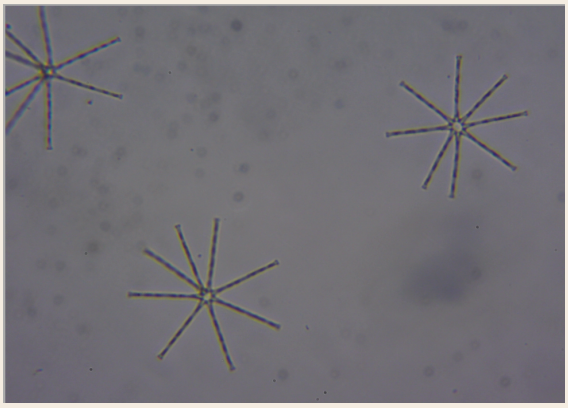
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Cook's Pond - October 2021

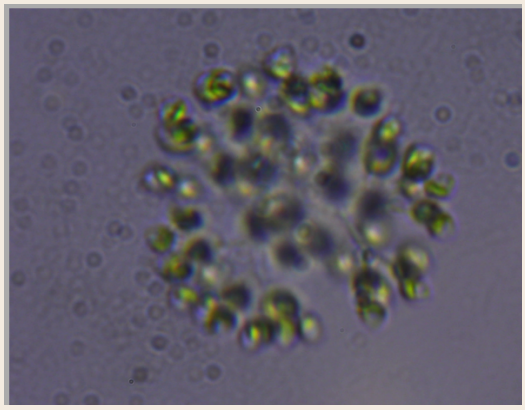
Sampling Conditions

October 16th was a sunny, breezy Saturday at 72℉. The water was 69℉ and clear with some tree debris on the surface. There was no rainfall the day before the sample was taken.

Microscopic Findings from the Plankton NET



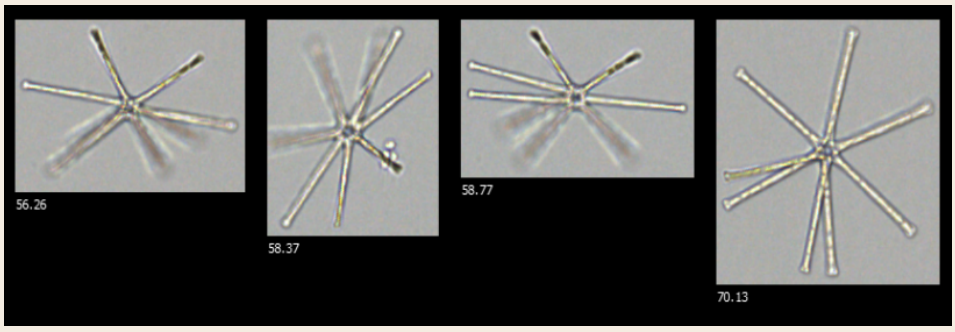
Asterionella Diatoms



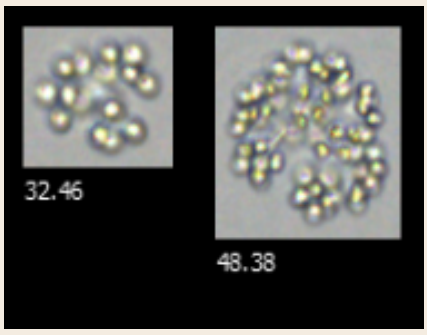
Snowella Cyanobacteria

FlowCam Findings from the GRAB Sample

The particle density at Cooks Pond was 308 particles/ml in October, down from 2232 particles/ml in September, according to the FlowCam. The sample contained an assortment of particles, including cryptomonads, circular diatoms, and Asterionella. Only a few particles of Snowella cyanobacteria were detected, however, in general, particle density was very low.



Asterionella Diatoms



Snowella Cyanobacteria

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, Cooks Pond had undetectable levels of phycocyanin pigment, which is the same reading that it had in September. A pond becomes at risk for a bloom when it is at levels above 50 Au.

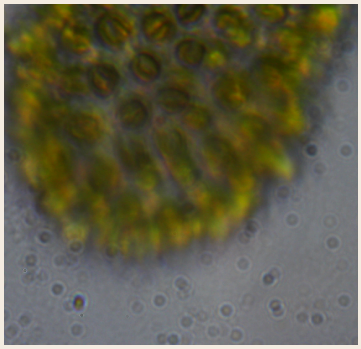
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Cook's Pond - September 2021

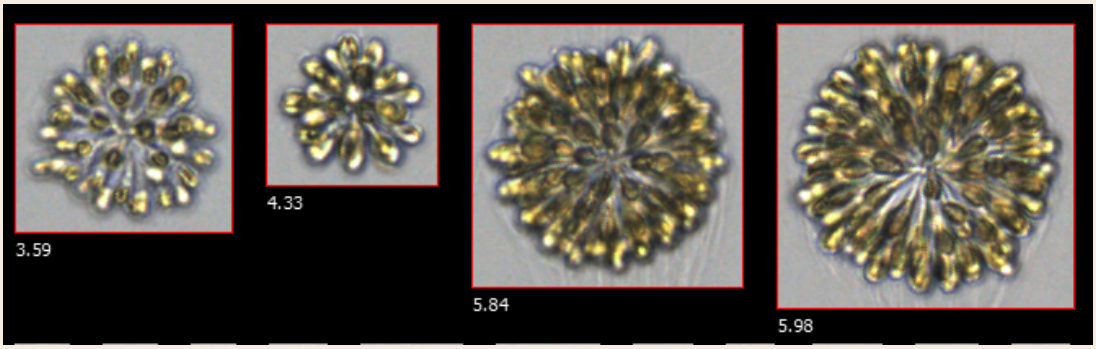
Sampling Conditions

September 25th was a sunny, calm Saturday at 70℉. The water was 70℉ and clear. There was less than one inch of rainfall the day before the sample was taken.

Microscopic Findings from the Plankton NET



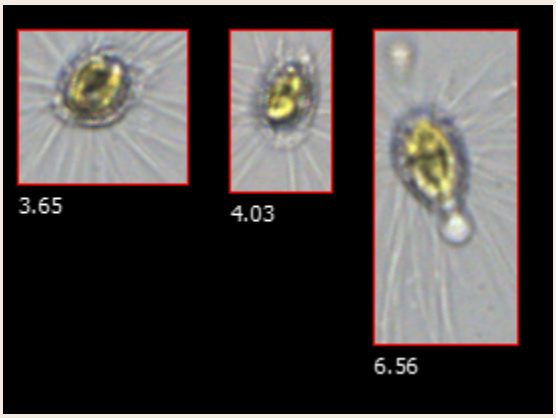
Synura Golden Algae

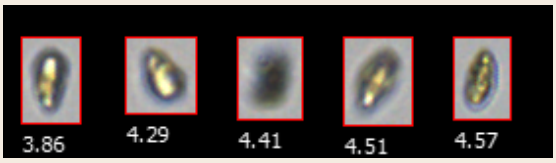


Flowcam images of *Synura* Golden Algae

FlowCam Findings from the GRAB Sample

The particle density at Cooks Pond was 2232 particles/ml in September, according to the FlowCam, which was higher than it was in August. The sample contained an assortment of particles, none of which were identified as cyanobacteria. There were several particles of Synura, a golden alga, as well as Cryptomonads and Mallomonas.





Mallomonas and 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 September, Cooks Pond had undetectable levels of phycocyanin pigment. This is down from the already low level of 13 Aus in August. A pond becomes at risk for a bloom when it is at levels above 50 Au

WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

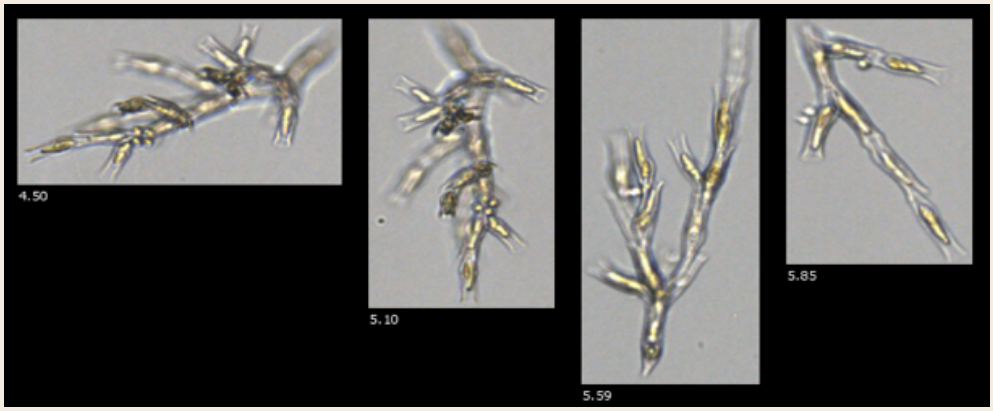
Cook's Pond - August 2021

Sampling Conditions

August 21st was a partly cloudy Saturday at 82℉ with a light breeze. There was no rainfall the day before the sample was taken, however there were 3 inches two days before.

FlowCam Findings from the GRAB Sample

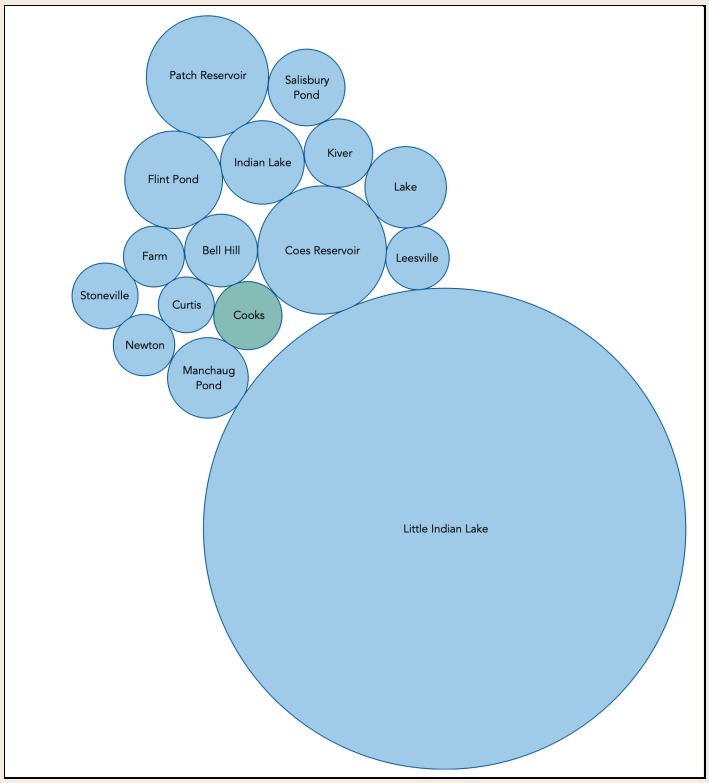
The particle density at Cooks Pond was 200 particles/ml in August, according to the FlowCam, which was lower than it was in July. The sample contained an assortment of particles, none of which were identified as cyanobacteria. There were several particles of *dinobryon*, a golden alga.



Dinobryon golden alga

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. Cooks Pond stayed the same from 13 Au in the month of July to 13 Au in the month of August. A pond becomes at risk for a bloom when it is at levels above 50 Au.



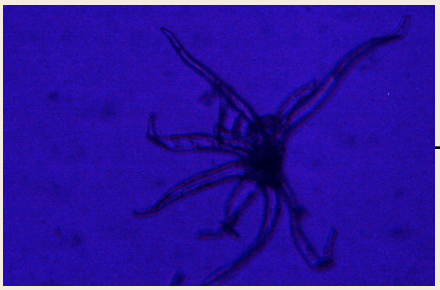
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Cooks Pond - July 2021

Sampling Conditions

July 17th was a partly cloudy Saturday at 73℉ with a light breeze from the north direction. Cooks Pond's sample was taken at the beach along the shore where there were .4 inches of rainfall the day before. The temperature at the surface of the water was 76℉ and the water was calm with little wave activity. The water was slightly turbid with no odor. Plant material was observed along the surface, as well as fish, birds, walkers, and anglers along the shore.

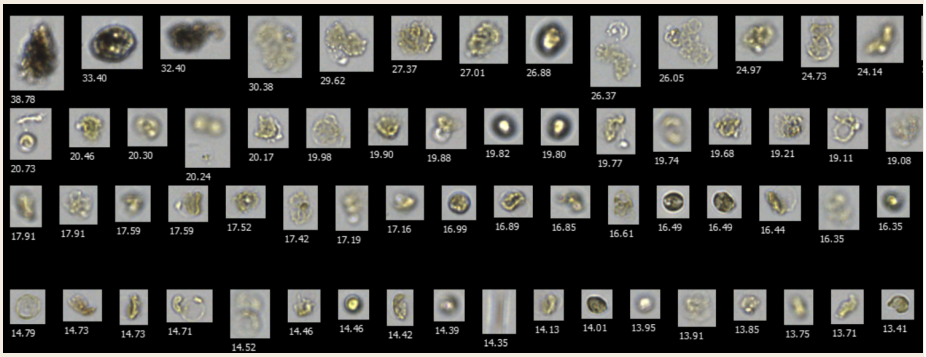
Microscopic Findings from the Plankton NET on July 17th

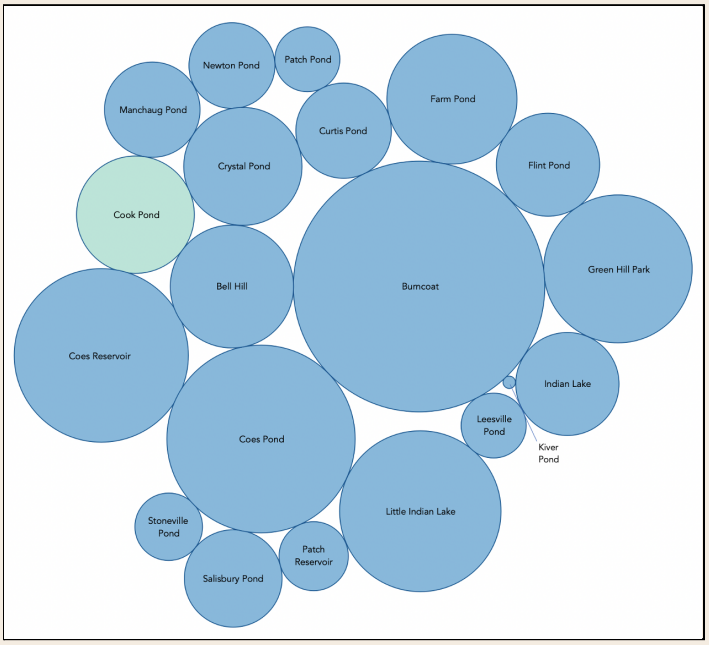


Trichome - 100x

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 Cooks Pond was 315 particles/ml in July, which is a decrease from 1001 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. Cooks Pond rose from an undetectable level in the month of June to about 13 Absorbance Units (Au) in the month of July. A pond becomes at risk for a bloom when levels rise above 50 Au.

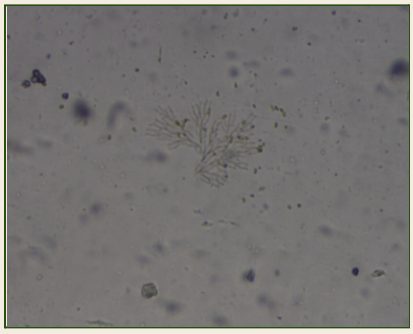
WORCESTER CYANOBACTERIA MONITORING COLLABORATIVE

Cooks Pond - June 2021

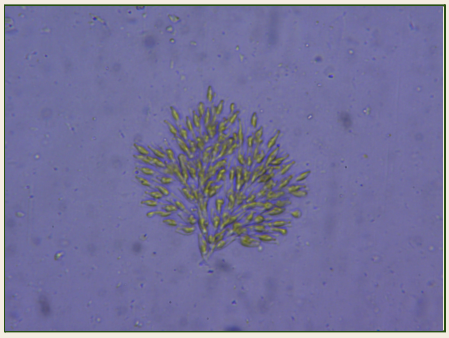
Sampling Conditions

June 19th was a partly cloudy Saturday at 76℉ with a light breeze from the north direction. Cook's Pond's sample was taken at the dock along the shore where there was .04 inches of rain the day before. The surface temperature was 74℉ and the water was calm with little wave activity. The water was clear with no odor. Pollen observed along the top, as well as anglers along the edge of the shore.

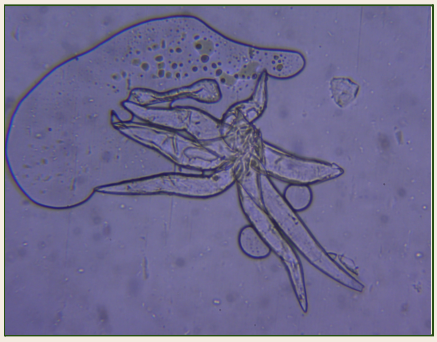
Microscopic Findings from Plankton NET on June 19th



Dinobryon - 40x



Dinobryon - 100x



Trichrome - 100x

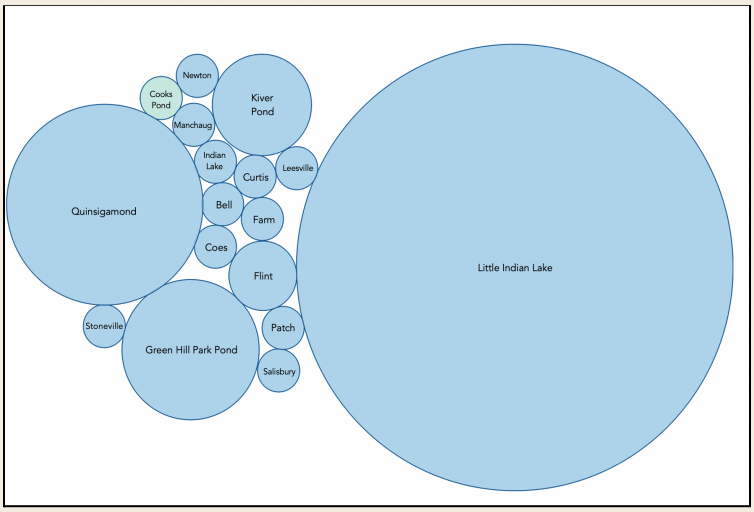
FlowCam Findings from GRAB Sample

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 Cook's Pond was 1,001 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 Cooks Pond, showed no distinguishable levels of phycocyanin.

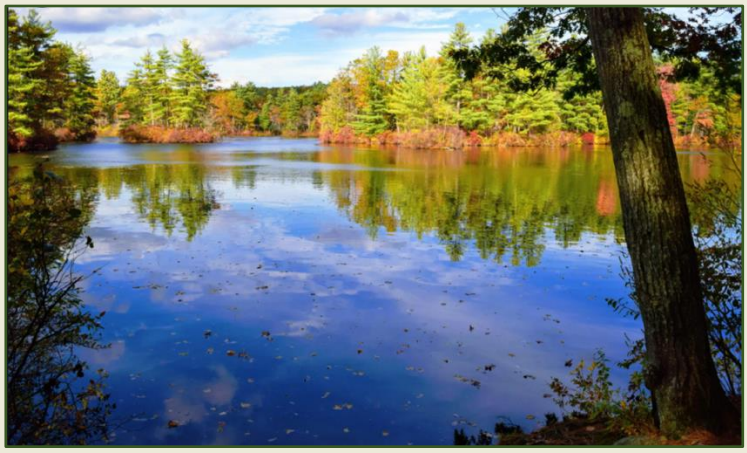


WORCESTER CYANOBACTERIA MONITERING COLLABORATIVE

Cooks Pond

May 2021

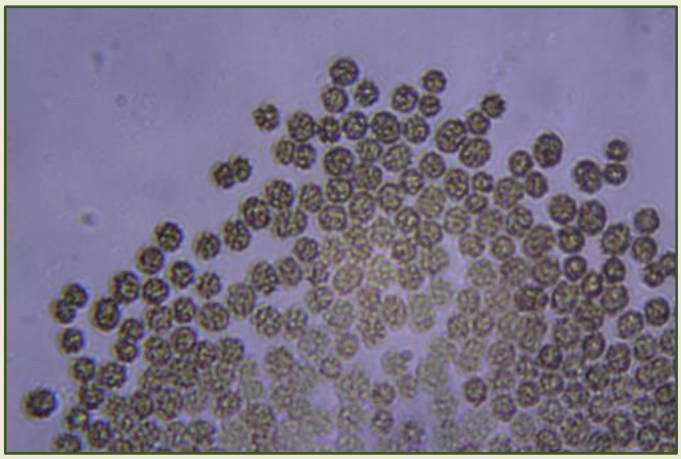
Cooks Pond is located in western Worcester near Cascades Park surrounded by residential homes. It is the first major impoundment in the Tatnuck Brook watershed after Worcester's drinking water reservoirs. It is 22 acres in size. The 2021 sampling season will be Cook Pond's third year of sampling with the WCMC, following 2018 and 2019.



Sampling Conditions

May 22nd was a partly cloudy, spring Saturday at 76°F. There was a light breeze coming from the northwest direction. Cooks Pond's sample was taken at the dock along the shore where there was no rain in the past 48 hours. Surface temperature was 72°F and the water was calm with little wave activity. The water was clear with no odor and had pollen and tree debris observed along the top. Bluegill was spotted while taking samples.

Microscopic Findings



Microcystis (400x)

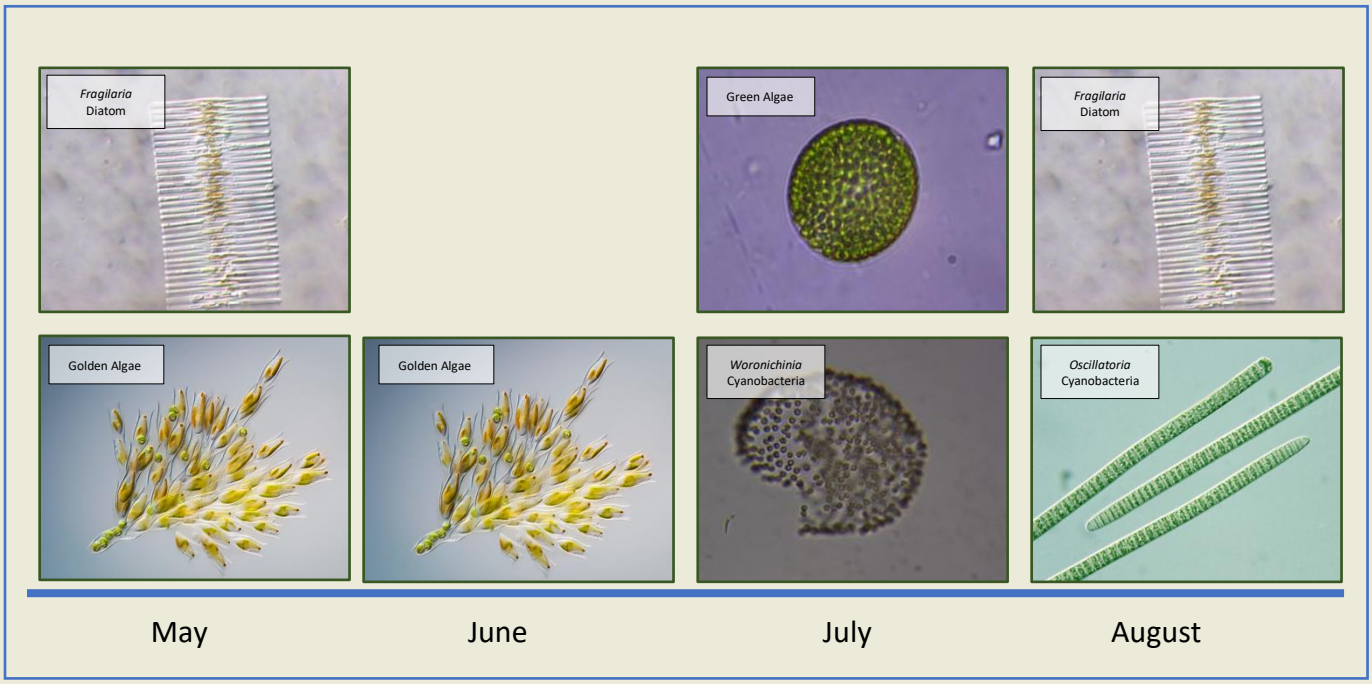
Microcystis cyanobacteria is a genus of freshwater cyanobacteria has the potential to produce toxins harmful to humans and pets at high density.

Monthly Overview

Underneath the microscope this month, volunteers found a colony of Microcystis. This is commonly found in many lakes and ponds around Worcester, but it is the first year found in Cook's Pond. While currently not a concern, we will continue to keep an eye on more cyanobacteria in this location!

Past Year's Findings

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



Thank you to Dan and all other volunteers!