone by Microcystin Category in 2020

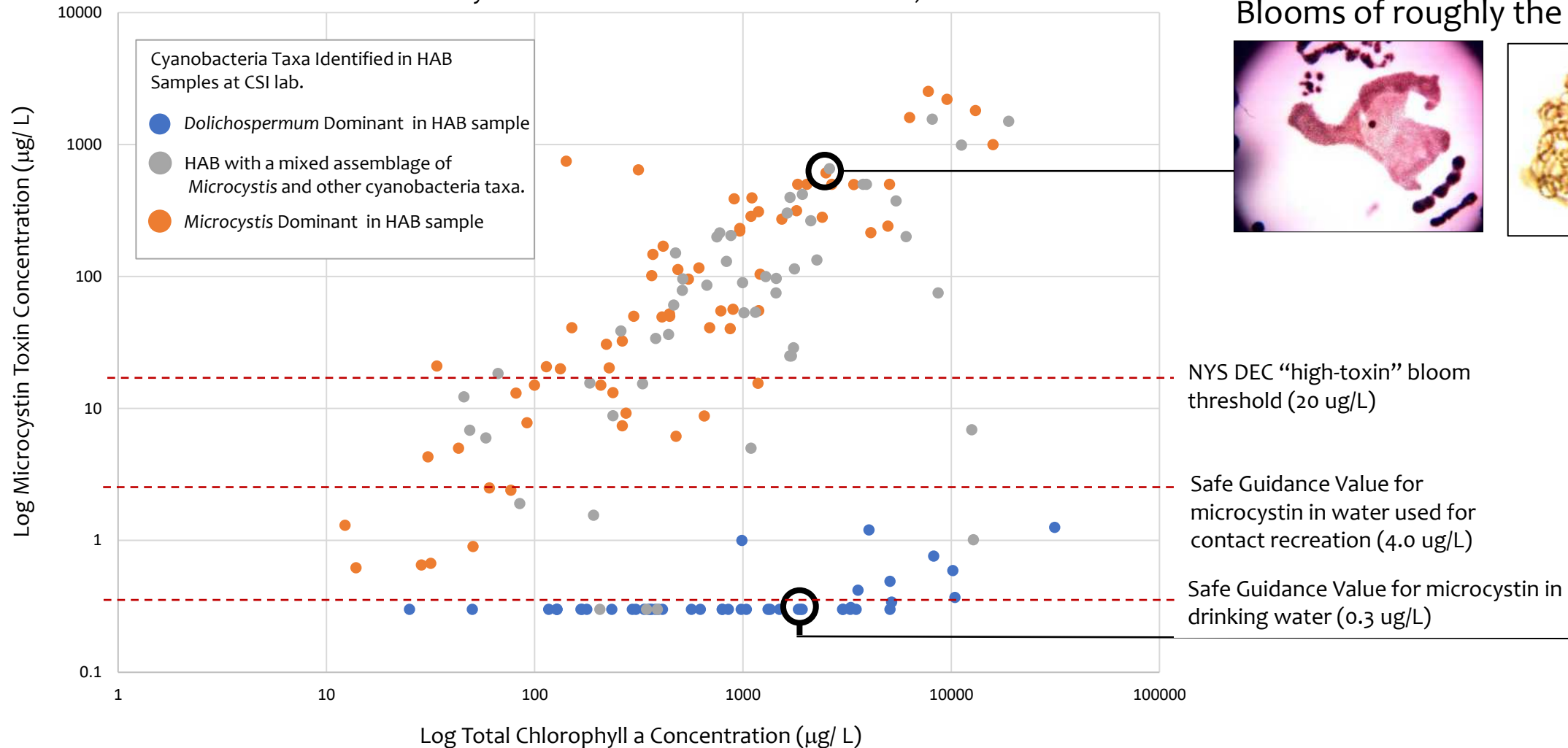
Figure 4b. "High" microcystin blooms were recorded along the southern 75 miles of shoreline in addition to a large cluster in the north.



Multi-Year Patterns: Taxa Associated Microcystin

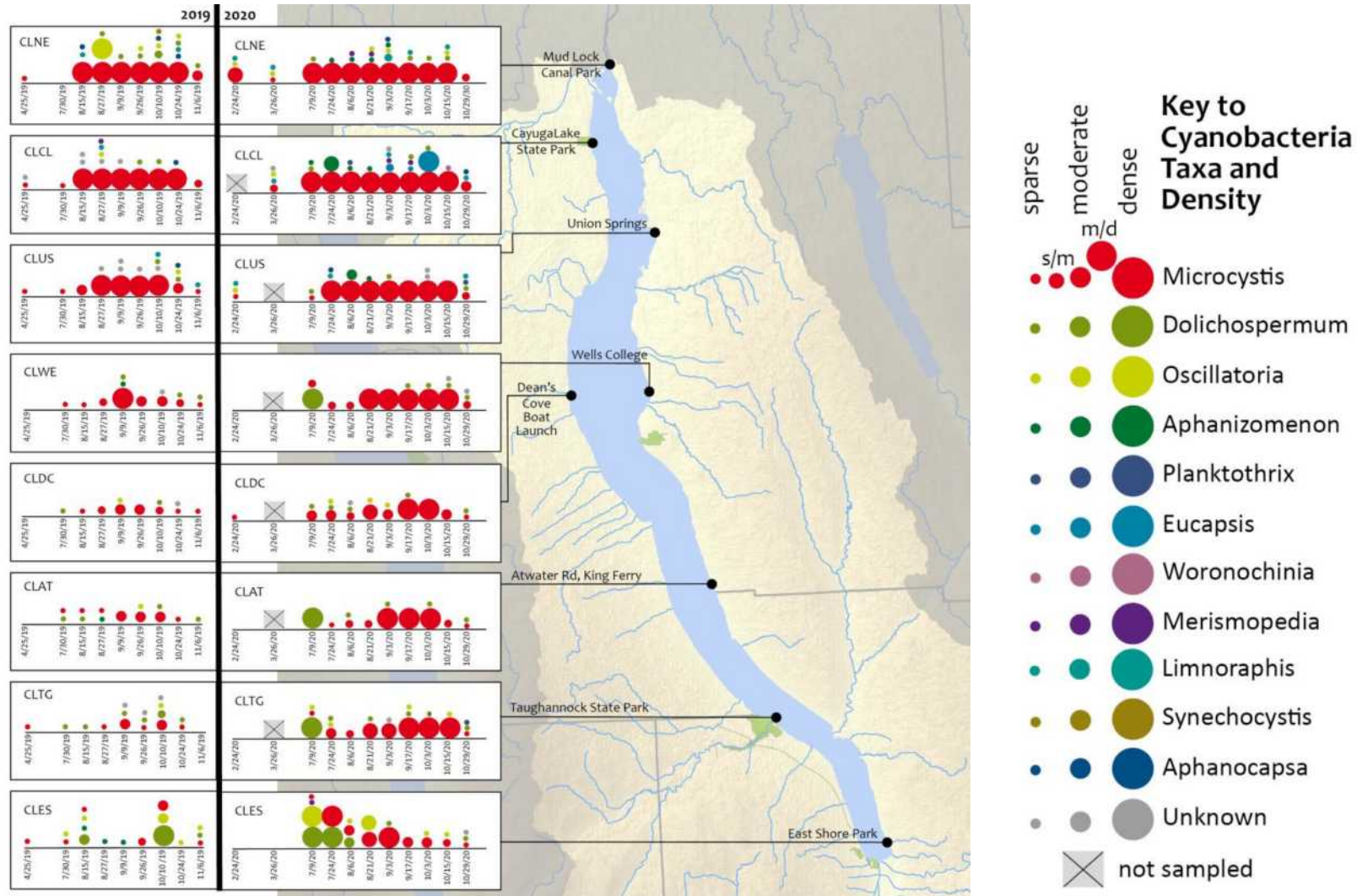
Three years of bloom data reinforces the idea that the microcystin toxin concentrations of blooms on Cayuga Lake are associated with the type of cyanobacteria that forms the bloom.

Microcystin Toxin Concentration Increased with Cyanobacteria Bloom (HABs) Sample Biomass when *Microcystis* was Dominant or Present in HABs, 2018 - 2020



Multi-Year Patterns: Taxa Density and Distribution

Results from the Cayuga Lake Phytoplankton Project show dense *Microcystis* populations to be more widely distributed around Cayuga Lake in 2020 than in 2019. More dense *Microcystis* populations around the lake are consistent with a greater number of “high” microcystin, *Microcystis* dominant blooms.



Review

During the past three years, nearly all blooms on Cayuga Lake with “high” microcystin toxin levels exceeding the limit for recreation and finished drinking water were dominated by the cyanobacteria *Microcystis*.

A greater number of “high” microcystin blooms tend to occur in the northern fifth of Cayuga Lake – from Union Springs to the outflow at the northern marshes.

In 2020 we observed a greater number of “high” microcystin blooms which is consistent with the observation of more dense *Microcystis* populations around 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

The Cayuga Lake HABs Monitoring Program fulfills many of the recommended monitoring actions in Section 13.6 of the [Cayuga Lake HABs Action Plan](#) published by the NYSDEC in 2018. Our community-led program continues to serve as the model HABs monitoring program as one of the only programs in the state with the capability to continue testing levels of microcystin toxin in blooms and as a program with one of the fastest and most comprehensive bloom reporting systems.



We Need Your Help This Summer Protecting Cayuga Lake from Harmful Algal Blooms (HABs)!



Who can volunteer?

- Anyone! Lake shore homeowners and avid boaters and anglers are especially encouraged to participate.

What does being a HABs Harrier entail?

- Attend a single two-hour HABs identification and sampling workshop in June, held online.
- Survey assigned length of shoreline once a week, mid-July through September.
- Collect HABs samples and transport them to CSI lab for further analysis.
- Be available to respond to HABs sightings reported by members of the public

We want to reach at least 75% of lakeshore coverage in 2021!



Community Science Institute
info@communityscience.org
607-257-6606



Cayuga Lake Watershed Network
programs@cayugalake.org
607-319-0475



Discover Cayuga Lake
floatingclassroom@gmail.com
(607) 327-5253



The Community Science Institute presents
an online **Water and Community** event:

Patterns of Harmful Algal Blooms (HABs) and Associated Toxins in Cayuga Lake: Findings from Three Years of Bloom Monitoring

Saturday, February 27

1:00 – 2:30 PM

Free Online Webinar

Registration is required. To register,
please email

Nathaniel.launer@communityscience.org

Speakers and Topics

1:00 PM - Introduction

An Overview of Monitoring HABs on Cayuga Lake

Nathaniel Launer, *CSI Outreach Coordinator*

Anatoxin - a in Select HABs on Cayuga Lake

Noah Mark, *CSI Technical Director*

Patterns of “High” Microcystin HABs Occurrence 2018 - 2020

Stephen Penningroth, *CSI Executive Director*

Cyanobacteria “Signatures” of Cayuga Lake

Adrianna Hirtler, *CSI Biomonitoring Coordinator*

Dealing with HABs: Perspectives from the Lakeshore

Shelley and Si Meyer, *HABs Harrier Volunteers*

