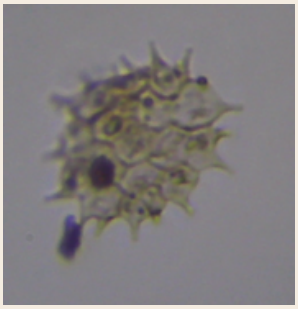
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Crystal Pond - October 2021

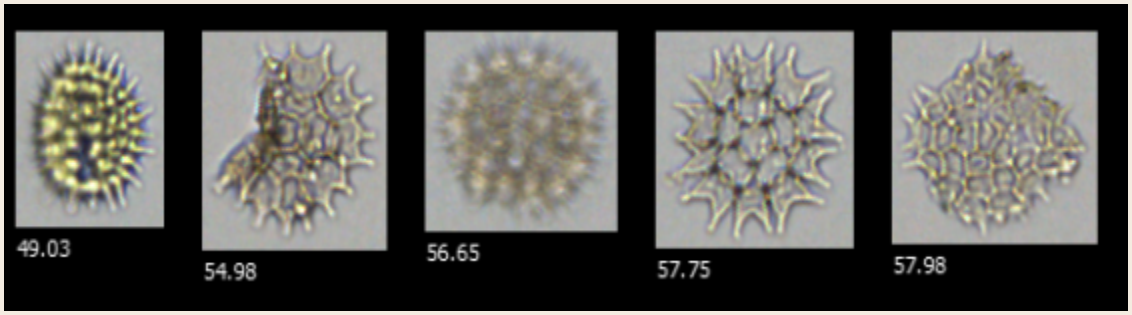
Sampling Conditions

October 16th was a partly cloudy Saturday at 65℉ with a light breeze. The water was 66℉ and Turbid. There was no rainfall the day before the sample was taken. Very little was found under the microscope.

Microscopic Findings from the Plankton NET



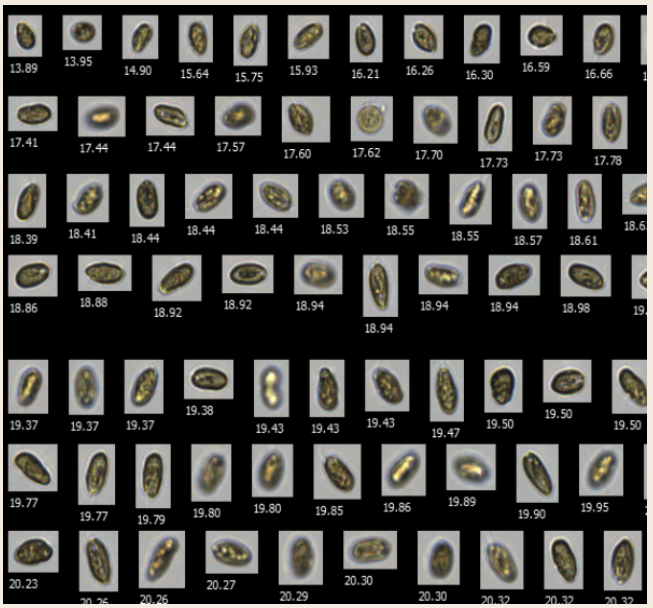
Pediastrum Green algae



Flowcam images of *Pediastrum* Green algae

FlowCam Findings from the GRAB Sample

The particle density at University Pond was 2,313 particles/ml in October, down from 9,505 particles/ml in September, according to the FlowCam. The sample was again dominated by Cryptomonads, which are not known to cause toxin blooms in our lakes. There was also a lot of debris in the sample. No cyanobacteria were identified.



Cryptomonads

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, Crystal Pond had undetectable levels of phycocyanin. A pond becomes at risk for a bloom when it is at levels above 50 Au.

WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Crystal Pond - September 2021

Sampling Conditions

September 25th was a sunny Saturday at 62℉ with a light breeze. The water was 68℉ and Turbid. There were 0.08 inches of rainfall the day before the sample was taken

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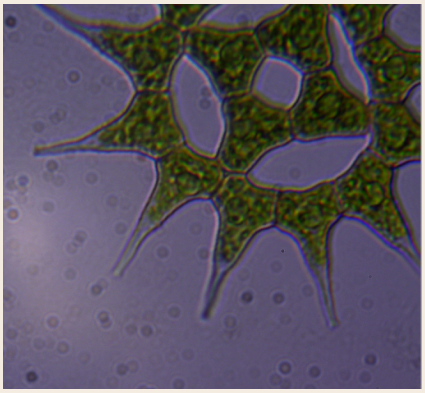
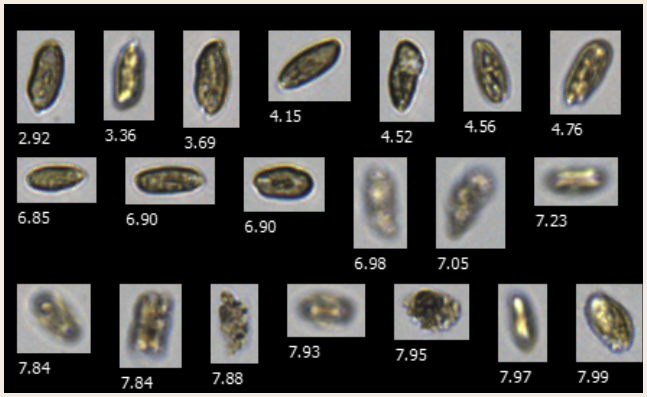
Microscopic Findings from the Plankton NET



Pediastrum Simplex

Zooplankton



Flocam Images of Cryptomonas, a cryophyte

FlowCam Findings from the GRAB Sample

The particle density at University Pond was 9505 particles/ml in September, according to the FlowCam, which was higher than it was in August. The sample was similarly dominated by Cryptomonads, which are not known to cause toxin blooms in our lakes. There was also a lot of debris in the sample.

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. Unfortunately, no IT sample was analyzed for Crystal Pond in September. A pond becomes at risk for a bloom when it is at levels above 50 Au.

WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Crystal Pond - August 2021

Sampling Conditions

August 21st was a partly cloudy Saturday at 82℉ 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 University Pond was 1,442 particles/ml in August, according to the FlowCam, which was lower than it was in July. The sample contained mostly small particles, dominated by *Cryptomonas*, a cryophyte. There was also a lot of debris in the sample.

Cryptomonas, a cryophyte

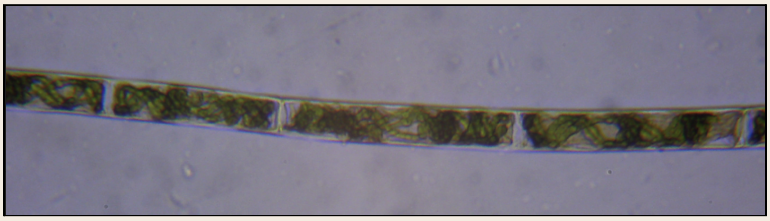
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Crystal Pond - July 2021

Sampling Conditions

July 17th was a partly cloudy Saturday at 73℉. Crystal Pond's sample was taken along the shoreline where there were .4 inches of rainfall the day before. The water was calm with little wave activity. The water was opaque with a faint, sewage smell. There was a scum along the surface, but no mats were observed.

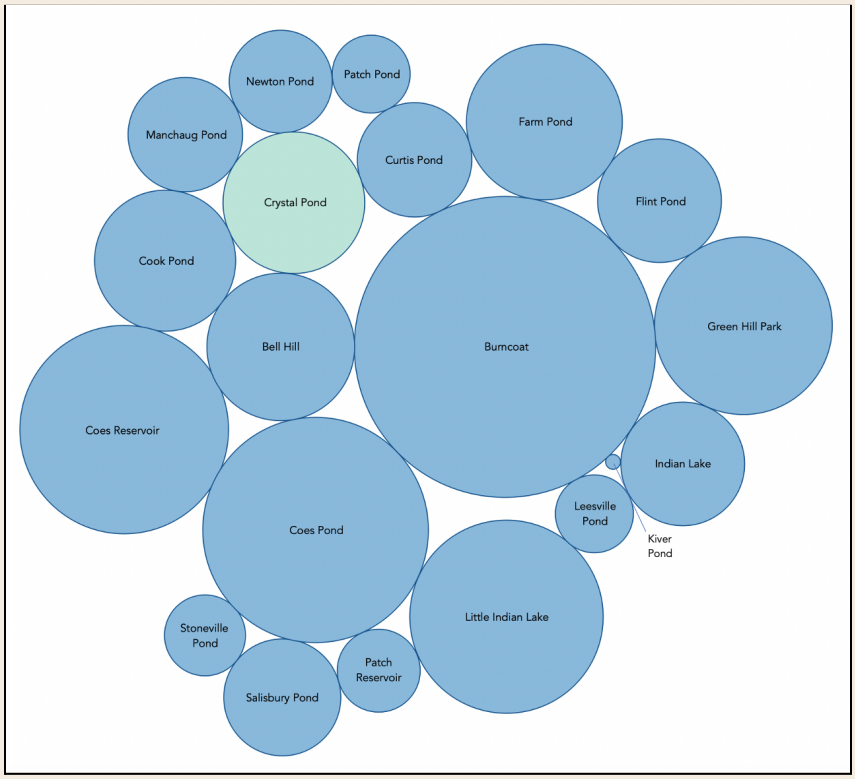
Microscopic Findings from the Plankton NET on July 17th



Spirogyra - 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 Crystal Pond was 4,075 particles/ml in July, which is an increase from 2,817 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. Crystal Pond was not sampled with the IT this June, and now is equal to about 14 Absorbance Units (Au) in the month of July. A pond becomes at risk for a bloom when the level is above 50 Au.

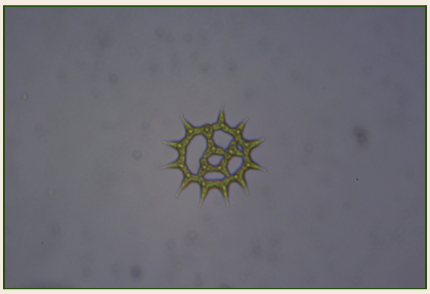
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

University Park Pond - June 2021

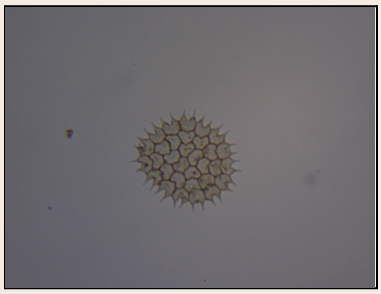
Sampling Conditions

June 19th was a partly cloudy Saturday at 78℉. There was a light breeze coming from the north direction. University Park Pond's sample was taken along the shoreline where there was no rain in the past 48 hours. The surface temperature was 72℉ and the water was calm with little wave activity. The water was slightly turbid with a faint fishy smell, and no scums. There were a few plants along the shoreline where the sample was taken.

Microscopic Findings from Plankton NET on June 19th

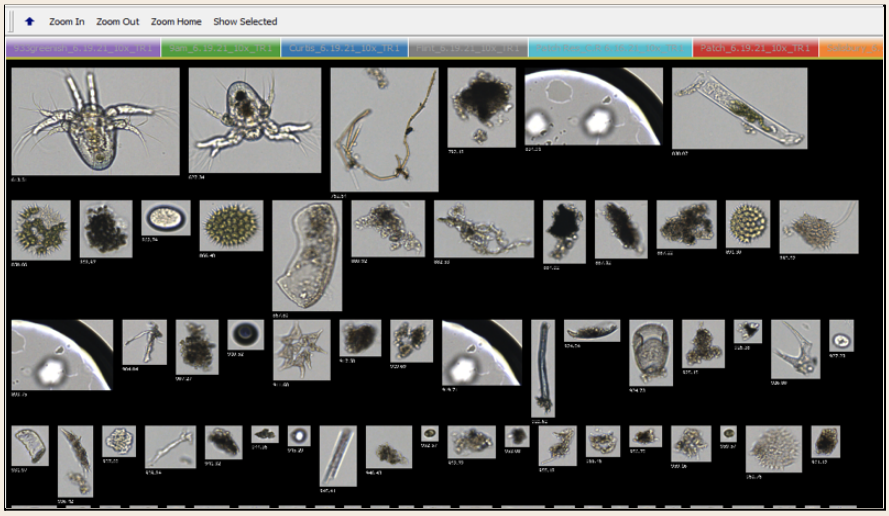


Pediastrum Simplex - 100x



Pediastrum - 100x

FlowCam Findings from GRAB Sample

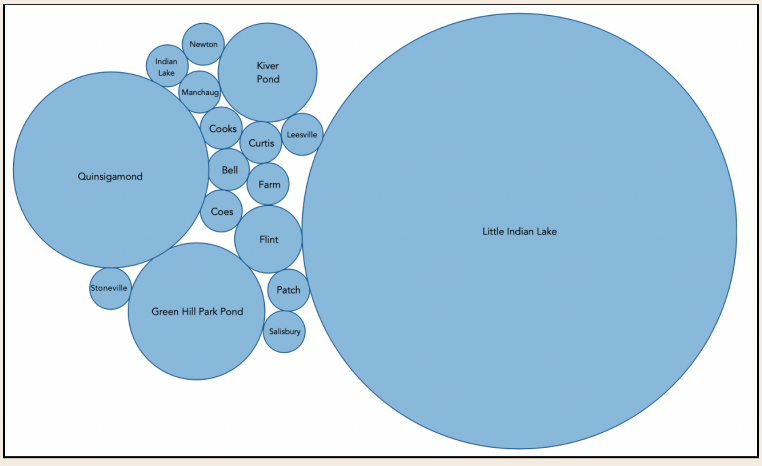


The FlowCam is advanced microscopy technology that uses a high speed camera to photograph individual cells as they pass through a thin flow cell. The computer's image recognition technology will then sort the cells based on parameters used to distinguish cyanobacteria from other organisms, and eventually 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 University Park Pond was 2,817 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 University Park Pond, showed no distinguishable levels of phycocyanin.



WORCESTER CYANOBACTERIA MONITERING COLLABORATIVE

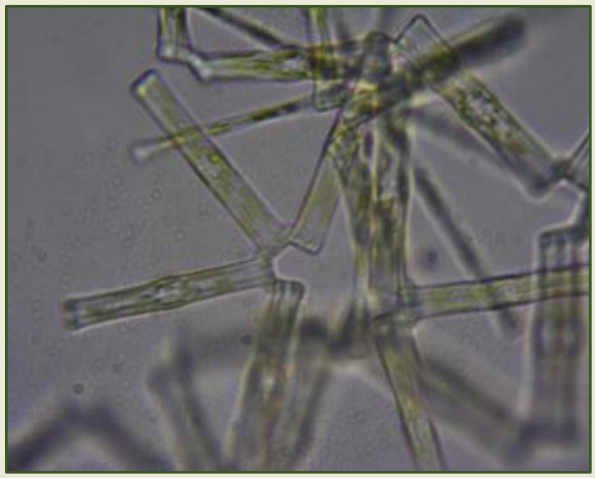
University Park Pond May 2021

University Park Pond, also known as Crystal Pond, is located across from Clark University on Main Street. The pond is small and shallow, 2.1 acres and 4.5 feet at its deepest point. Nearby goose populations are suspected to be causing an excess in nutrients in the water. As water level drops in the summer, the pond has been observed to develop algal blooms and anoxic conditions. Crystal Pond contains an aeration fountain in the center to help avoid anoxic conditions. The stagnancy of the water combined with the small size and depth make the waters susceptible to cyanobacteria blooms. The 2021 sampling season will be the second year the WCMC has sampled Crystal Pond, after 2019.

Sampling Conditions

May 22nd was a partly cloudy, spring Saturday at 75°F. There was a light breeze coming from the north direction. Crystal Pond's sample was taken along a shoreline where there was no rain in the past 48 hours. Surface temperature was 68°F and the water was still with no waves. The water was slightly turbid with a faint fishy smell, and a scum was observed along the edge by the reeds. There were small fish spotted while sampling, as well as some people fishing.

Microscopic Findings



Tabellaria diatom(100x)

Diatoms are a major group of phytoplankton common in most aquatic ecosystems. They are characterized by cell walls made of silica that often give them a glassy or jewel like appearance.

Note: This image is from a previous year's microscope pictures. This May, no pictures were able to be taken for University Park.

Monthly Overview

Underneath the microscope, Tabellaria was observed. However, there was no evidence of cyanobacteria colonies. Unfortunately, no fluorimetry data could be taken for University Park Pond. However, we look forward to having a better idea of the cyanobacteria bloom risk at this location with FlowCam data next month.

Thank you to Emily and all other volunteers!