

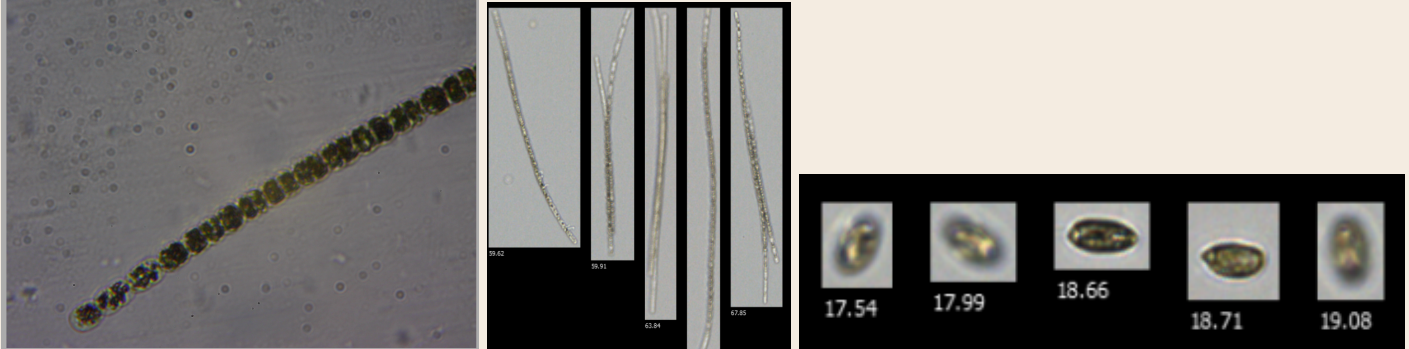
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Flint Pond - October 2021

Sampling Conditions

October 16th was a sunny, windy Saturday at 70°F. The water was 70°F and slightly turbid. There was no rainfall the day before the sample was taken.

Microscopic Findings from the Plankton NET.



Dolichospermum Cyanobacteria FlowCam images of *Aphanizomenon* Cyanobacteria and Cryptomonads

FlowCam Findings from the GRAB Sample

The particle density at Flint Pond was 151 particles/ml in October, down from 1757 particles/ml in September, according to the FlowCam. The sample contained cyanobacteria from the genera *Aphanizomenon*, *Dolichospermum*, and *Woronichinia*, though fewer than last month. In addition to the cyanobacteria, there were diatoms from the genera *Tabellaria* and *Asterionella*, some circular diatoms, as well as a lot of organic debris.

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, Flint Pond had undetectable levels of phycocyanin pigment, just as it did in September. A pond becomes at risk for a bloom when it is at levels above 50 Au.

WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Flint Pond - September 2021

Sampling Conditions

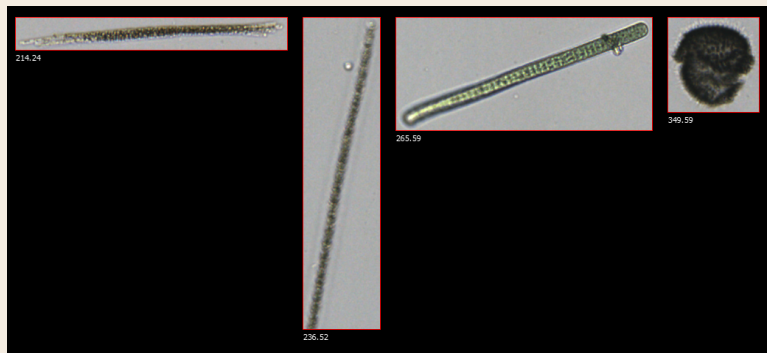
September 25th was a calm, sunny Saturday at 66°F. There were 0.34 inches of rainfall the day before the sample was taken. Pollen and floating plant detritus were noticed on the water's surface.

FlowCam Findings from the GRAB Sample

The particle density at Flint Pond was 1757 particles/ml in September, according to the FlowCam, which was higher than it was in August. The sample contained cyanobacteria from the genera *Aphanizomenon*, *Dolichospermum*, *Woronichinia*, and *Oscillatoria*, a more diverse but less dense community than last month. In addition to the cyanobacteria, there were diatoms from the genus *Tabellaria* and *Asterionella*, as well as a lot of organic debris.



Cryptomonads



Cyanobacteria of the genera *Aphanizomenon*, *Dolichospermum*, *Oscillatoria*, and *Woronichinia*.

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, Flint Pond had undetectable levels of phycocyanin pigment. This is a decrease from August, when it had 27 Au. A pond becomes at risk for a bloom when it is at levels above 50 Au.

WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

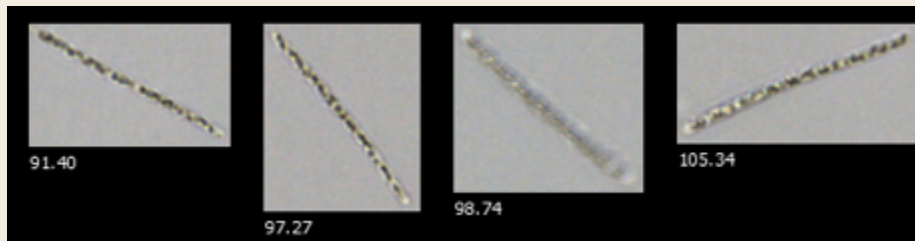
Flint Pond - August 2021

Sampling Conditions

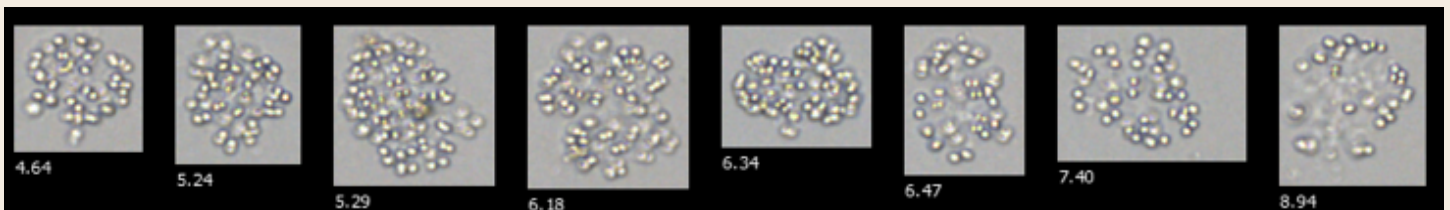
August 21st was a partly cloudy Saturday at 82°F with a light breeze. There were .2 inches of rainfall the day before the sample was taken, and 3 inches two days before the sample was taken.

FlowCam Findings from the GRAB Sample

The particle density at Flint Pond was 188 particles/ml in August, according to the FlowCam, which was slightly higher than it was in July. The sample contained cyanobacteria from the genera *Snowella* and *Aphanizomenon*, as well as the diatom *Tabellaria*. The population of microorganisms reflects the diversity found in Lake Quinsigamond, which is directly upstream. While there is not yet a threat of a bloom, there is risk of one under the right conditions in the future.



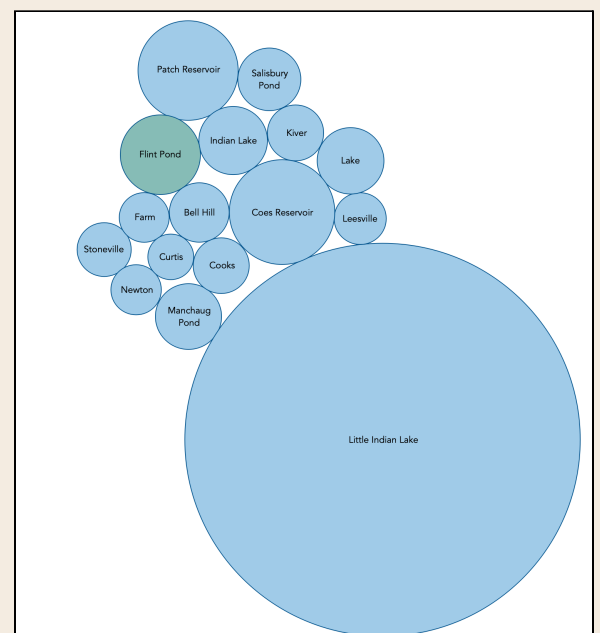
Aphanizomenon cyanobacteria



Snowella cyanobacteria

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. Flint Pond rose from 10 Au in the month of July to 27 Au in the month of August. A pond becomes at risk for a bloom when it is at levels above 50 Au.



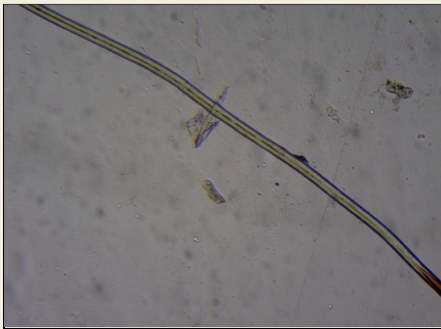
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Flint Pond - July 2021

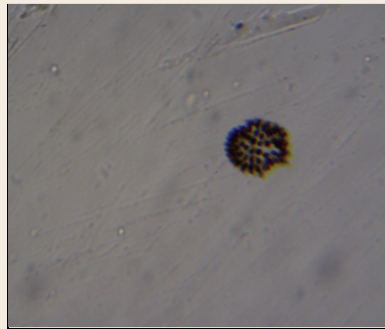
Sampling Conditions

July 17th was a partly cloudy Saturday at 73°F with a light breeze coming from the southwest direction. Flint Pond's sample was taken at the boat ramp where there were .4 inches of rainfall the day before the sample was taken. The water's surface temperature was 80°F and the water was still with little wave activity with no odor. Birds, dragonflies, lily pads, and small fishing boats were observed in the pond.

Microscopic Findings from the Plankton NET on July 17th



100x



Synura - 100x

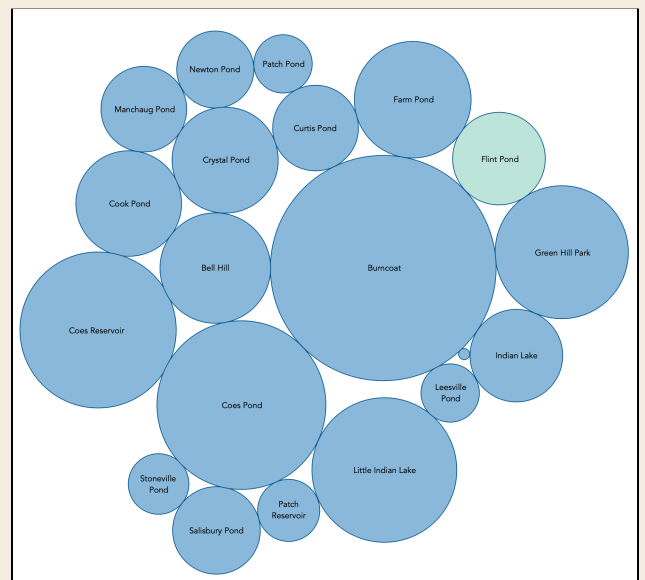


FlowCam Findings from the GRAB Sample

The FlowCam, an advanced microscopy technology, was run for all organisms in the water sample including green algae, golden algae, cyanobacteria, diatoms, and debris. The particle density at Flint Pond was 158 particles/ml in July, which is a decrease from 686 particles/ml in June. The figure provides a snapshot of some of the images that were seen by the camera at this lake.

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. Flint Pond rose from an undetectable level in the month of June to about 10 Absorbance Units (Au) in the month of July. A pond becomes at risk for a bloom when levels rise above 50 Au.



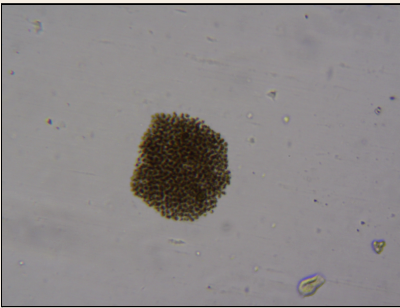
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Flint Pond - June 2021

Sampling Conditions

June 19th was a partly cloudy Saturday with a light breeze coming from the west direction. Flint Pond's sample was taken at Oak Island where there was .25 inches of rain the day before the sample was taken. The surface temperature was 76°F and the water was calm with little wave activity. The water had no odor and was slightly turbid with pollen and small particles along the top of the water. Some lily pads were observed along the shoreline.

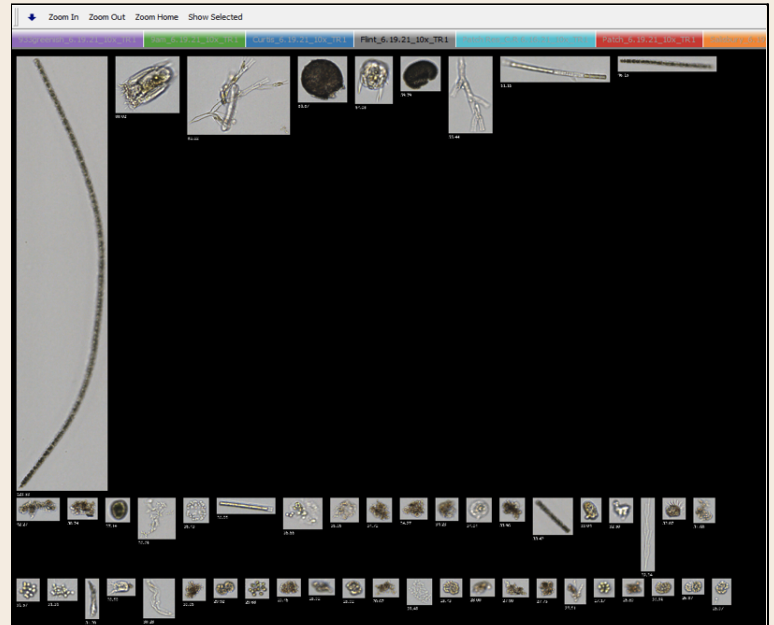
Microscopic Findings from Plankton NET on June 19th



Microcystis - 100x

FlowCam Findings from GRAB Sample

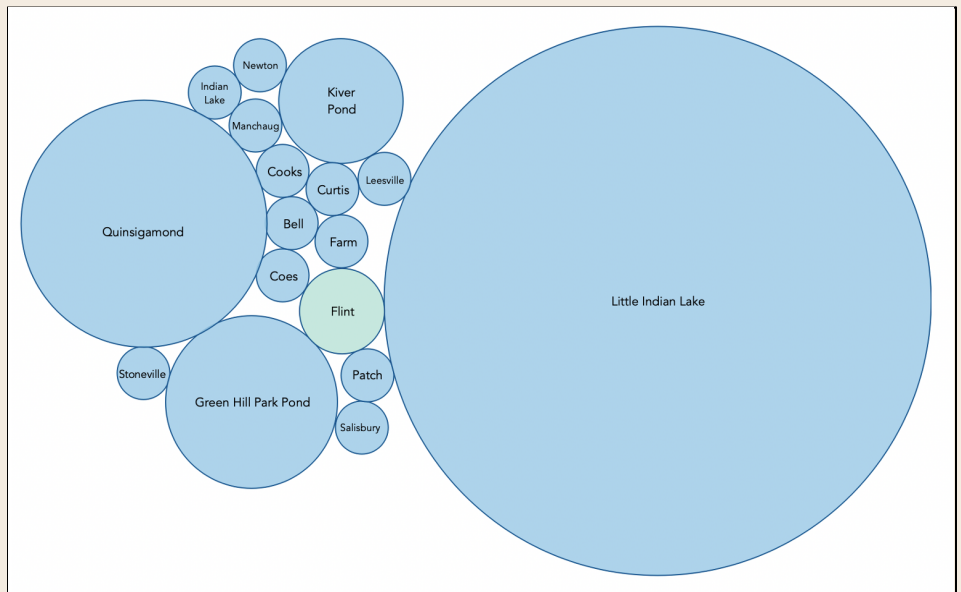
The FlowCam is advanced microscopy technology that uses a high speed camera to photograph individual cells as they pass through a thin flow cell. The computer's image recognition technology will then sort the cells based on parameters used to distinguish cyanobacteria from other organisms, and eventually 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 Flint Pond was 686 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.



Flint Pond

May 2021

Flint Pond is in the town of Shrewsbury, a southern terminus to the southeast of Lake Quinsigamond and Worcester. The pond is 265 acres, and is 16 feet at its deepest point. It is regularly treated with herbicides for invasive plants by the Lake Quinsigamond Commission. This is Flint Pond's first year participating with the WCMC.



Sampling Conditions

May 22nd was a partly cloudy, spring Saturday at 80°F. There was a light breeze coming from the southeast direction. Flint Pond's sample was taken at Oak Island where there was no rain for the past 48 hours. The water temperature at the surface was 72°F and the water was calm with little wave activity. The water had no odor, though some pollen was observed along the surface. Some milfoil and several swans were spotted while taking samples, as well as people launching boats and fishing.

Monthly Overview

Underneath the microscope, there were no organisms observed in Flint Pond this month. We look forward to getting more data on Flint Pond in the coming months, including improved fluorometer and microscopy data!

Thank you to Brendan, Trish, and all other volunteers!