

WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Farm Pond - October 2021

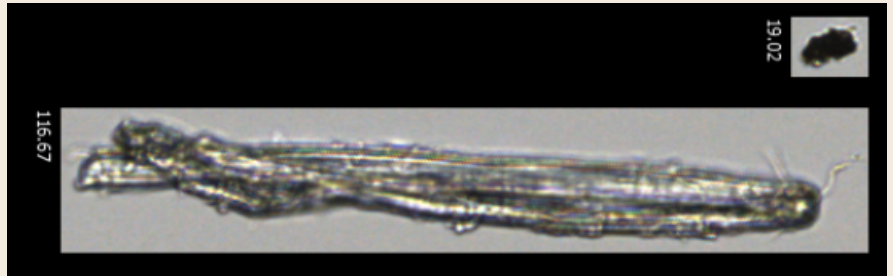
Sampling Conditions

October 16th was a breezy, partly cloudy Saturday at 68.7°F. There was no rainfall the day before the sample was taken. The water was 67.4°F with leaves and pollen on the surface.

Microscopic Findings from the Plankton NET



Detritus



Flowcam image of Detritus

FlowCam Findings from the GRAB Sample

The particle density at Farm Pond was 6 particles/ml in October, down from 448 particles/ml in September, according to the FlowCam. No cyanobacteria cells were detected. The sample was made up primarily 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, Farm Pond had undetectable levels of phycocyanin. While an IT sample was not taken in September, in August, Farm Pond had 10 Aus of phycocyanin. A pond becomes at risk for a bloom when it is at levels above 50 Aus.

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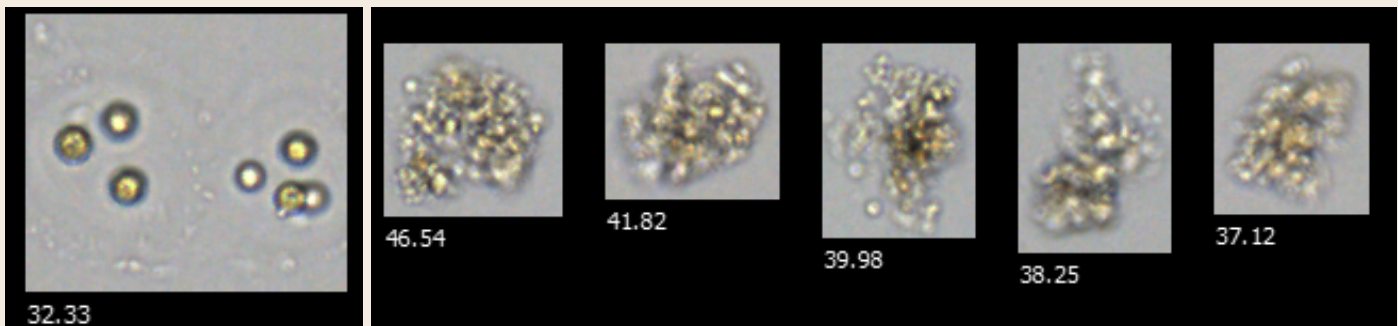
Farm Pond - September 2021

Sampling Conditions

September 30th was a calm, partly cloudy Thursday at 54.3°F. There were 0.2 inches of rainfall the day before the sample was taken. The water was 70.3°F with surface pollen and goose feathers.

FlowCam Findings from the GRAB Sample

The particle density at Farm Pond was 448 particles/ml in September, according to the FlowCam, which is relatively low compared to other program lakes. The density was higher than it was in August. No cyanobacteria cells were detected. The sample was made up primarily of organic debris, with an image of Chlorella also obtained.



Chlorella

Flowcam Images 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. While an IT sample was not taken in September, in August, Farm Pond had 10 Aus of phycocyanin. A pond becomes at risk for a bloom when it is at levels above 50 Aus.

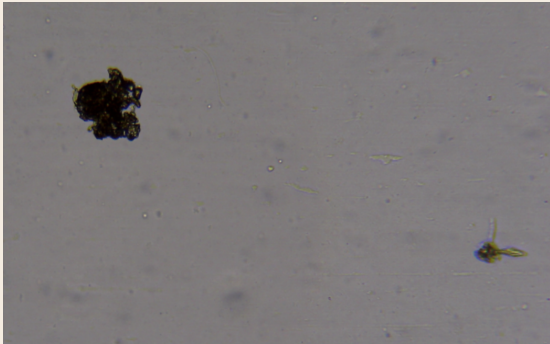
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Farm Pond - August 2021

Sampling Conditions

August 21st was a partly cloudy Saturday at 76.6°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.

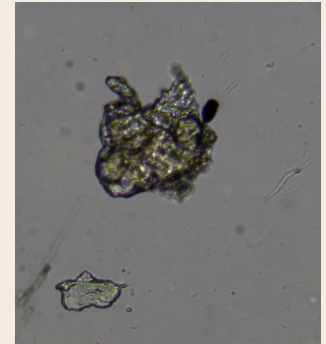
Microscopic Findings from the Plankton NET



Detritus



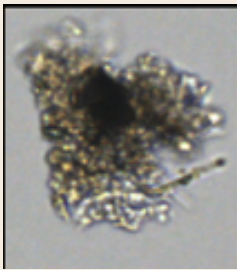
Detritus



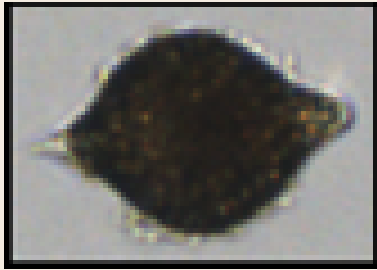
Detritus

FlowCam Findings from the GRAB Sample

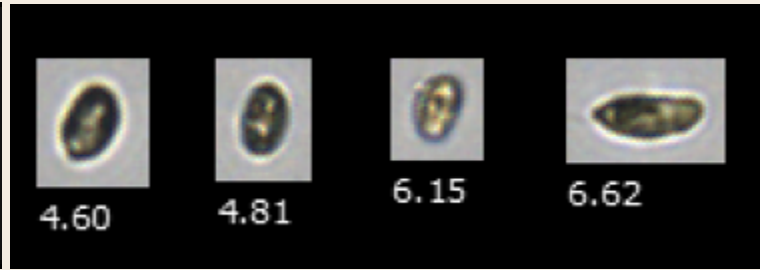
The particle density at Farm Pond was 74 particles/ml in August, according to the FlowCam, which is relatively low compared to other program lakes. The density was about equal to that in July. No cyanobacteria cells were detected. The sample was made up primarily of the alga *Cryptomonas*, and a dinoflagellate believed to be *Gyrodinium*. Neither is known to produce toxins, though *Cryptomonas* has been known to form deep water blooms during winter months. Apart from these two organisms, there was also some organic debris.



Detritus



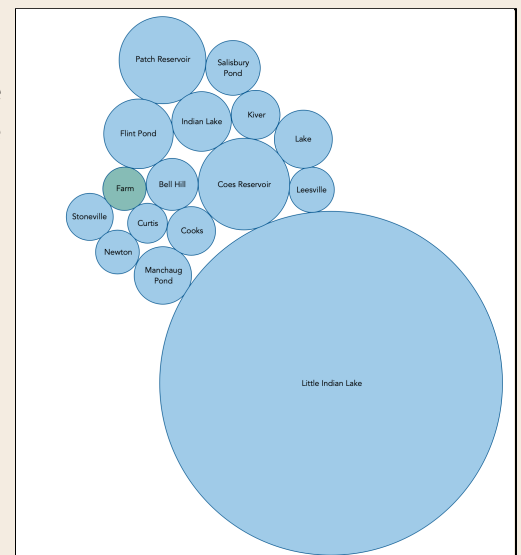
Gyrodinium dinoflagellate



Cryptomonas Algae

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. Farm Pond decreased from 16 Au in the month of July to 10 Au in the month of August. A pond becomes at risk for a bloom when it is at levels above 50 Au.



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Farm Pond - July 2021

Sampling Conditions

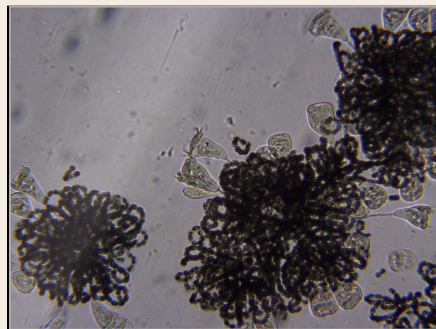
July 17th was a partly cloudy Saturday at 73°F with a light breeze coming from the west direction. Farm Pond's sample was taken at a boat ramp where there were .4 inches of rainfall the day before. The water's surface temperature was 79.4 °F and the water had average wave activity. The water had no odor and pollen was observed along the surface. Small fish were observed along the water's edge as well as people swimming in the water, anglers, and kayaks.



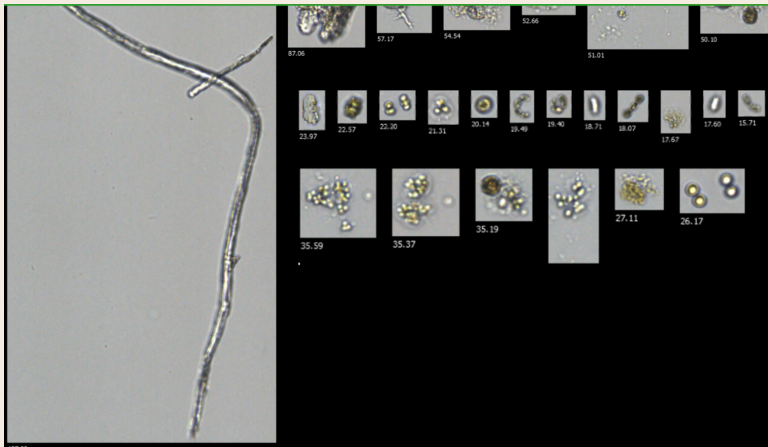
Microscopic Findings from the Plankton NET on July 17th



100x



Dolichospermum - 100x

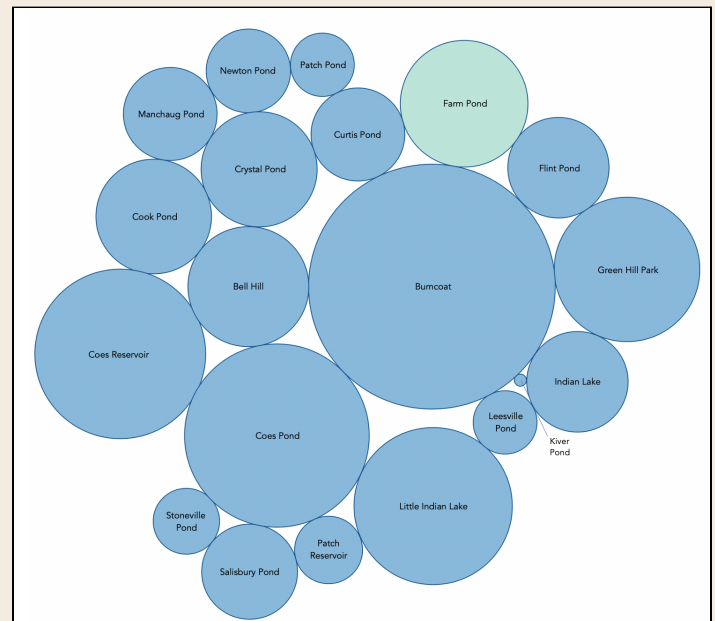


FlowCam Findings from the GRAB Sample

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 Farm Pond was 74 particles/ml in July, which is a decrease from 284 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. Farm Pond rose from an undetectable level in the month of June to about 16 Absorbance Units (Au) in the month of July. A pond becomes at risk for a bloom when levels rise above 50 Au.



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Farm Pond - June 2021

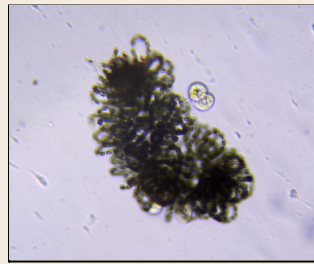
Sampling Conditions

June 19th was a partly cloudy Saturday at 72°F with a light breeze coming from the west direction. Farm Pond's sample was taken at a boat ramp where there was no rain in the past 48 hours. Surface temperature was 74°F and the water had average wave activity. The water had no odor and no evidence of scums. Many fish were observed along the water's edge as well as people swimming in the water.

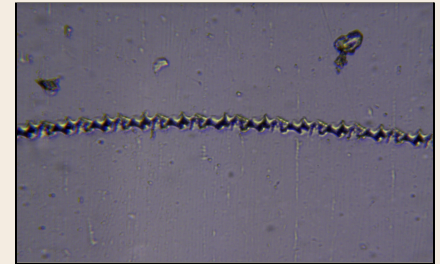
Microscopic Findings from Plankton NET Sample on June 19th



Detritus - 100x



Dolichospermum - 100x

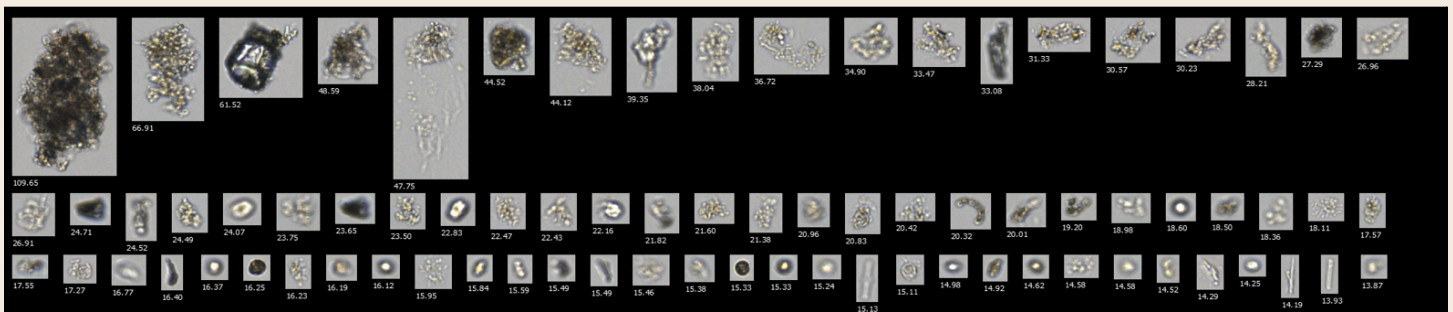


Glass Scratch - 100x

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.

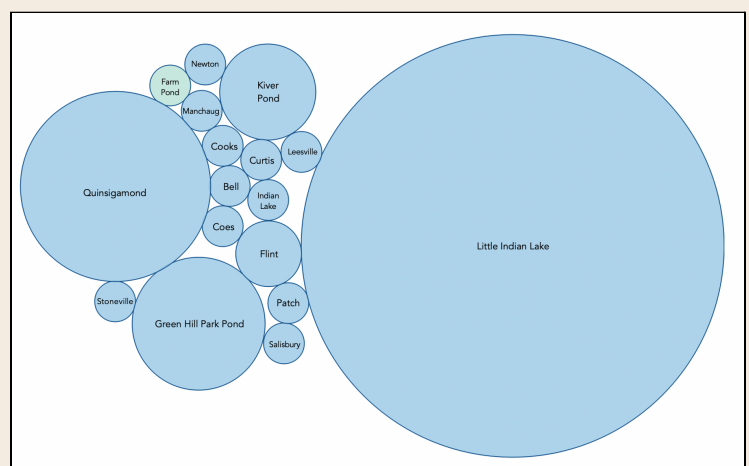
The particle density at Farm Pond was 284 particles/ml. Keep in mind that this number includes all organisms in the water sample, including green algae, golden algae, cyanobacteria, diatoms, and debris. Further work with the FlowCam will allow us to tease the groups apart, but for now, this figure can 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 Farm Pond, showed no distinguishable levels of phycocyanin.



Farm Pond

May 2021

Farm Pond is located in Sherborn, about forty minutes east of Worcester. Farm Pond is a “kettle” lake, meaning it was formed by the melting remnant of one of the glaciers that departed from New England more than 12,000 years ago. Farm Pond has always been a very active wildlife area, providing habitat to fish and many birds, including geese, blue herons, eagles, and hawks. Some species of fish and amphibians that inhabit the pond are relatively rare. The 2021 sampling season will be Farm Pond’s first year of sampling with the WCMC.

Sampling Conditions

June 1st was a partly cloudy, spring Saturday at 64°F. The sample was taken from the boat ramp. There was a light breeze coming from the north direction, and the last time it had rained was 24 hours before the sample was taken. The surface temperature of the water was 63.5°F and the water was still with no wave activity. The water was clear with no odor, and there were pollen particulates in the water. Small fish were observed nearby.



Monthly Overview

No plankton net sample was taken this month, but initial fluorometry data suggests low levels of cyanobacteria. We look forward to having more information on Farm Pond next month!

Thank you to Tom and all of our volunteers!