

# WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

## Newton Pond - October 2021

### Sampling Conditions

October 16th was a mostly cloudy Saturday at 58°F with a light breeze. The water was 64°F, clear and had floating leaves on the surface. There was no rainfall the day before the meeting.

### Microscopic Findings from Plankton NET on June 19th



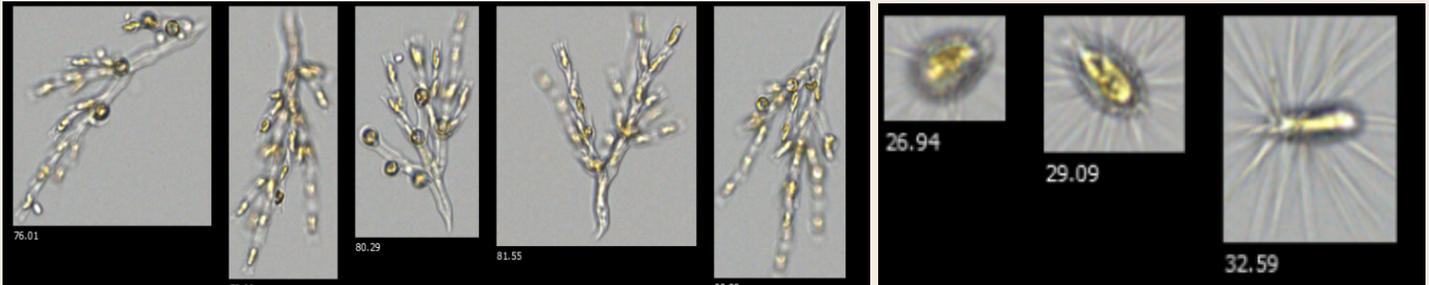
*Dinobryan* Golden Algae



Unknown Particles

### FlowCam Findings from the GRAB Sample

The particle density at Newton Pond was 323 particles/ml in October, down from 707 particles/ml in September, according to the FlowCam. While no cyanobacteria were detected, the sample did contain *Dinobryan*, a golden alga, as well as cryptomonads and other small particles.



*Dinobryan* Golden Algae

ID??

### 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, Newton 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.

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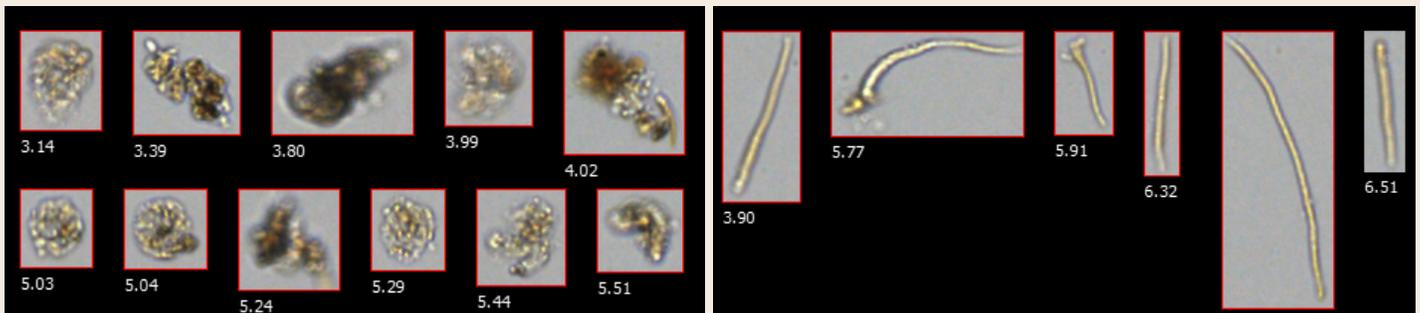
# Newton Pond - September 2021

### Sampling Conditions

September 25th was a calm, sunny Saturday at 58°F. The water was 68°F scattered with dead floating weeds. There were 0.5 inches of rainfall the day before the meeting.

### FlowCam Findings from the GRAB Sample

The particle density at Newton Pond was 707 particles/ml in September, according to the FlowCam, which is relatively low compared to other program lakes. The density was higher this month than it was in September, however, no cyanobacteria cells were detected. The sample was made up primarily of organic debris.



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. In September, Newton Pond had undetectable levels of phycocyanin pigment. This is down from the already low level of 10 Au in August. A pond becomes at risk for a bloom when it is at levels above 50 Au.

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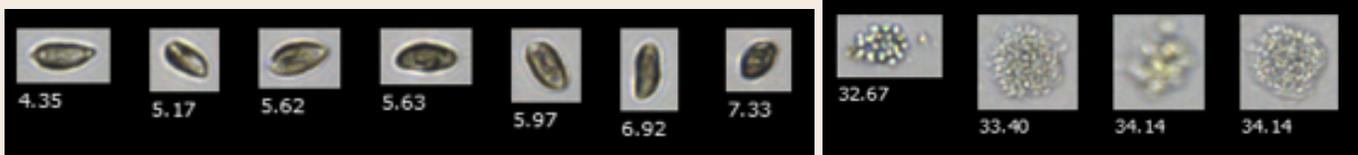
## Newton Pond - August 2021

### Sampling Conditions

August 21st was a calm, partly cloudy Saturday at 70°F. There were 3.2 inches of rainfall two days prior to the meeting.

### FlowCam Findings from the GRAB Sample

The particle density at Newton Pond was 138 particles/ml in August, according to the FlowCam, which is relatively low compared to other program lakes. The density was lower this month than it was 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.

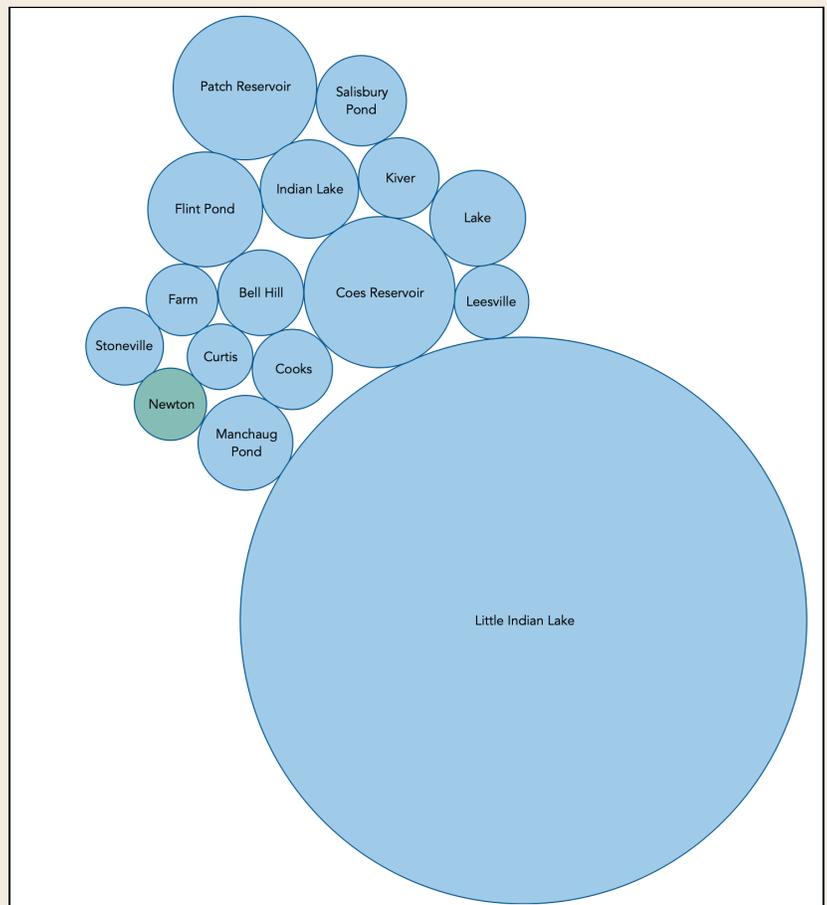


*Cryptomonas*

Unidentified

### 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. Newton Pond rose from undetectable levels 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.



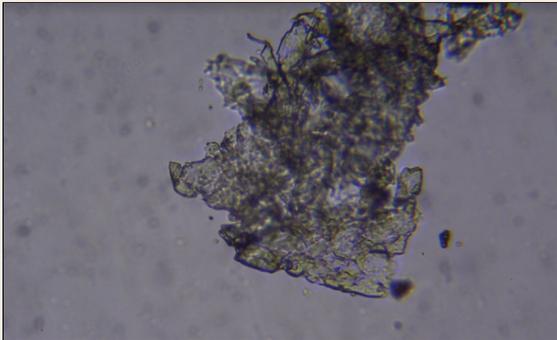
# WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

## Newton Pond - July 2021

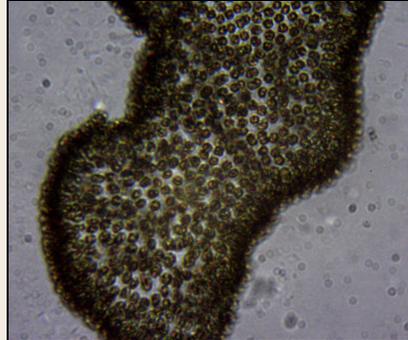
### Sampling Conditions

July 17th was a partly cloudy Saturday at 73°F with a light breeze coming from the southwest direction. It had .4 inches of rainfall the day before. The water's surface temperature was 68°F and the water was calm with average wave activity. The water was clear with no odor, and no evidence of scums. There were lily pads, invasive weeds, ducks, herons, and other birds spotted along the shore.

### Microscopic Findings from the Plankton NET on July 17th



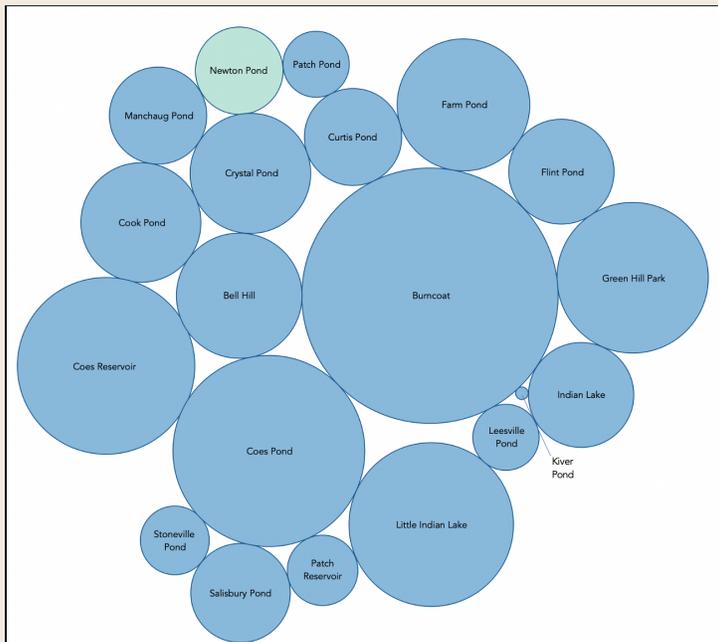
Detritus - 100x



Woronichinia - 400x

### 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 Newton Pond was 283 particles/ml in July, which is a decrease from 420 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. Newton Pond has remained at undetectable limits in the months of June and July. A pond becomes at risk for a bloom when levels rise above 50 Au.

# WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

## Newton Pond - June 2021

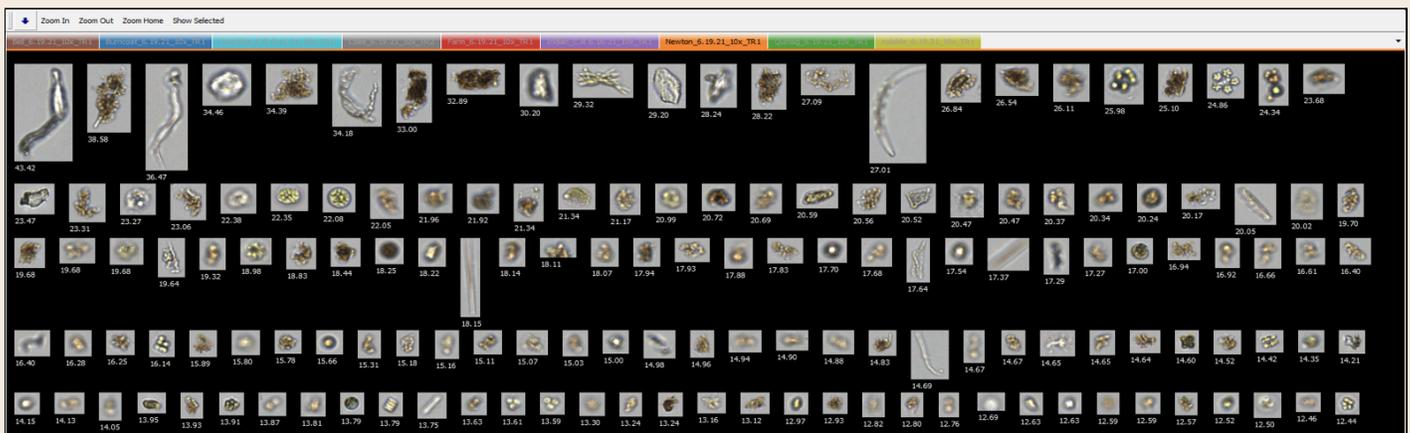
### Sampling Conditions

June 19th was a partly cloudy Saturday at 72°F. There was a light breeze coming from the southwest direction, and no rain in the past 48 hours of taking the sample. Surface temperature was 65°F and the water was calm with average wave activity. The water was slightly turbid and had no odor, with no evidence of scums. There were lily pads, invasive weeds, ducks, herons, and other birds spotted along the shore.

### FlowCam Findings from GRAB Sample

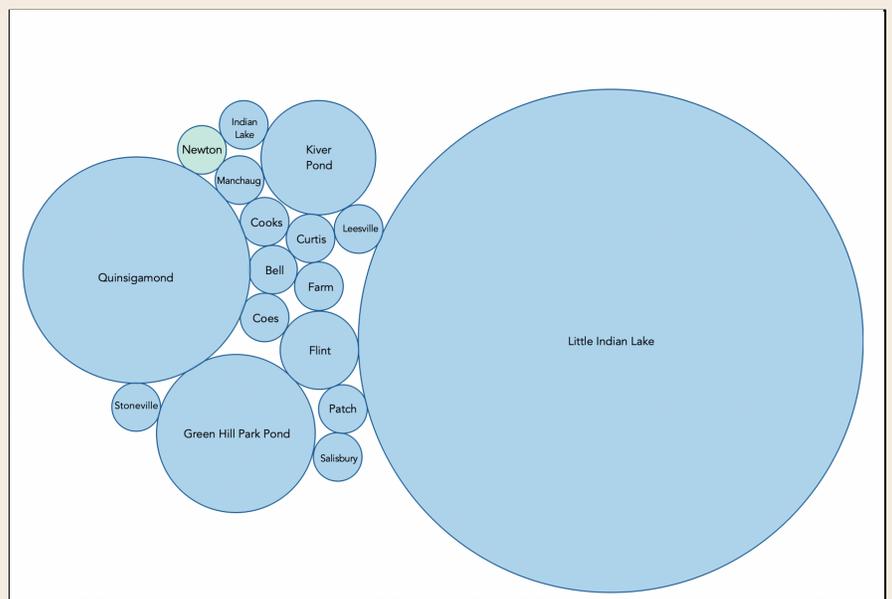
The FlowCam is advanced microscopy technology that uses a high speed camera to photograph individual cells as they pass through a thin flow cell. The computer's image recognition technology will then sort the cells based on parameters used to distinguish cyanobacteria from other organisms, and eventually 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 Newton Pond was 420 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 Newton Pond, showed no distinguishable levels of phycocyanin.



# Newton Pond

May 2021

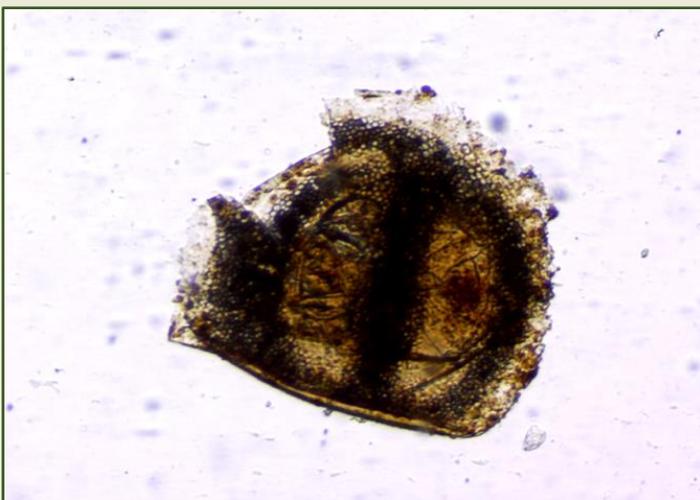
Newton Pond is located in Shrewsbury near Route 70, Mill Road, and Sewall Street, and to the North of Lake Quinsigamond. The pond is 55 acres and has significant public access for hiking, fishing, and other recreational activities. The 2021 sampling season will be the first year the WCMC has sampled Newton Pond.

## Sampling Conditions

May 22nd was a partly cloudy, spring Saturday at 70°F. There was a light breeze coming from the southwest direction, and no rain in the past 48 hours of taking the sample. The surface water temperature was 62°F and the water was calm with average wave activity. The water was slightly turbid and had no odor, with pollen and other spring debris observed along the surface. There were a couple sunfish spotted, as well as birds such as crows, robins, and nesting swans.



## Microscopic Findings



Detritus (100x)

Detritus is a general term for nonliving organic matter in the process of decomposition. In aquatic ecosystems detritus plays a large role in food webs.

## Monthly Overview

Underneath the microscope this month, volunteers found detritus, but no evidence of cyanobacteria. We do not have enough data to determine the threat of cyanobacteria in Newton Pond at this time, but hope to have a clearer picture with our June sampling.

Thank you to Bob, his grandsons Luke and Jax, and all other volunteers!