

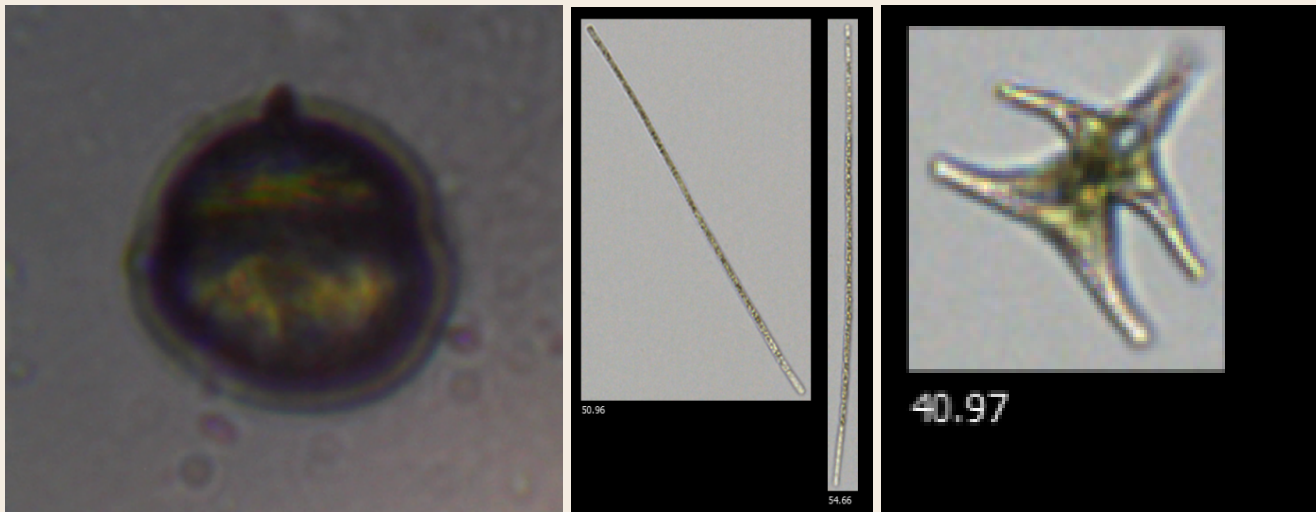
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Lake Quinsigamond - October 2021

Sampling Conditions

October 16th was a calm, cloudy Saturday at 64°F. The water was 66°F and clear. There was no rainfall the day before the meeting.

Microscopic Findings from the Plankton NET



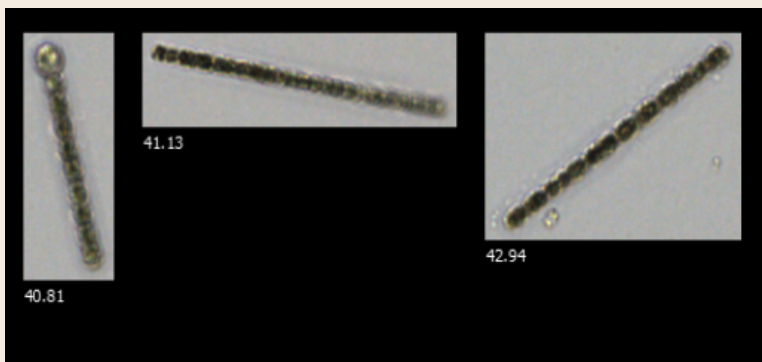
Pollen

Aphanizomenon Cyanobacteria

Staurostrum Green Algae

FlowCam Findings from the GRAB Sample

The particle density at Lake Quinsigamond was 79 particles/ml in October, down from 1537 particles/ml in September, according to the FlowCam. The sample contained cyanobacteria from the genera *Aphanizomenon*, and several *Dolichospermum* particles, but neither in high density. Additionally, there were small particles and cryptomonads present.



Dolichospermum Cyanobacteria

Fluorimetry Data from the Integrated Tube Sample

We used the fluorometer to find the amount of phycocyanin in the sample, which we can use as an indicator of cyanobacteria. In October, Lake Quinsigamond had undetectable levels of phycocyanin pigment, which is down from 9 Au in August. A pond becomes at risk for a bloom when it is at levels above 50 Au.

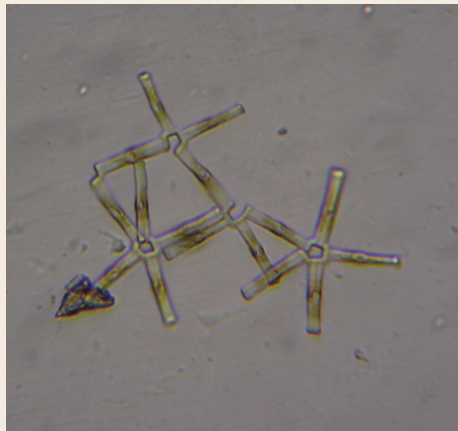
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Lake Quinsigamond - September 2021

Sampling Conditions

September 25th was a calm, sunny Saturday at 68°F. The water was 70°F and slightly turbid. There were .28 inches of rainfall the day before the meeting. Milfoil and geese were observed at the beach.

Microscopic Findings from the Plankton NET



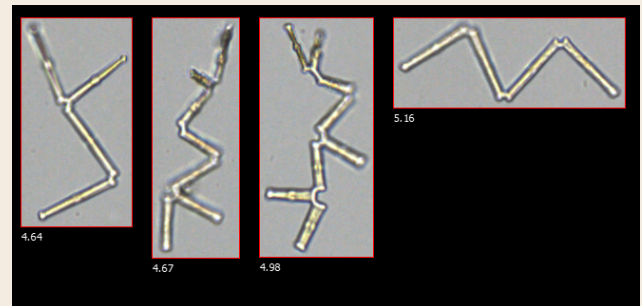
Tabellaria Diatoms_



Aphanizomenon Cyanobacteria

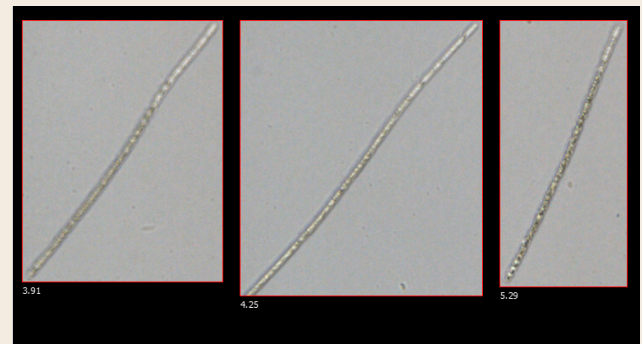
FlowCam Findings from the GRAB Sample

The particle density at Lake Quinsigamond was 1537 particles/ml in September, according to the FlowCam, which is higher than it was when it was last sampled in August. The sample contained cyanobacteria from the genera *Aphanizomenon*, and the *Snowella* that were present last month were largely absent. In general, the sample seemed to be more diverse in community, containing several genera of diatoms, including *Tabellaria* and *Fragilaria*.



Fluorimetry Data from the Integrated Tube Sample

We used the fluorometer to find the amount of phycocyanin in the sample, which we can use as an indicator of cyanobacteria. In September, Lake Quinsigamond had 9 Au of phycocyanin pigment, which is relatively low compared to other lakes in the program, and lower than what it had in August. A pond becomes at risk for a bloom when it is at levels above 50 Au.



Tabellaria Diatom and *Aphanizomenon* Cyanobacteria

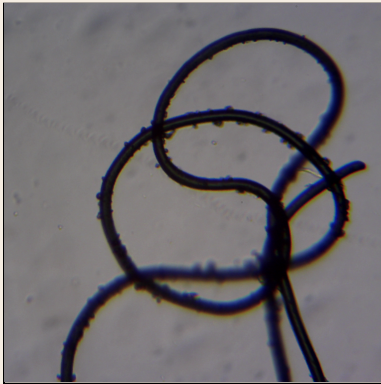
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Lake Quinsigamond - August 2021

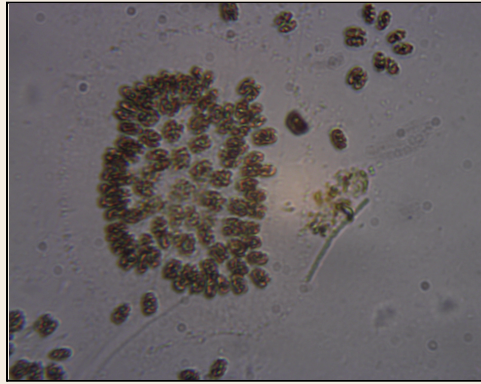
Sampling Conditions

August 21st was a calm, partly cloudy Saturday at 82°F. There were 3.2 inches of rainfall two days prior to the meeting.

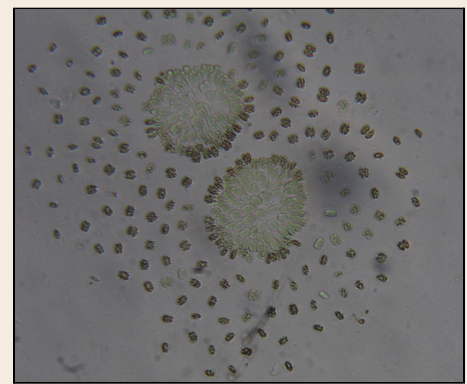
Microscopic Findings from the Plankton NET



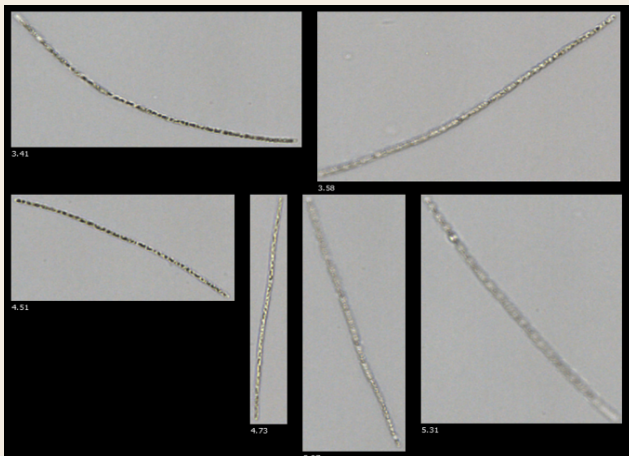
Unidentified Particle



Woronichinia Cyanobacteria

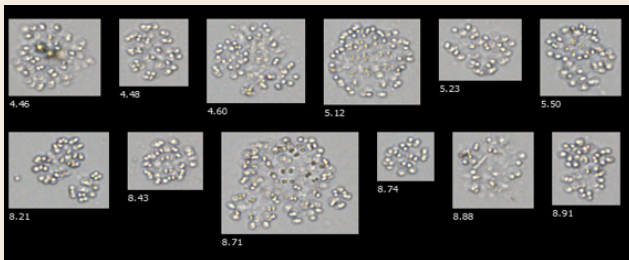


Woronichinia Cyanobacteria



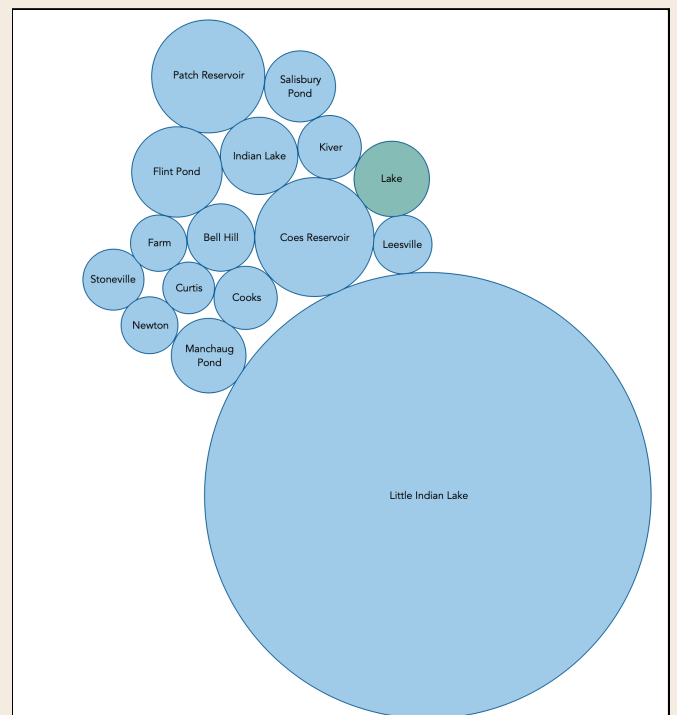
FlowCam Findings from the GRAB Sample

The particle density at Lake Quinsigamond was 707 particles/ml in August, according to the FlowCam. While it was not sampled in July, this density is lower than it was when it was last sampled in June. The sample contained cyanobacteria from the genera *Snowella* and *Aphanizomenon*, as well as the diatom *Tabellaria*. However, based on the low particle density and fluorometry results, it is not suspected that a bloom is occurring.



Fluorimetry Data from the Integrated Tube Sample

Using the fluorometer to find phycocyanin levels, the following graph represents the relative cyanobacteria pigment in each pond. Lake Quinsigamond presented with 18 Au in the month of August. A pond becomes at risk for a bloom when it is at levels above 50 Au.



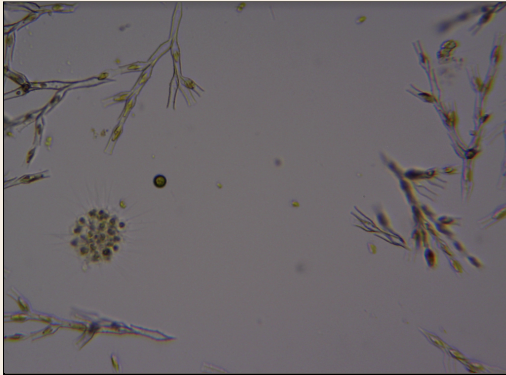
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Lake Quinsigamond - June 2021

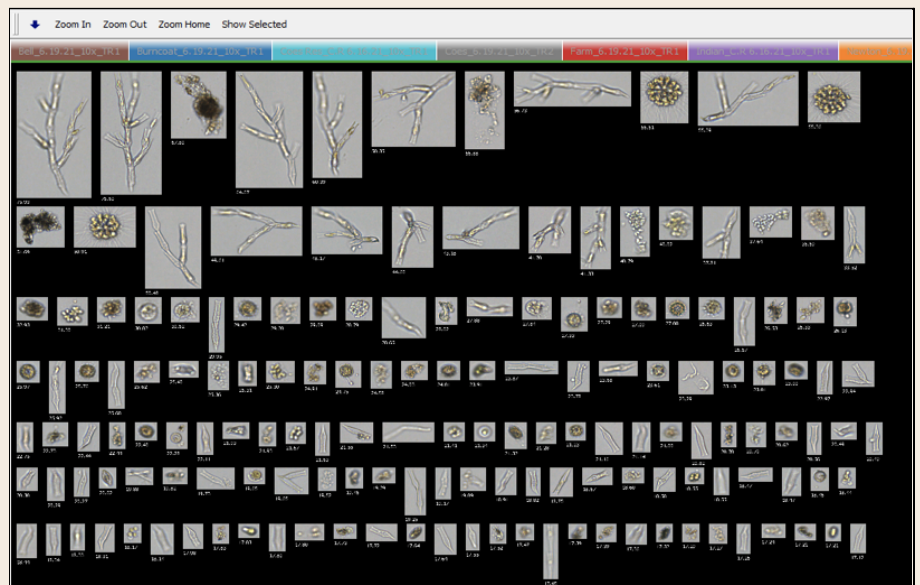
Sampling Conditions

June 19th was a partly cloudy Saturday at 80°F with a light breeze from the southwest direction. Lake Quinsigamond's sample was taken at Regatta Point where there was .25 inches of rain the morning of the sample being taken. The surface temperature was 71°F and the water had average wave activity. The water was slightly turbid with no odor or evidence of scum. Geese, rowers, and life guards were observed along the shoreline.

Microscopic Findings from Plankton NET on June 19th



Dinobryon, Synura - 100x



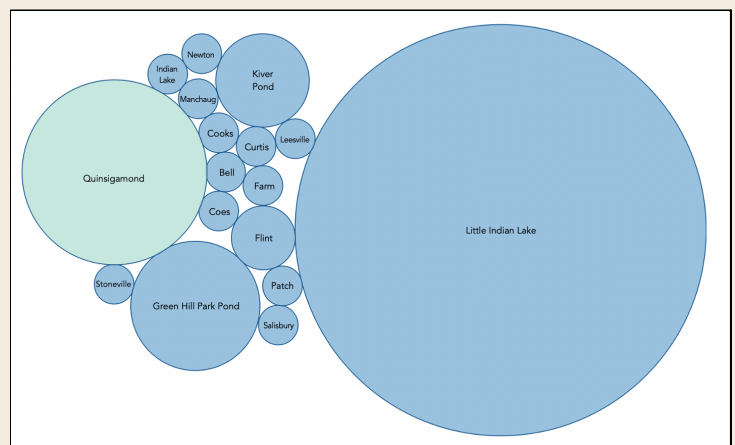
FlowCam Findings from GRAB Sample

The FlowCam is advanced microscopy technology that uses a high speed camera to photograph individual cells as they pass through a thin flow cell. The computer's image recognition technology will then sort the cells based on parameters used to distinguish cyanobacteria from other organisms, and eventually count them. While we still have some work to do to train the computer to cell counts, we were able to do an initial scan on June's samples.

The particle density at Lake Quinsigamond was 871 particles/ml. Keep in mind that this number includes all organisms in the water sample, including green algae, golden algae, cyanobacteria, diatoms, and debris. Further work with the FlowCam will allow us to tease the groups apart, but for now, this figure can be used to help us understand how productive the water is. Here also is a snapshot of some of the images that were seen by the camera at this lake.

Fluorimetry Data from IT Tube

A spectrometer is a scientific instrument used to measure specific fluorescent components of a substance. Using this machine, we are able to measure the amounts of phycocyanin - a pigment specific to cyanobacteria - in a water sample. From these measurements we are able to determine the relative amounts of cyanobacteria in Worcester's waters. The graph provides the relative amounts of cyanobacteria found in the month of June. This month, only five water bodies presented with a distinguishable amount of cyanobacteria: Flint Pond, Kiver Pond, Lake Quinsigamond, Green Hill Park Pond, and Little Indian Lake.



WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Lake Quinsigamond May 2021

Lake Quinsigamond is located along the border of Worcester and Shrewsbury, and hosts a large number of recreational activities. It is the largest and deepest lake in the WCMC, at 772 acres and 80 feet at its deepest point. It also has cooler temperatures and lower nutrient levels at the water's surface than other lakes throughout most of the summer months. Because of this, it seems to be at low risk for Harmful Algal Blooms (HABs) during the bathing season. This will be Lake Quinsigamond fourth year of sampling with the WCMC, following 2017, 2018, and 2019.



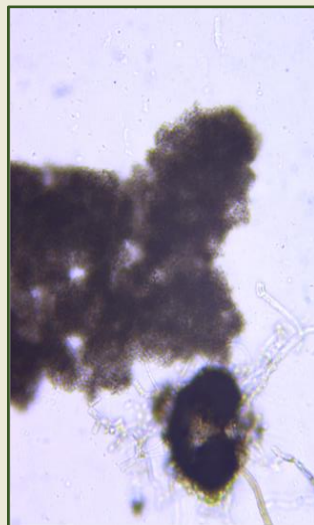
Sampling Conditions

May 22nd was a sunny, spring Saturday at 80°F. There was a light breeze coming off the water. Lake Quinsigamond's sample was taken at Regatta Point where there had been no rain in the past 48 hours. The water surface temperature was 70°F and the water was calm with little wave activity. The water was slightly turbid with no odor or evidence of scum. There was pollen observed along the top of the water, as well as some native plants. People were spotted along the beach and in the water participating in crew races.

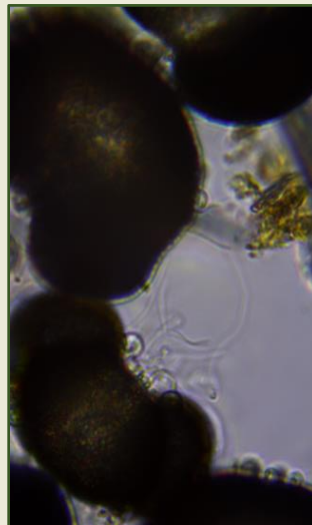
Microscopic Findings



Tardigrade Water Bear
(100x)



Microcystis (100x)



Pollen (400x)



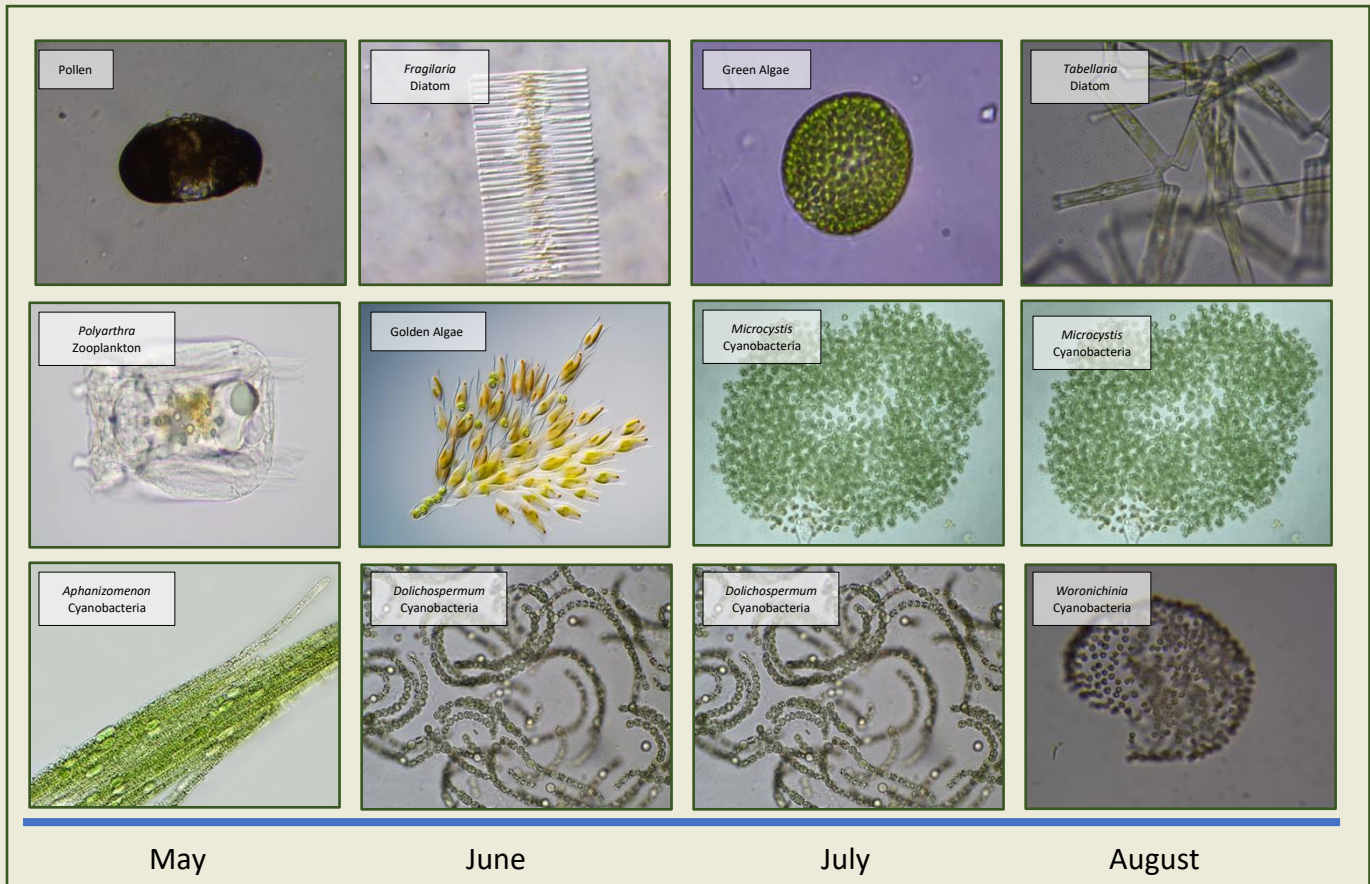
Pollen and
Zooplankton (100x)

Monthly Overview

Underneath the microscopes, volunteers found many different types of organisms, including Microcystis cyanobacteria. In past years, Microcystis has been found in July and August in Lake Quinsigamond. Based on other water quality indicators collected by the City of Worcester, we have determined that there is minimal risk of a cyanobacteria bloom at this time. We look forward to continuing to collect more data on Lake Quinsigamond.

Past Year's Findings

The timeline below shows the organisms that have been found in Lake Quinsigamond in past years.



Thank you to Steve, Sarah, and all other volunteers!