

WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

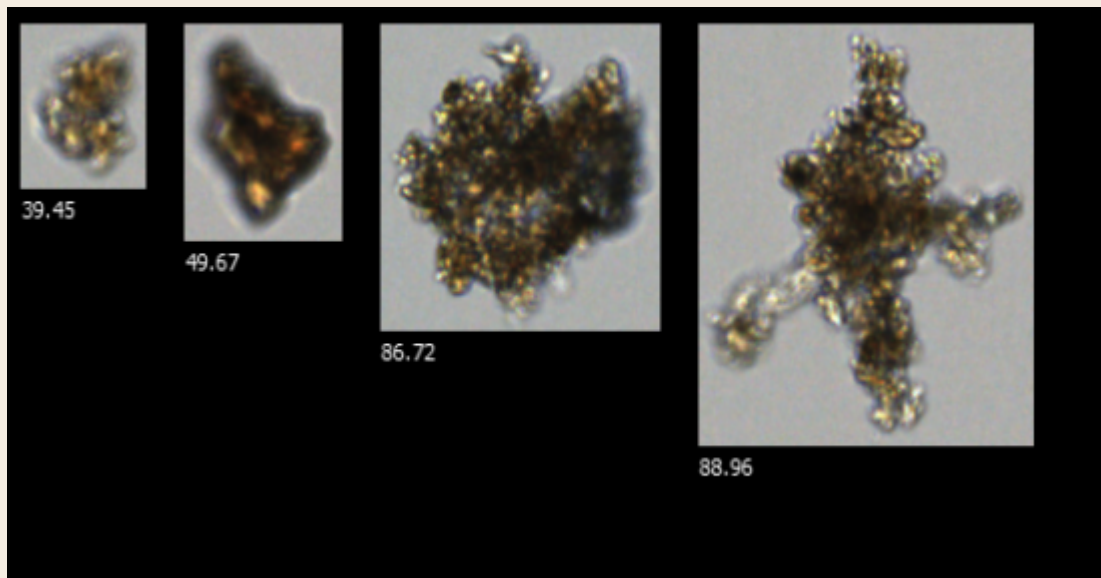
Bell Pond - October 2021

Sampling Conditions

October 16th was a calm, mostly cloudy Saturday at 71.8°F. The water was slightly cloudy and 68.5°F. There was no rainfall the day before the sample was taken.

FlowCam Findings from the GRAB Sample

The particle density at Bell Pond was 20 particles/ml in October, according to the FlowCam, which is relatively low compared to other program lakes, and much lower than the density was in September, when it was 263 particles/ml. The sample was dominated by organic debris, with several *Tabellaria* diatoms. No cyanobacteria cells were detected.



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

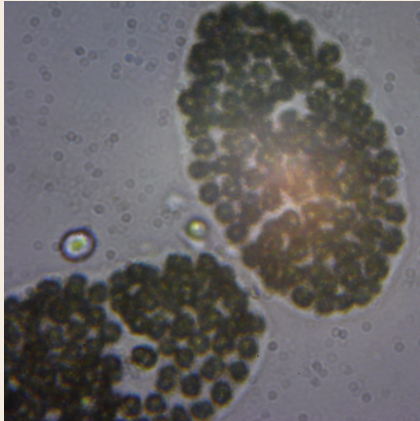
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Bell Pond - September 2021

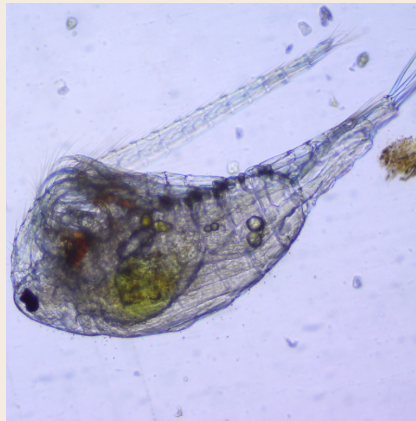
Sampling Conditions

September 25th was a calm, sunny Saturday at 59°F. Some pollen was noticed on the water's surface. There were 0.34 inches of rainfall the day before the sample was taken.

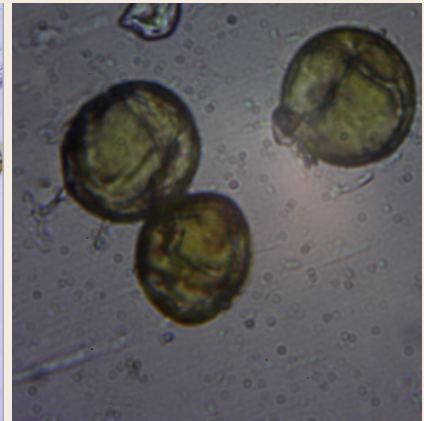
Microscopic Findings from the Plankton NET



Microcystis Cyanobacteria



Zooplankton



Unknown Particles

FlowCam Findings from the GRAB Sample

The particle density at Bell Pond was 263 particles/ml in September, according to the FlowCam, which is relatively low compared to other program lakes. With that said, the density was higher this month than it was in August. The sample was dominated by organic debris, with one image of green algae. No cyanobacteria cells were detected.



Green Algae

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 September, Bell Pond had undetectable levels of phycocyanin pigment. This is down from the already low level of 15 Au in August. A pond becomes at risk for a bloom when it is at levels above 50 Au.

WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Bell Pond - August 2021

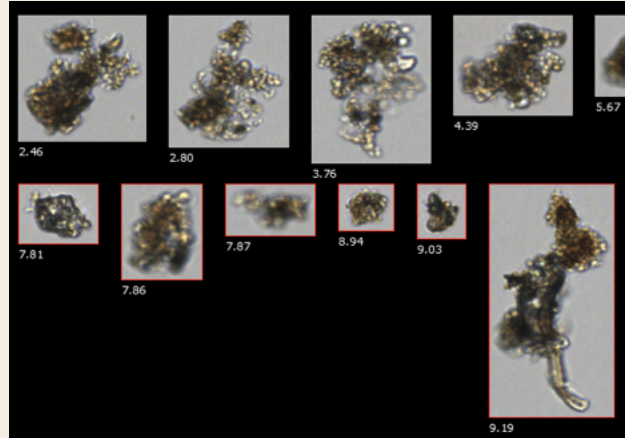
Sampling Conditions

August 21st was a partly cloudy Saturday at 81°F with a light breeze. There were 3.2 inches of rainfall two days prior to when the sample was taken.

Microscopic Findings from the Plankton NET



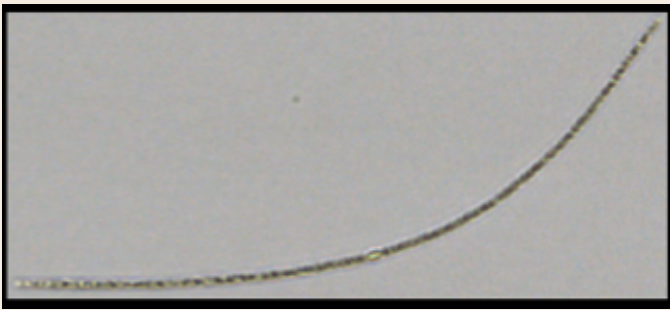
Detritus 100x



FlowCam images of detritus

FlowCam Findings from the GRAB Sample

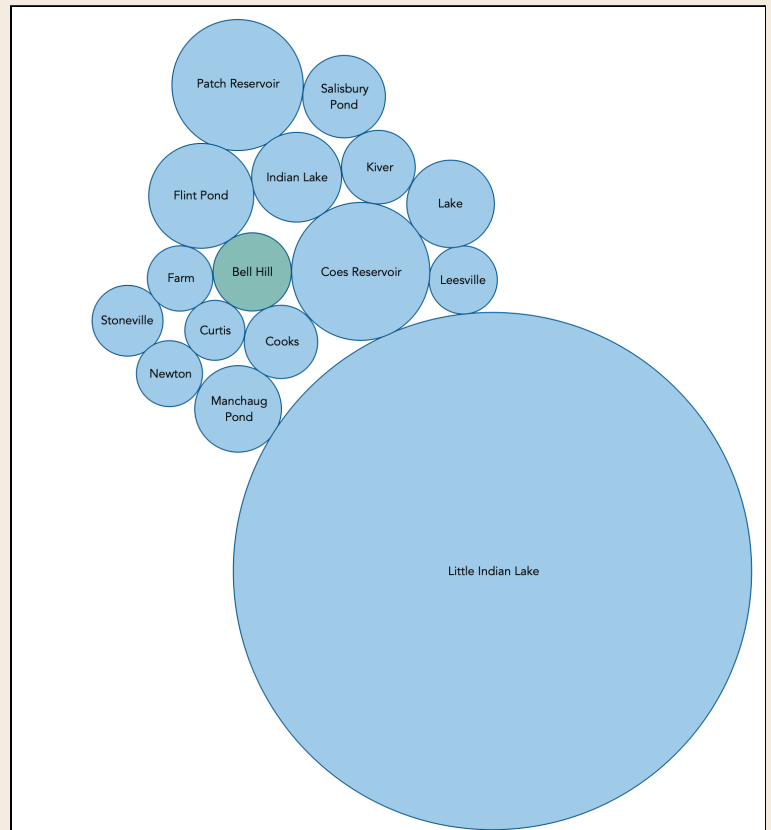
The particle density at Bell Pond was 80 particles/ml in August, according to the FlowCam, which is relatively low compared to other program lakes. With that said, the density was higher this month than it was in July. Several cyanobacteria cells of the genus *Aphanizomenon* were detected, however, not enough to cause concern. The sample was made up primarily of organic debris.



Aphanizomenon

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. Bell Pond stayed at 15 Aus in the months of July and August. A pond becomes at risk for a bloom when it is at levels above 50 Au.



WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Bell Pond - July 2021

Sampling Conditions

July 17th was a partly cloudy Saturday at 73°F with a light breeze. Bell Pond's sample was taken at Bell Pond Beach where there were .4 inches of rainfall the day before the sample was taken. The surface temperature of the water was 80°F and the water was still with no waves. The water was slightly turbid with no odor, and no evidence of scums. Goose droppings and geese were seen along the beach. There were people in the nearby parking lot.

Microscopic Findings from the Plankton NET on July 17th



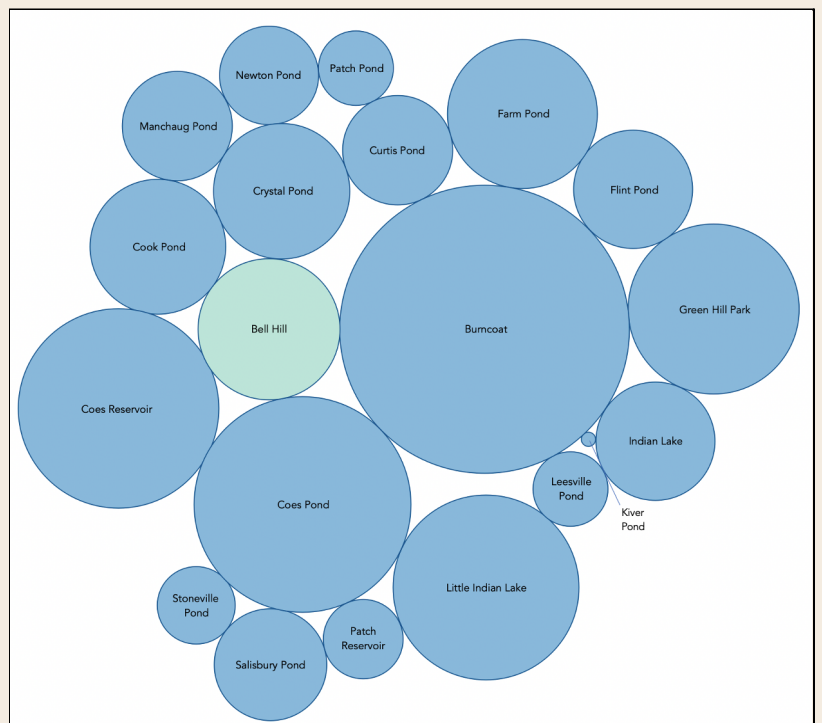
Trichome - 100x

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 Bell Pond was 127 particles/ml in June, and decreased to 10 particles/ml in July. 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. Bell Pond rose from an undetectable level in the month of June to about 15 Absorbance Units (Au) in the month of July. A pond becomes at risk for a bloom when it is at levels above 50 Au.



WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Bell Pond - June 2021

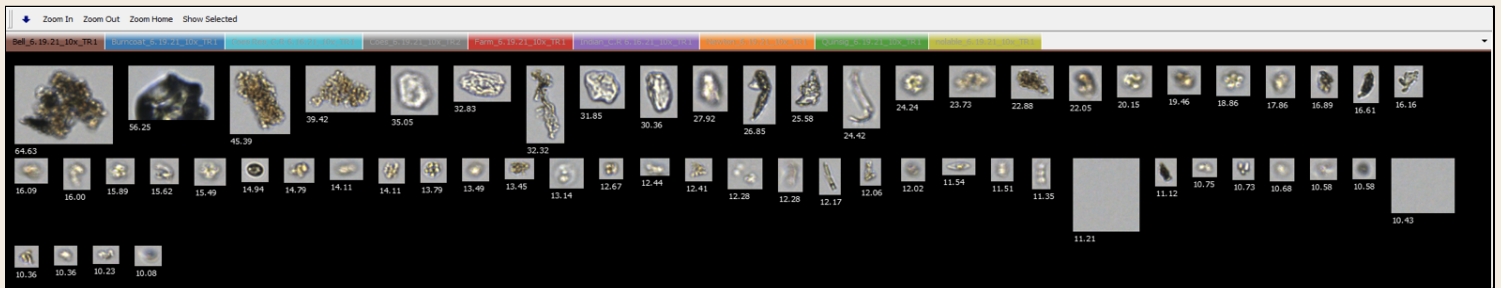
Sampling Conditions

June 19th was a partly cloudy Saturday at 72°F with a light breeze from the west direction. Bell Pond's sample was taken at Bell Pond Beach where there was .25 inches of rain two days prior. The surface temperature was 70°F and the water was still with no waves. The water was very clear with no odor, no evidence of scums. There were four walkers spotted along the beach.

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.

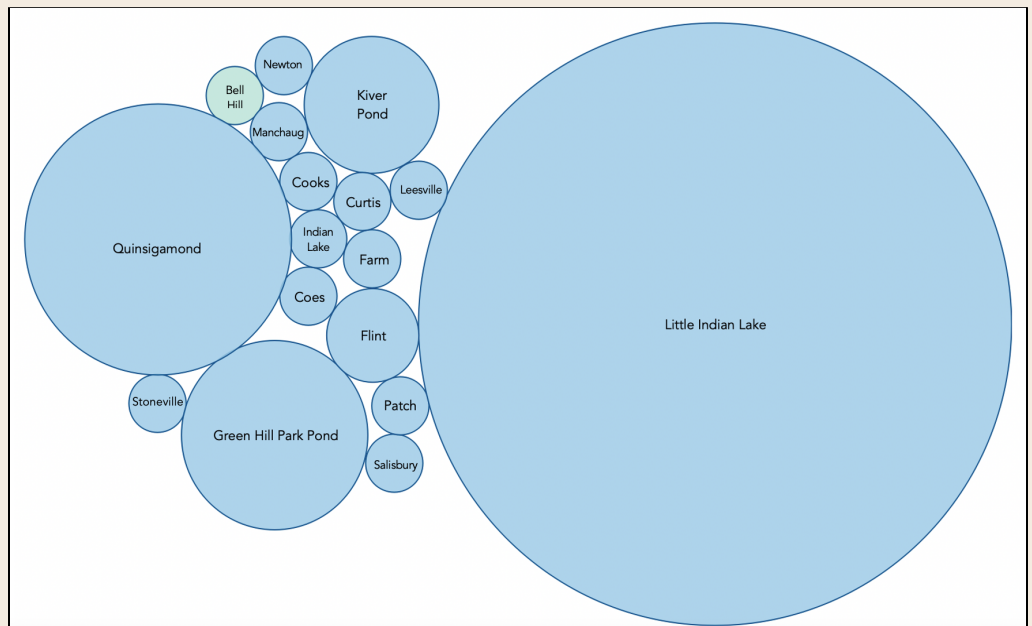
The particle density at Bell Pond was 127 particles/ml. Keep in mind that this number includes all organisms in the water sample, including green algae, golden algae, cyanobacteria, diatoms, and debris. Further work with the FlowCam will allow us to tease the groups apart, but for now, this figure can 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, Kiver, Quinsigamond, Green Hill, and Little Indian Lake. All other ponds, including Bell Pond, showed no distinguishable levels of phycocyanin.



WORCESTER CYANOBACTERIA MONITERING COLLABORATIVE

Bell Pond

May 2021

Bell Pond is located at Chandler Hill Park, located adjacent to Belmont Street, with Shrewsbury Street to the south and a densely packed neighborhood of mostly apartment buildings to the west. At the pond is a playground, basketball courts, and a beach with swimming access. Bell Pond, formerly known as Bladder Pond, was Worcester's first reservoir and water supply in 1845. At its deepest point, the pond is 17 feet deep. There has only once been an incident of a small bloom in 2019 recorded, and the pond is considered to be one of the cleanest waters in Worcester. This is the second year WCMC has sampled at Bell Pond, following sampling in 2019.



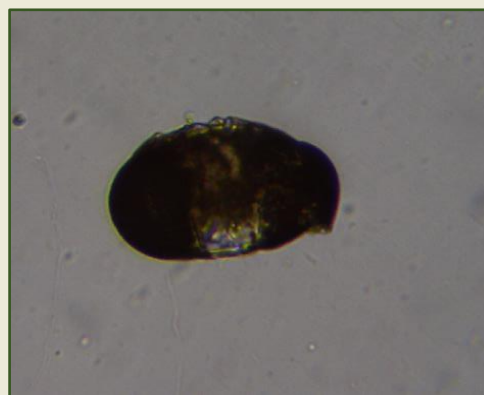
Sampling Conditions

May 22nd was a partly cloudy, spring Saturday at 75°F with no wind. Bell Pond's sample was taken at Bell Pond Beach where there had been no rain in the past 48 hours. Surface water temperature was 70°F and the water was still with no waves. The water was clear and had a faint odor of pond water, with pollen observed along the top. There were a couple fish in the water, birds in the weeds, and people walking along the shore.

Microscopic Findings



Cladocera zooplankton (400x)



Pollen (100x)

Monthly Overview

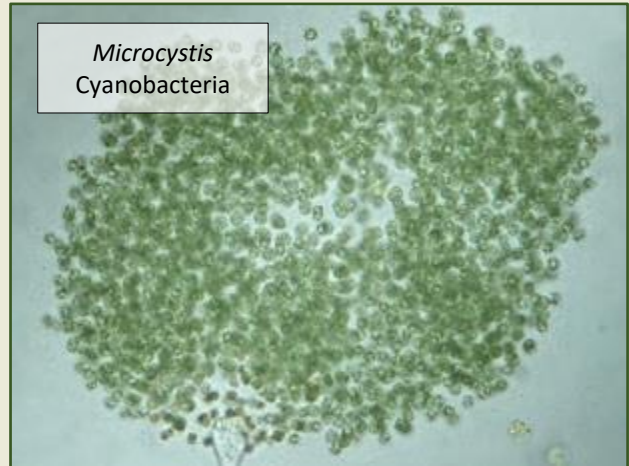
Underneath the microscope this month, volunteers found pollen and a type of zooplankton called Cladocera. As expected, no cyanobacteria were observed this month.

Past Year's Findings

The timeline below shows the organisms that have been found in Bell Pond in past years.



July



September

Thank you to Beth and Catherine and all our volunteers!