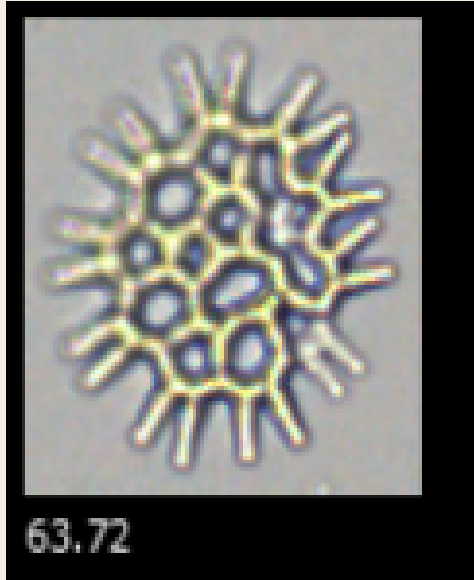# Salisbury Pond – October 2021

Sampling Conditions

October 16th was a partly cloudy Saturday at 67℉ with a light breeze. The water was 68℉ and had a coating of filamentous algae on the bottom. There was no rainfall the day prior to the meeting.

Microscopic Findings from Plankton NET on June 19th
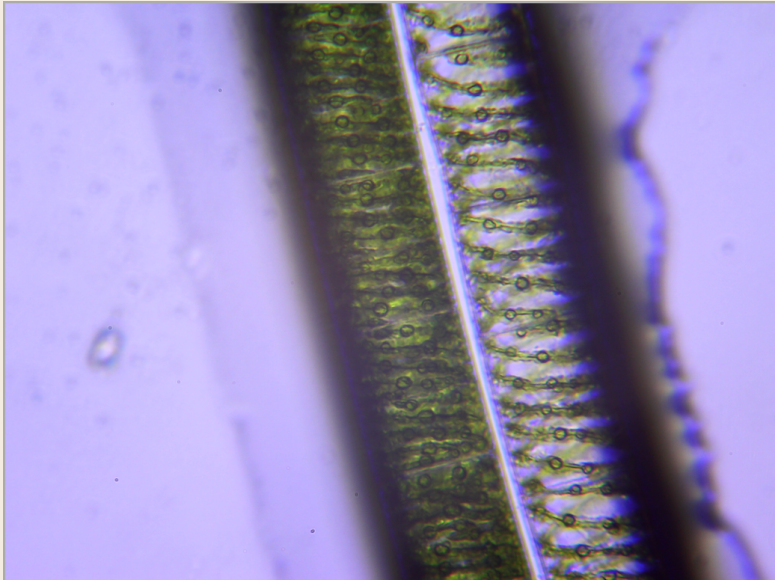

Spirogyra Green Algae

FlowCam image of *Pediastrum* Green Algae

FlowCam Findings from the GRAB Sample

The particle density at University Pond was 531 particles/ml in October, down from 4,274 particles/ml in September, according to the FlowCam. The sample contained several genera of cyanobacteria, including Aphanizomenon, Dolichospermum, Woronichinia, and Microcystis, though many fewer than the previous month. The sample also contained the green alga Pediastrum. Apart from this, the sample contained a lot of small particles and debris.

Dolichospermum Cyanobacteria
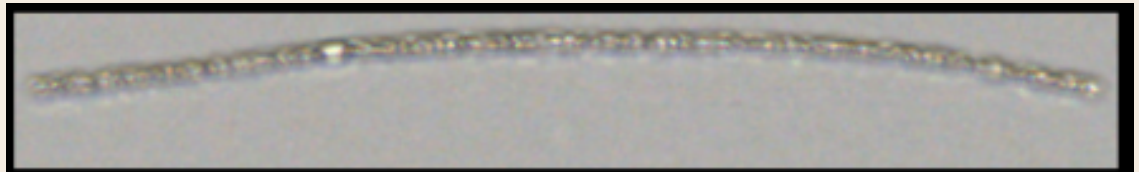
Aphanizomenon Cyanobacteria

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, Salisbury Pond had undetectable levels of phycocyanin pigment, down from 45 Aus in September. A pond becomes at risk for a bloom when it is at levels above 50 Aus.

Salisbury Pond – September 2021

Sampling Conditions

September 25th was a sunny Saturday at 64℉ with a light breeze. The water was 68℉ and clear. There were 0.08 inches of rainfall the day prior to the meeting. Lots of water chestnut observed in the pond.

FlowCam Findings from the GRAB Sample

The particle density at University Pond was 4274 particles/ml in September, according to the FlowCam, which was higher than it was in August. The sample contained several images of cyanobacteria, including Aphanizomenon and Microcystis, as well as the charismatic green alga Pediastrum. Apart from this, the sample contained a lot of small particles and debris.
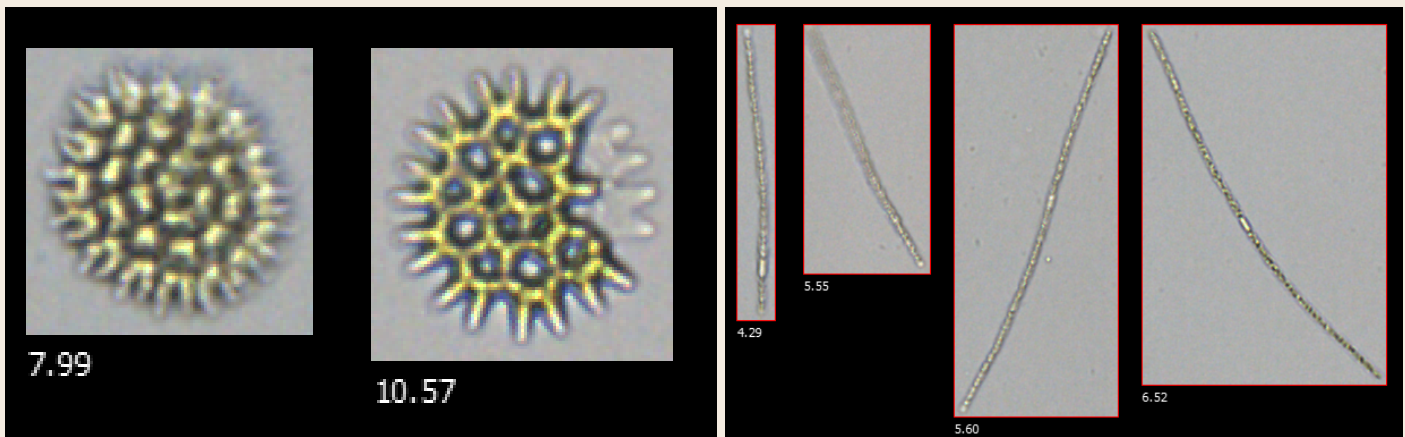
Pediastrum Green Algae

Aphanizomenon 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 September, Salisbury Pond had 45 Aus of phycocyanin pigment. This is increased from the August reading of 16 Aus. A pond becomes at risk for a bloom when it is at levels above 50 Au.

Salisbury Pond - August 2021

Sampling Conditions

August 21st was a calm, sunny Saturday at 78℉. There were 3.2 inches of rainfall two days prior to the meeting.

### FlowCam Findings from the GRAB Sample

The particle density at Salisbury Pond was 1,422 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.
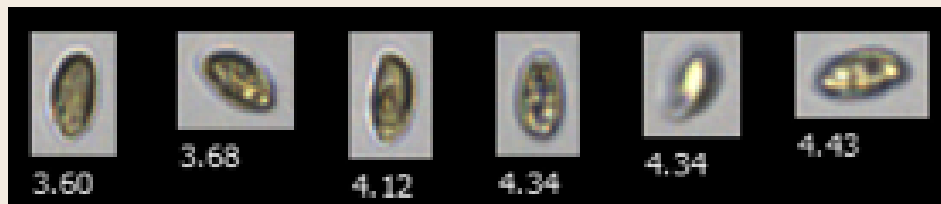
Cryptomonas

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. Salisbury Pond rose from undetectable levels in the month of July to 16 Au in the month of August. A pond becomes at risk for a bloom when it is at levels above 50 Au.
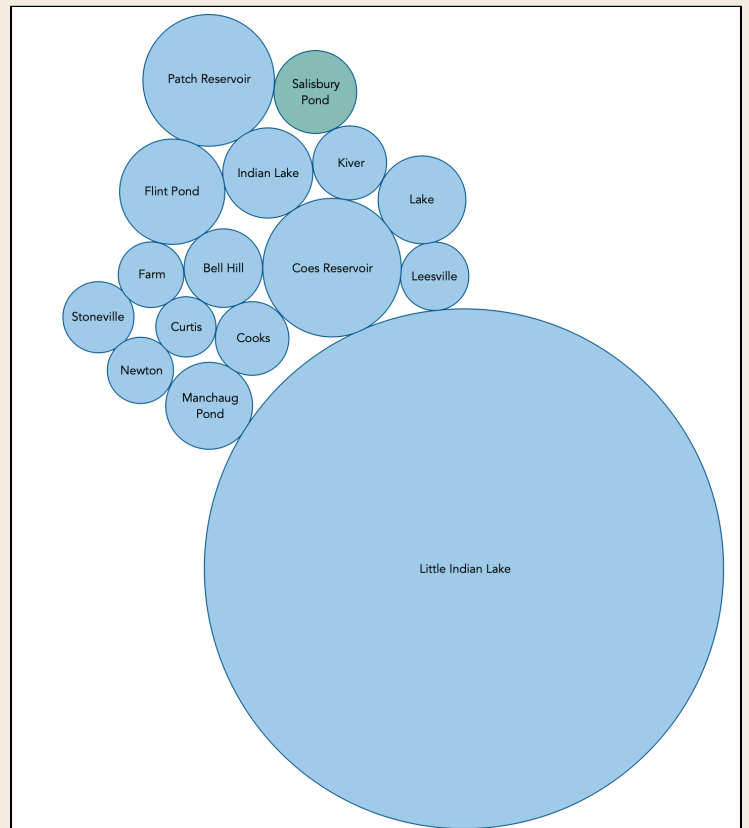
Salisbury Pond - July 2021

Sampling Conditions

July 17th was a partly cloudy Saturday at 73℉ with a light breeze coming from the southwest. There were .4 inches of rainfall the day before. The water's surface temperature was 75.2 ℉ and the water was still with no wave activity. The water was opaque with no odor, and the surface of the water was covered by water chestnut. Small particles and sediment were observed in the water column. Under the microscope, pollen, cyanobacteria, and diatoms were observed.

## Microscopic Findings from the Plankton NET on July 17th
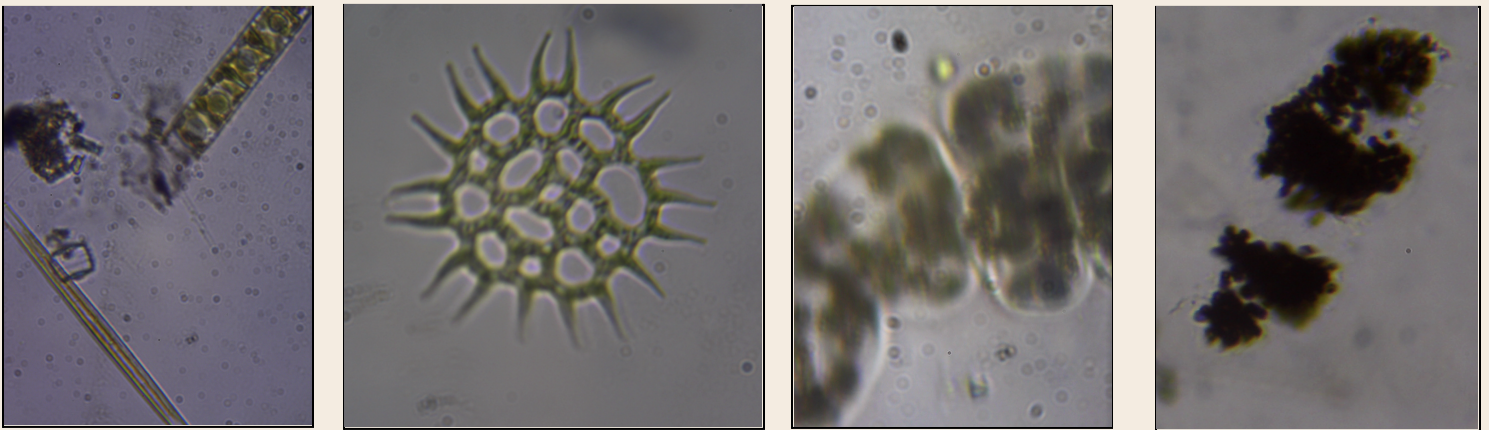
FlowCam Findings from the GRAB Sample

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 Salisbury Pond was 8,611 particles/ml in July, which is an increase from 1,115 particles/ml in June. The figure provides a snapshot of some of the images that were seen by the camera at this lake.
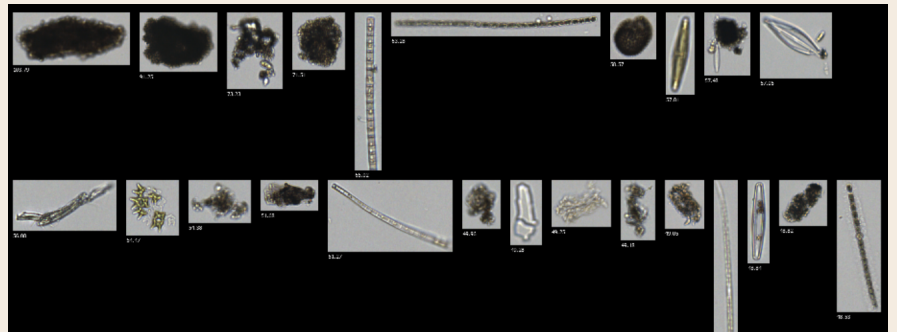
Fluorimetry Data from the Integrated Tube Sample

Using the fluorometer to find phycocyanin levels, the following graph represents the relative cyanobacteria pigment in each pond. Salisbury Pond has remained at undetectable limits in the months of June and July. A pond becomes at serious risk for a bloom when levels rise above 50 Au.
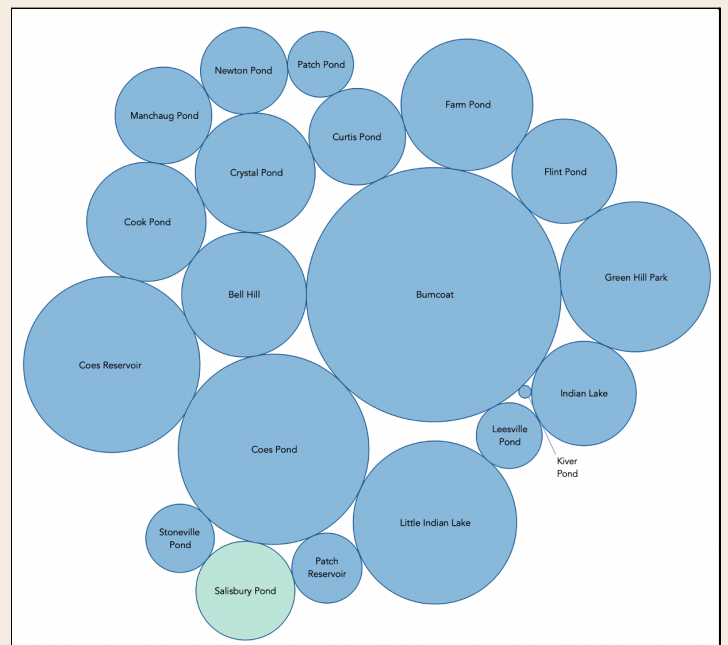
Salisbury Pond - June 2021

Sampling Conditions

June 19th was a cloudy Saturday at 75℉ with no wind. There was no rain in the past 48 hours of taking the sample. Surface temperature was 73℉ and the water was calm with little wave activity. The water was turbid with no odor, and the surface of the water was covered by plant matter.

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 Salisbury Pond was 1,115 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.
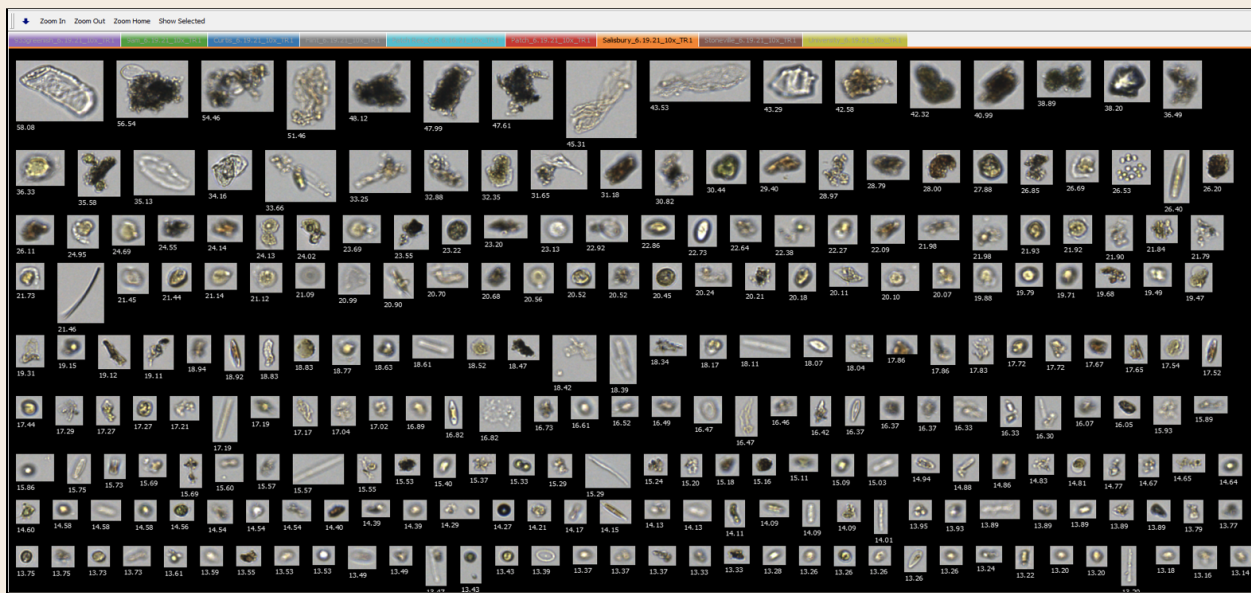
Fluorimetry Data from IT Tube

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 Salisbury Pond, showed no distinguishable levels of phycocyanin.

WORCESTER CYANOBACTERIA MONITERING COLLABORATIVE
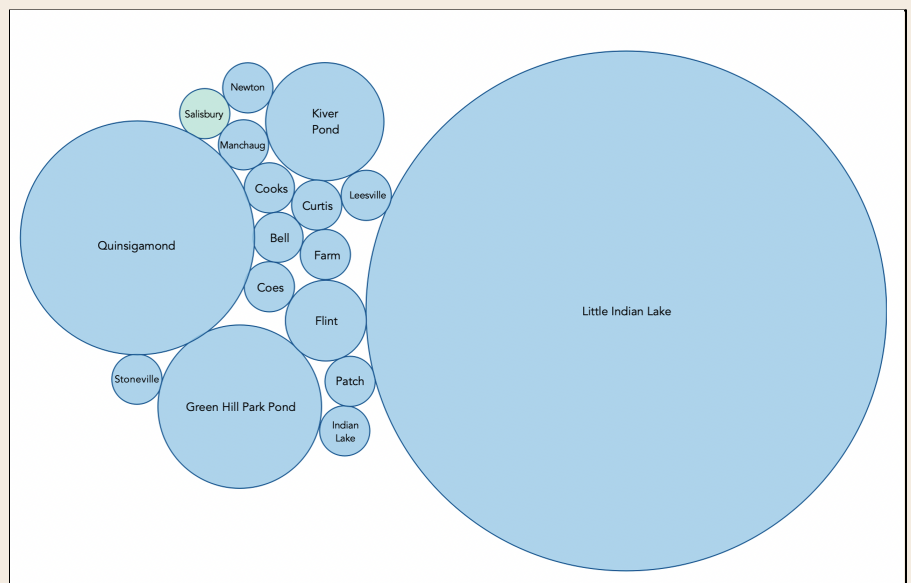
Salisbury Pond
May 2021

Salisbury Pond, also known as Institute Pond, is the 16-acre centerpiece of Institute Park, located near Worcester Polytechnic Institute. Originally this pond was a mill pond, an artificial lake damned by Grove Street to supply power to nearby factories. Originally 12 feet deep, Salisbury Pond's average water depth today is only 3 feet, and in some areas, it is less than a foot deep. 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 first year the WCMC has sampled Institute Pond.

Sampling Conditions

May 22nd was a cloudy, spring Saturday at 75°F. There was a light breeze coming from the north direction, and there was no rain in the 48 hours prior to taking the sample. The water temperature was 68°F at the surface and the water was calm with little wave activity. The water was turbid with no odor, and there were particulates of kicked up sediment observed along the surface.

Monthly Overview

Underneath the microscope, volunteers found pollen, but no cyanobacteria colonies. Initial fluorometry data suggests that the levels of cyanobacteria found were not significantly high and show no threat of a bloom this month. However, more data is needed to determine risk at this location, and we look forward to collecting more data in June

Thank you to Emily and all other volunteers!