



Harmful Algal Blooms (HABs) Update

Since the Cayuga Lake HABs Monitoring Program began in 2018, the Community Science Institute has collected enough data to begin to identify patterns of HABs on Cayuga Lake. For one, a relationship has been observed between the months of the season and the type of cyanobacteria genus that dominates the bloom. Over the past two years, HABs in July are most often composed of *Dolichospermum*. Not until later in the summer are blooms composed of *Microcystis* observed. This year however, the CSI lab has already begun to see blooms dominated by *Microcystis* in the northern end of the lake—this previously hasn't occurred until mid-August to early September. For example, bloom 20-3402-B1, reported on July 15th and located in the Village of Cayuga, was determined by the lab to be dense with *Microcystis* with a microcystin concentration of 86.10 $\mu\text{g/L}$. This microcystin concentration exceeds the limit for contact recreation (4.0 $\mu\text{g/L}$), and therefore must be entirely avoided.



Both images are of bloom 20-3430-B2, located near the shore on Taughannock Boulevard in Northwest Ithaca. The image to the left is a macroscopic view of the harmful algal bloom, exhibiting a streaking at the surface and green, cloudy water. The image to the right, provided by CSI, is a microscopic view of the colonies of *Dolichospermum* within the bloom water sample.

Through public outreach, CLWN works with CSI to support their water quality research. To get the latest update, visit CSI's [Cayuga Lake HABs Reporting Page](#), which also provides a map visualizing where the blooms are located. Below is a partial chart showing the reported blooms from July 14th to July 21th.

Bloom Sample Code	Date Sampled	Location Description	Bloom Extent	Microscopy	Microcystin Toxin (µg/L)
20-3470-B1	7/14/2020	On the shores of Taughannock Blvd. about a half mile south of Taughannock Falls State Park.	Small localized	Dense Dolichospermum	< 0.30
20-3402-B1	7/15/2020	Near the shore on Lake St. in the Village of Cayuga.	Small localized	Dense Microcystis and sparse Dolichospermum	86.10
20-3430-B2	7/15/2020	Near the shore on Taughannock Blvd. in Northwest Ithaca.	Small localized	Sparse Dolichospermum	< 0.30
20-3458-B4	7/19/2020	On the shoreline north of the Village of Cayuga and Beacon Bay Marina.	Small localized	Dense Microcystis	Results pending
20-3458-B5	7/20/2020	Along the shoreline of several residences on Water St. in the Village of Cayuga.	Large localized	Dense Microcystis	Results pending

HABs and Invasive Species

According to the [Harmful Algal Bloom Action Plan for Cayuga Lake](#) developed by the New York State Department of Environmental Conservation (NYSDEC), Cayuga Lake contains eleven aquatic invasive species that are of concern to the health of the ecosystem. Below are descriptions of some of the invasive species whose various behaviors are suspected to influence the duration and frequency of HABs.

The **common carp** (*Cyprinus carpio*) feeds on benthic macroinvertebrates found within sediments at the bottom of the lake. During active feeding, the common carp increases sediment suspension in the water, which also includes nutrients that can be utilized by cyanobacteria.

The aquatic plants **eurasian watermilfoil** (*Myriophyllum spicatum*) and *Hydrilla* similarly bring nutrients from the sediment and into the water column through living plants during the growing season. These nutrients are then released into the water column during respiration and the decay of plant material. Eurasian watermilfoil and *Hydrilla* also grow in widespread, dense beds, which outcompete native aquatic vegetation and provide less suitable habitats for fish and other aquatic species.

The NYSDEC found that the presence of **dreissenid mussels** (i.e. quagga and zebra mussels) was associated with an increase in the probability of annual HABs by 18% to 66%. Dreissenid mussels selectively feed on species of phytoplankton, thereby increasing the prevalence of cyanobacteria by limiting competition. Dreissenid mussels are also often found in nearshore zones and have high filtration rates of algae, causing an increase in the concentration of nutrients by the shoreline. Therefore, dreissenid mussels likely cause an increase in the frequency of shoreline HABs.

Alewife (*Alosa pseudoharengus*), a species of herring, may contribute to HABs by having a top-down effect (i.e. when a top predator controls the population dynamics of lower trophic levels) on the plankton population. This occurs because alewife grazes on zooplankton, which not only decreases their abundance but also shifts zooplankton composition to smaller taxa. This then results in an increase in phytoplankton abundance, including the cyanobacteria that cause HABs.

Invasive species have the potential to biologically, chemically, and physically modify ecosystems. More research is needed to better understand the extent to which the invasive species in Cayuga Lake influence the occurrence of HABs.



From left to right, top to bottom: The common carp, eurasian watermilfoil, *Hydrilla*, quagga mussels, zebra mussels, and alewife.

Reporting a HAB

If you observe a suspicious HAB, avoid it and report it! Email habshotline@gmail.com with the location of the bloom, the date and time, and two pictures. If possible, include the GPS coordinates of its location using the Compass app or Google Maps on smartphones. Otherwise, an address or nearby landmark will do the job! You may also call CSI at (607) 257-6606.

Stay Informed!

Before heading on the lake, you can view the interactive map on CSI's [Cayuga Lake HABs Reporting Page](#) that is regularly updated. The DEC provides a similar interactive map of current HABs across New York State that you can view [here](#). You may also call your local park office on the most up-to-date water quality information (see below).

Taughannock Falls State Park

(607) 387-6739

Cayuga Lake State Park

(315) 568-5163

Long Point State Park

(315) 364- 5637 or (315) 497-0130

Lansing Myers Park

(607) 533-7388 ext. 17

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The Cayuga Lake HABs Monitoring Program is a collaborative effort led by a local consortium of three nonprofits: the Community Science Institute (CSI), the Cayuga Lake Watershed Network (CLWN), and Discover Cayuga Lake (DCL), working in collaboration with the New York State Department of Environmental Conservation (NYSDEC) and the State University of New York Environmental School of Forestry (SUNY-ESF).

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