

The City of Worcester Department of Public Works and Parks Presents

The State of the Lakes

Community Initiatives to Track and Improve Water Quality



March 4th, 6:00pm
Blackstone Heritage
Corridor Visitor Center

Worcester's lakes and ponds are valuable *recreational resources*. Residents play a key role in *observing changes in our water quality*, complementing municipal and state efforts. Join us to learn about the exciting projects to *study and improve* our local waterways, from invasive plant removal to cyanobacteria monitoring and mitigation, and how you can become a *Citizen Scientist*.

6:00 pm– Refreshments with Citizen Scientists

6:30 pm– Program begins

Learn more about the City of Worcester Lakes and Ponds Program at:

www.worcesterma.gov/water-sewer/recreational-waters



Citizen Science in the City of Worcester

What is the WCMC?

The *Worcester Cyanobacteria Monitoring Collaborative* (WCMC) is a group of Worcester area residents that are interested in learning more about cyanobacteria and plankton, and how they affect water quality in their lakes and ponds. These volunteers may or may not have a background in science, but are trained by the Lakes and Ponds Program to collect samples, prepare slides, and identify cyanobacteria and other microscopic organisms that play a role in water quality. The data they collect is not only useful to our local understanding of cyanobacteria life history and dynamics, but contributes to global research on the topic.



WCMC volunteers Peg, Michele, and Pat collect samples from Lake Quinsigamond in April 2017.

Collecting samples

Between Spring and Fall, volunteers collect samples using a plankton net from a boat or the shore of their neighborhood lake once a month, they observe water temperature, air temperature, and how much rain has fallen in the past 24 hours. These are important factors for studying cyanobacteria and HABs.



WCMC volunteers look for organisms under the microscope.

Identifying Cyanobacteria

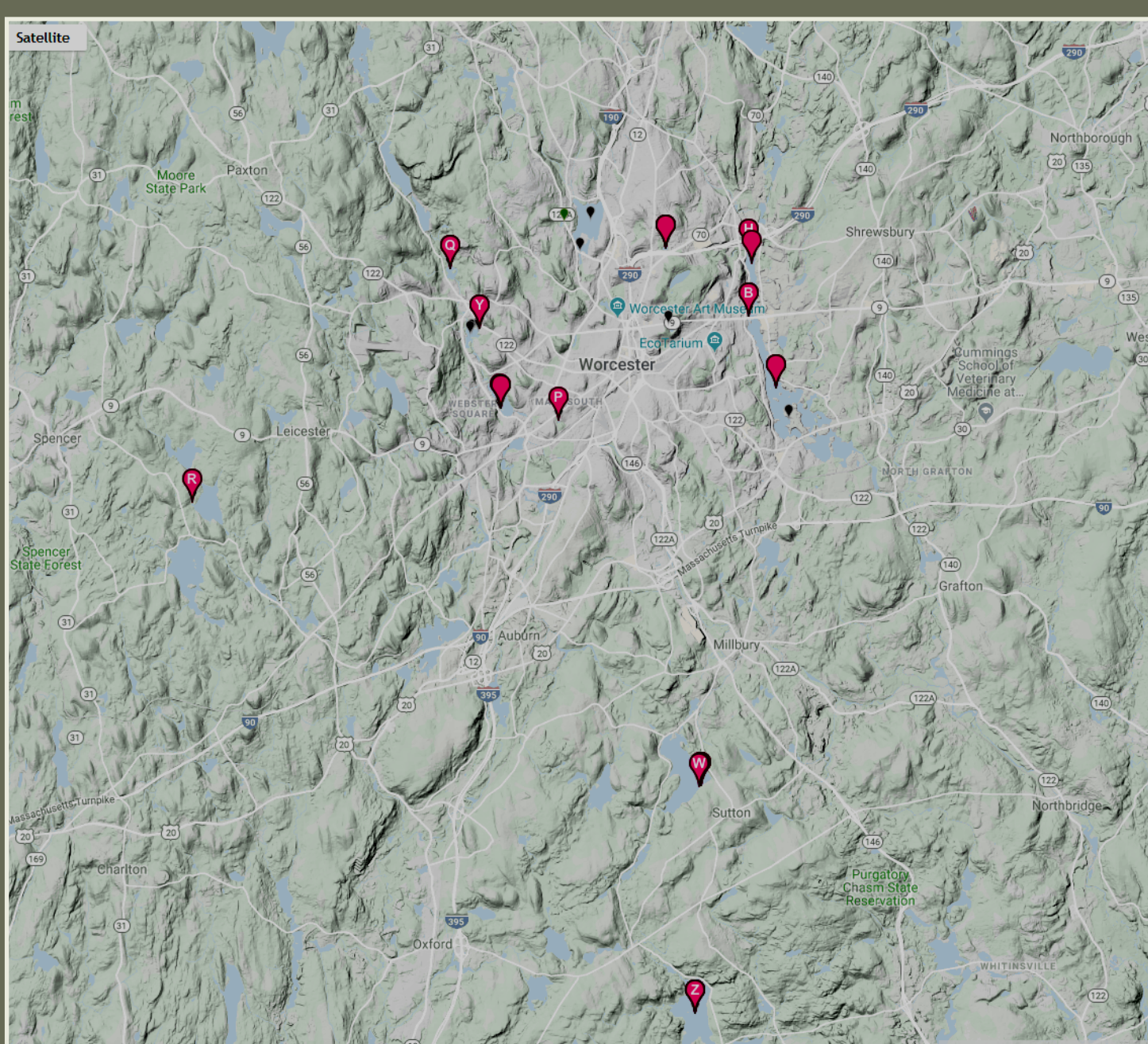
Volunteers bring their samples to a field laboratory at the Blackstone Heritage Corridor Visitor Center, where they prepare samples and mount slides onto light microscopes. Volunteers then “hunt” for organisms in the sample. Once an organism is found, it is identified and its significance determined for water quality. Photographs are then taken using a microscope camera.



WCMC volunteers, having found an organism, attempt to identify what kind of cyanobacteria or other plankton genus it is.

Building Understanding

Photographed cyanobacteria are uploaded and geotagged to the public nature database, [inaturalist.org](https://www.inaturalist.org). This database organizes the uploads in a way that different genera of cyanobacteria can be tracked over time and space, giving new insights into their behavior. Since 2017 when our program began, WCMC has uploaded over 75 observations, and is one of the top contributors to the project. These data complement the local Lakes and Ponds Program water quality monitoring.

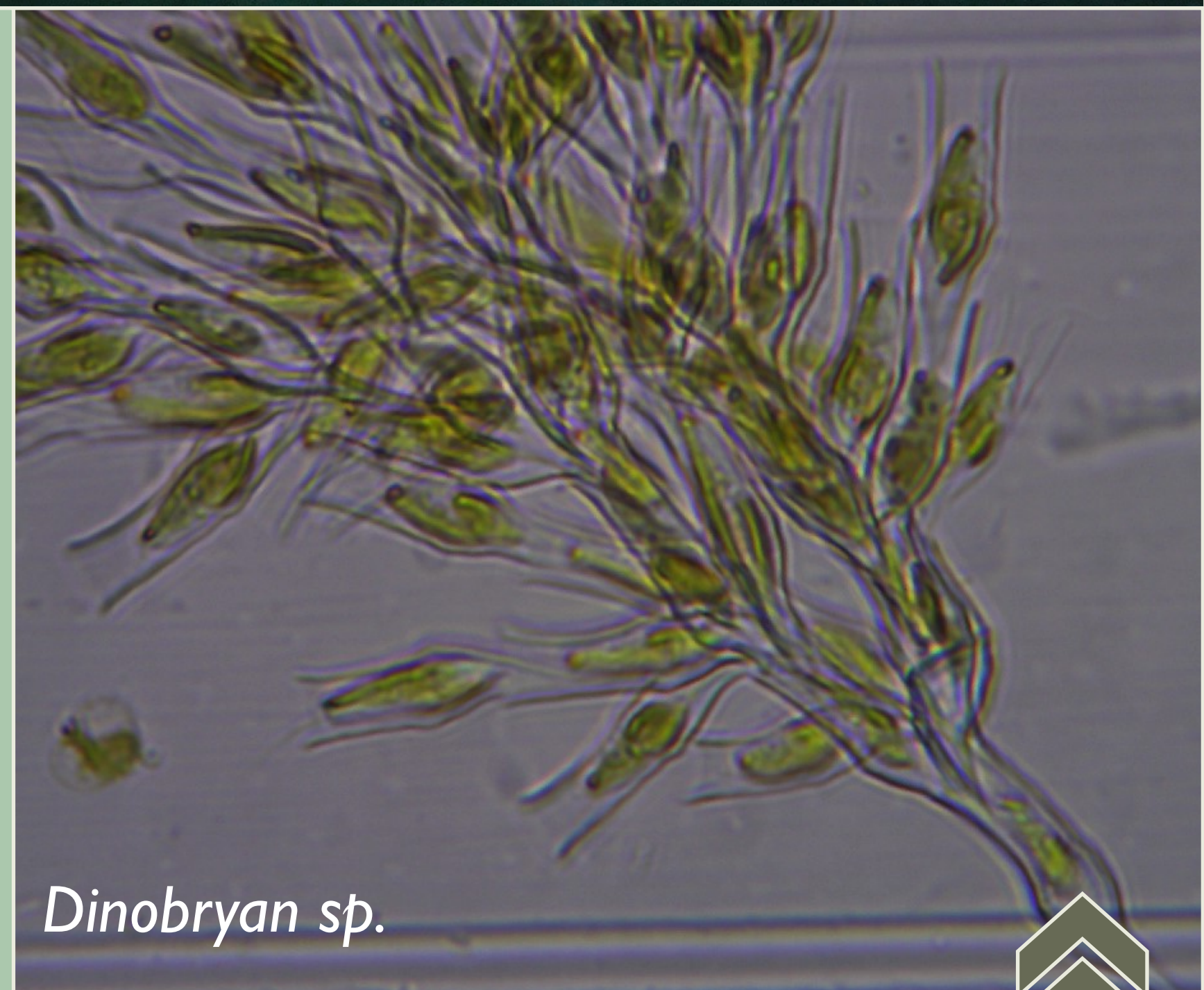


Map of WCMC cyanobacteria observations in and around Worcester waterways.

Cook's Pond



Cook's Pond is the first recreational Worcester pond that Tatnuck Brook enters after leaving the Holden II drinking water reservoir, and water quality here is thought to be quite high. No blooms have been reported to date. A majority of the observations made by volunteers are of golden algae, which are not concerning at low levels and are not known to produce toxins. A water quality committee comprised of Tatnuck Club and Cook's Pond Club members make up the citizen scientists of Cook's Pond.

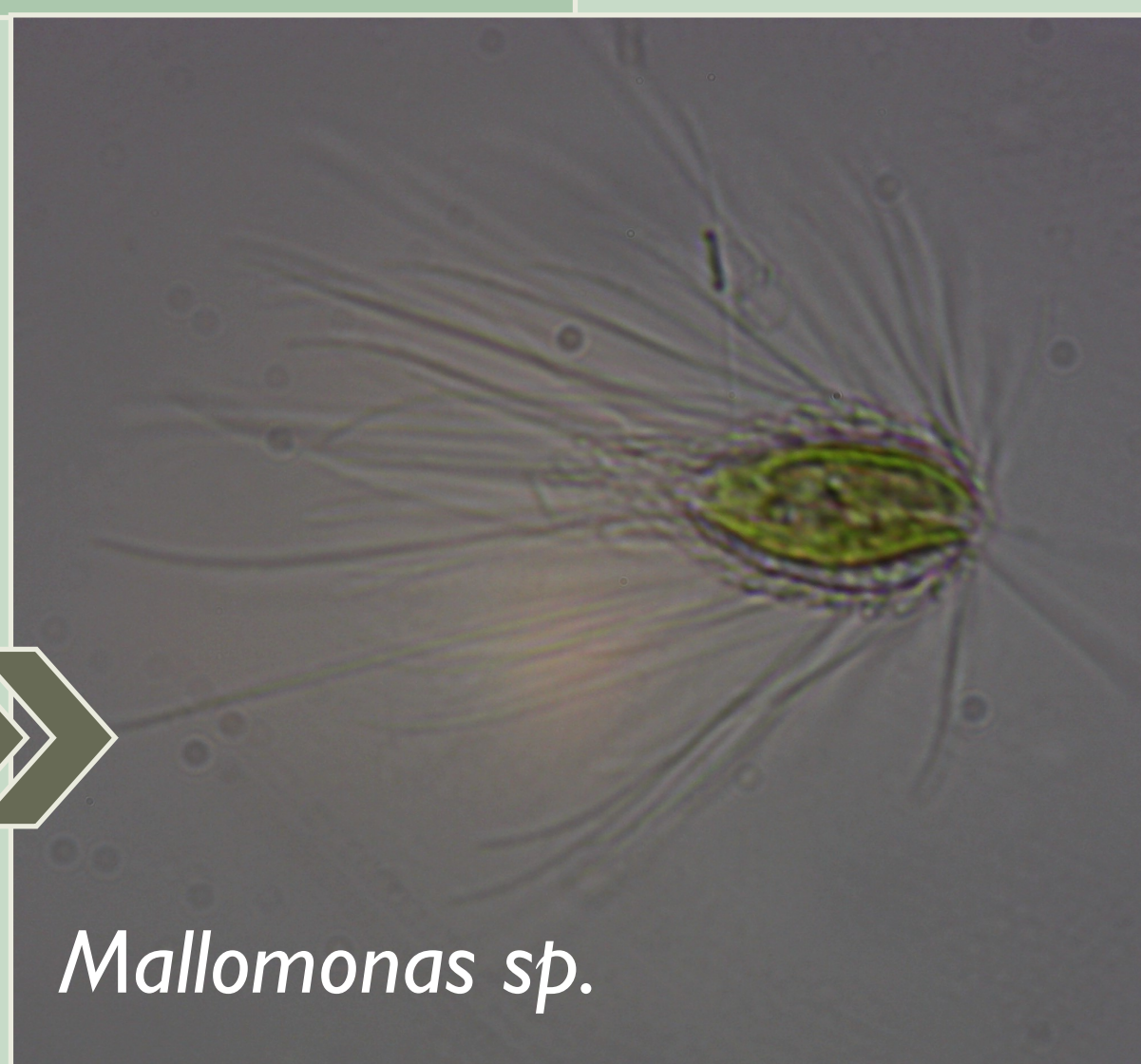


Dinobryan sp.

A golden alga, commonly found in Cooks Pond, is *Dinobryan*. This is a photograph of an observation from June of 2019.



Mallomonas is a golden alga that is common in New England lakes and ponds. This individual was observed in May of 2018.



Mallomonas sp.

Synura is another genus of golden algae, that looks a little more golden. The below photo was taken from a sample in September of 2018.

Jillian, one of the volunteers from Cook's Pond, collects a sample from a boat while her partner records weather conditions and sample time.



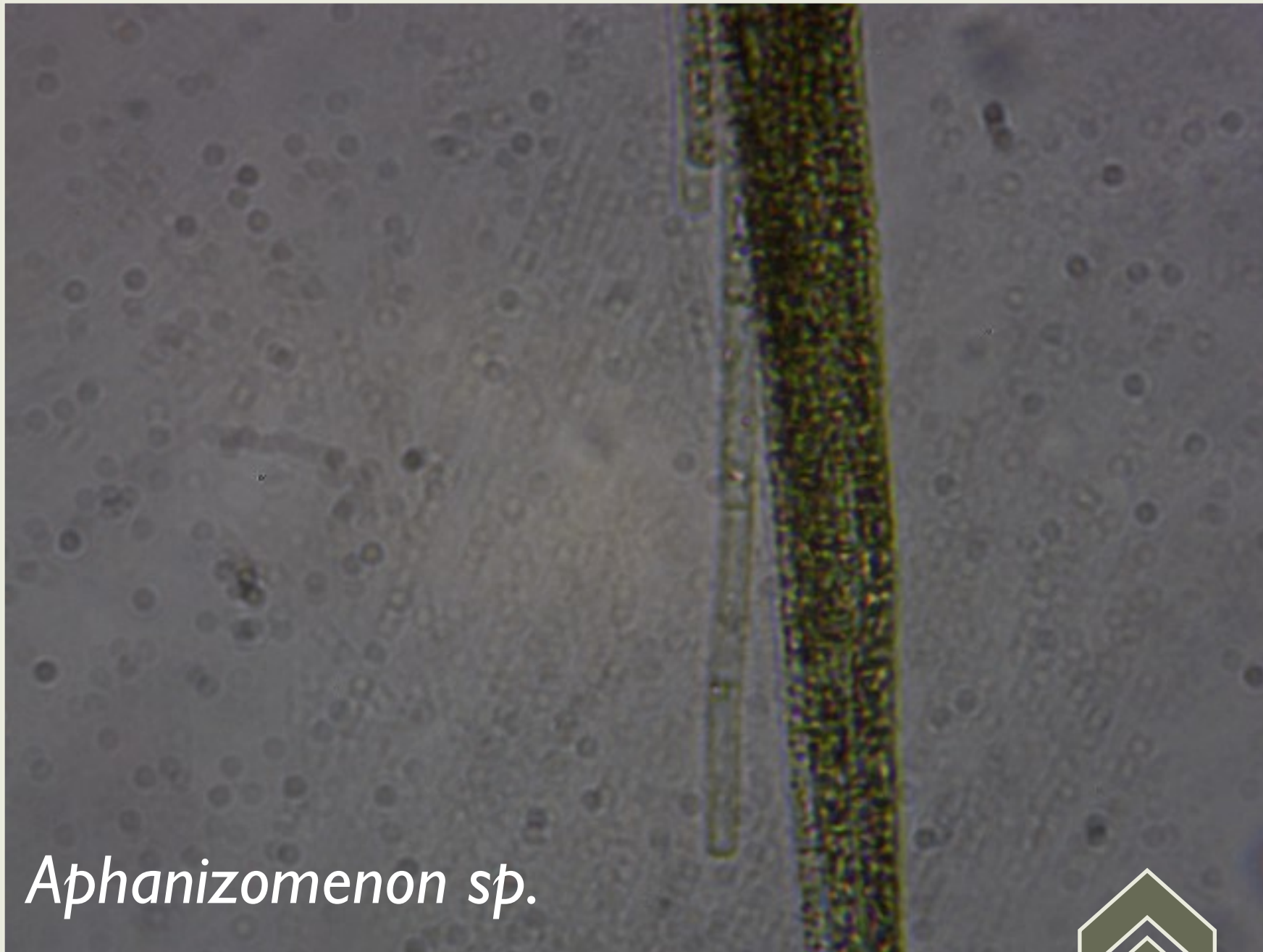
Oscillatoria sp.

It is not often that volunteers observe cyanobacteria in Cook's Pond. On this occasion, volunteers observed an *Oscillatoria*, which can potentially produce toxins, in August of 2019.



Synura sp.

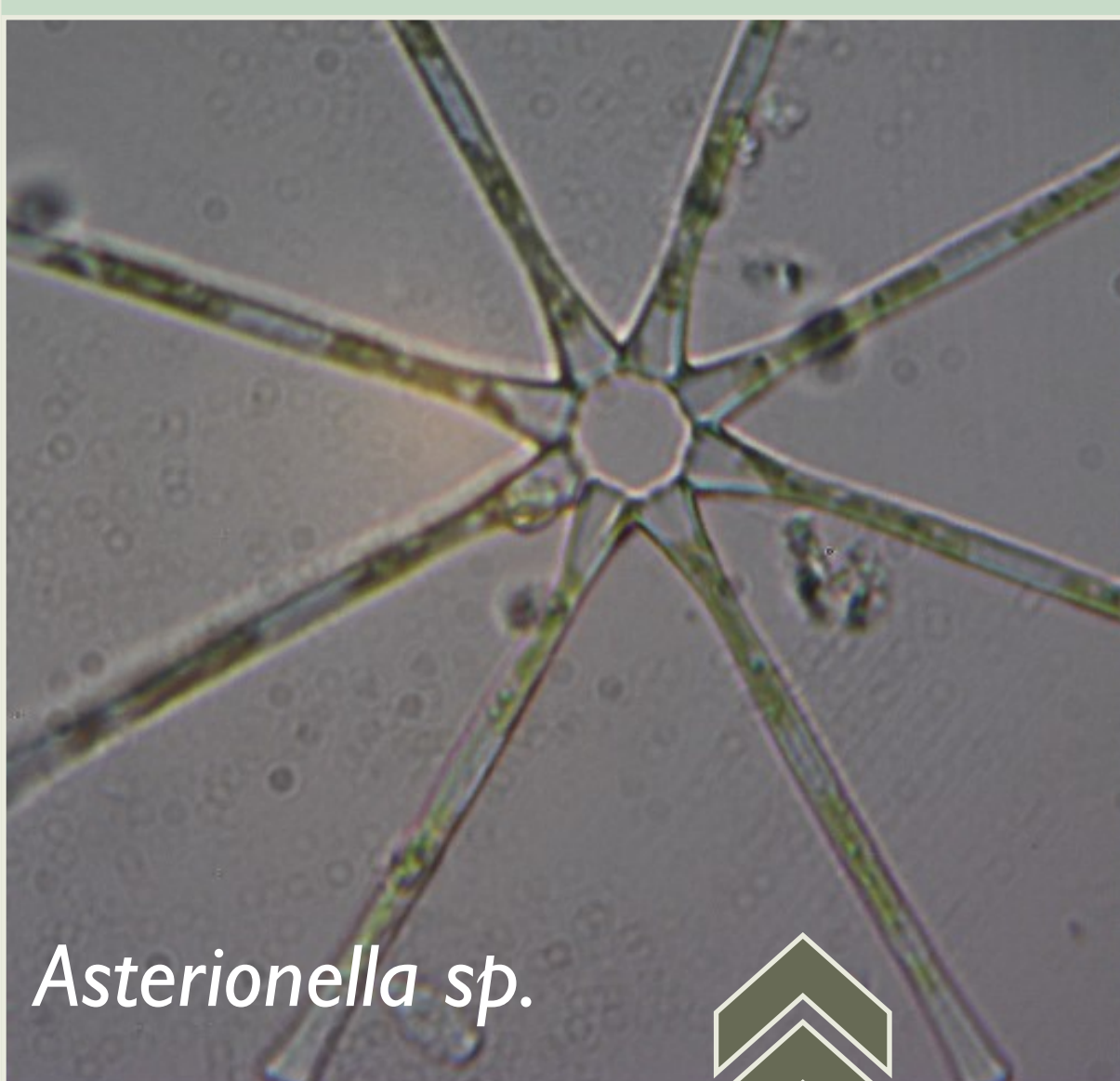
Burncoat Pond



Aphanizomenon sp.

Burncoat Pond was generally dominated by cyanobacteria throughout the warm, summer months and into September. *Aphanizomenon* is a common toxin producing cyanobacterium. This photo was taken September 2019.

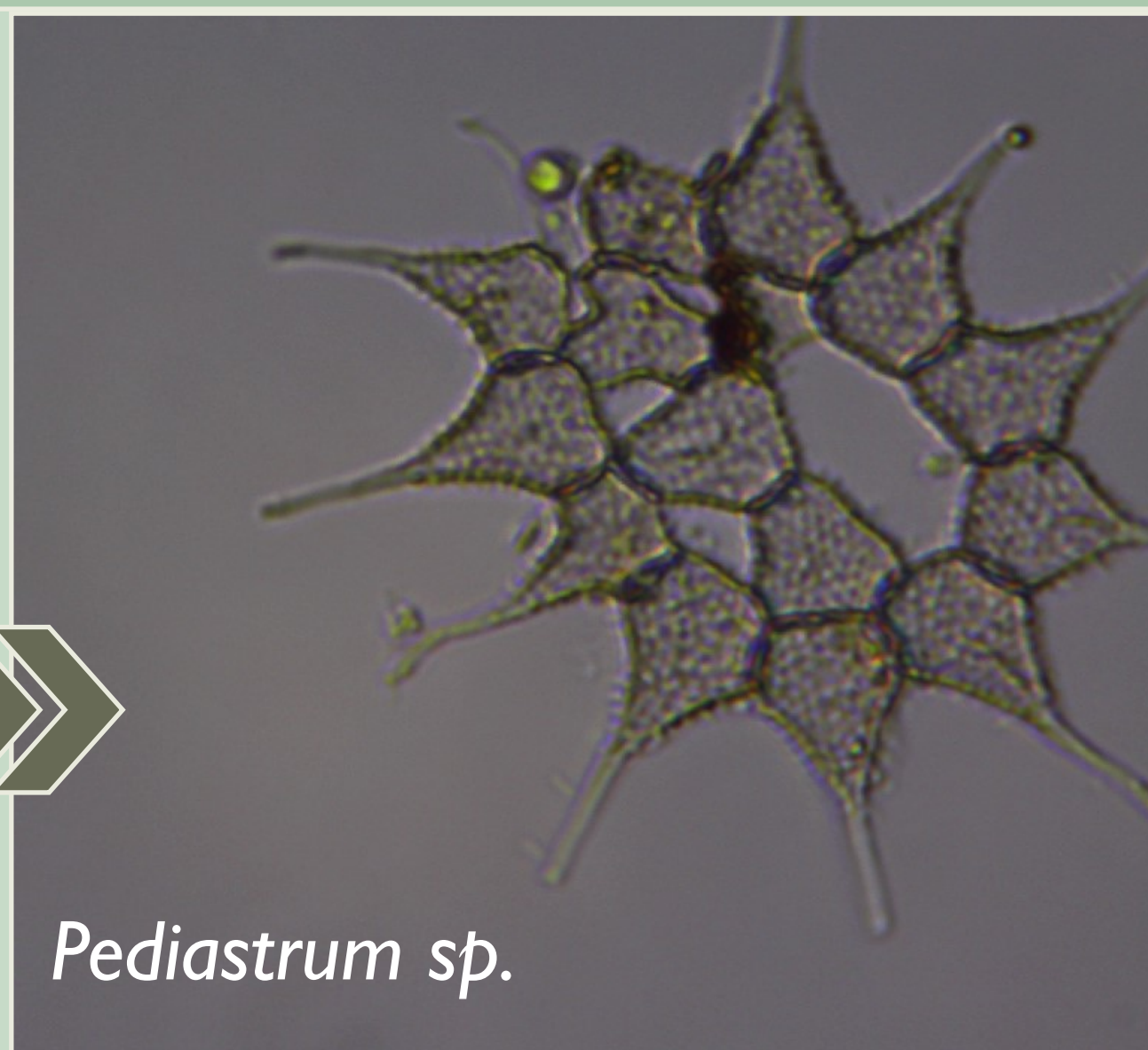
Burncoat Pond is a small, shallow basin, located in a heavily developed area in northern Worcester. It contains no rooted aquatic plants, which compete with phytoplankton for nutrients. As a result, this pond is especially prone to blooms. During almost every sampling event, volunteers found cyanobacteria at Burncoat Pond. It should be noted that this pond is not intended for aquatic recreational activities, and is not tested for cyanotoxins. The volunteers at Burncoat Pond were Hannah Dixon and Jamie Remillard.



Asterionella sp.

Burncoat Pond followed a very common sequence of phytoplankton activity throughout the year. Above is the diatom of the genus *Asterionella*, which we observed in May 2019. Diatoms do not generally produce toxins.

In June of this year, we observed the green alga *Pediastrum*, which is not known to produce toxins.



Pediastrum sp.

In addition to the *Aphanizomenon* shown above, volunteers observed *Microcystis* in Burncoat Pond in September of 2019. This genus is known to produce toxins.



Dolicospermum sp.

We saw fewer green algae and diatoms going into the hot summer months. To the left is a photograph of the genus *Dolicospermum* in August, a cyanobacteria known to produce cyanotoxins.

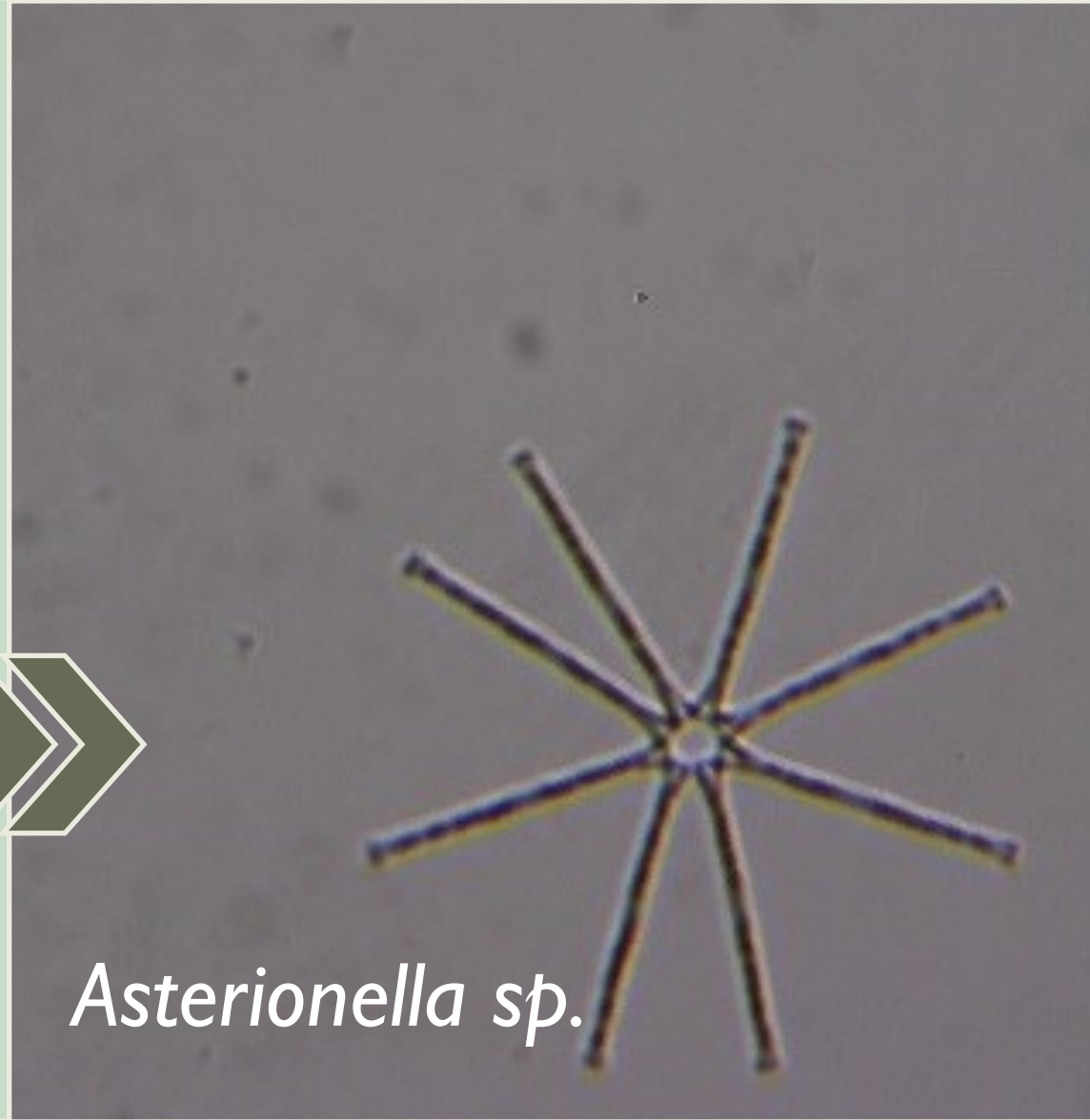


Microcystis sp.



Cladocera sp.

Cladocera is a genus of water flea. Technically zooplankton, these animals can affect the community of phytoplankton through grazing. This observation was made in August of 2018.



Asterionella sp.

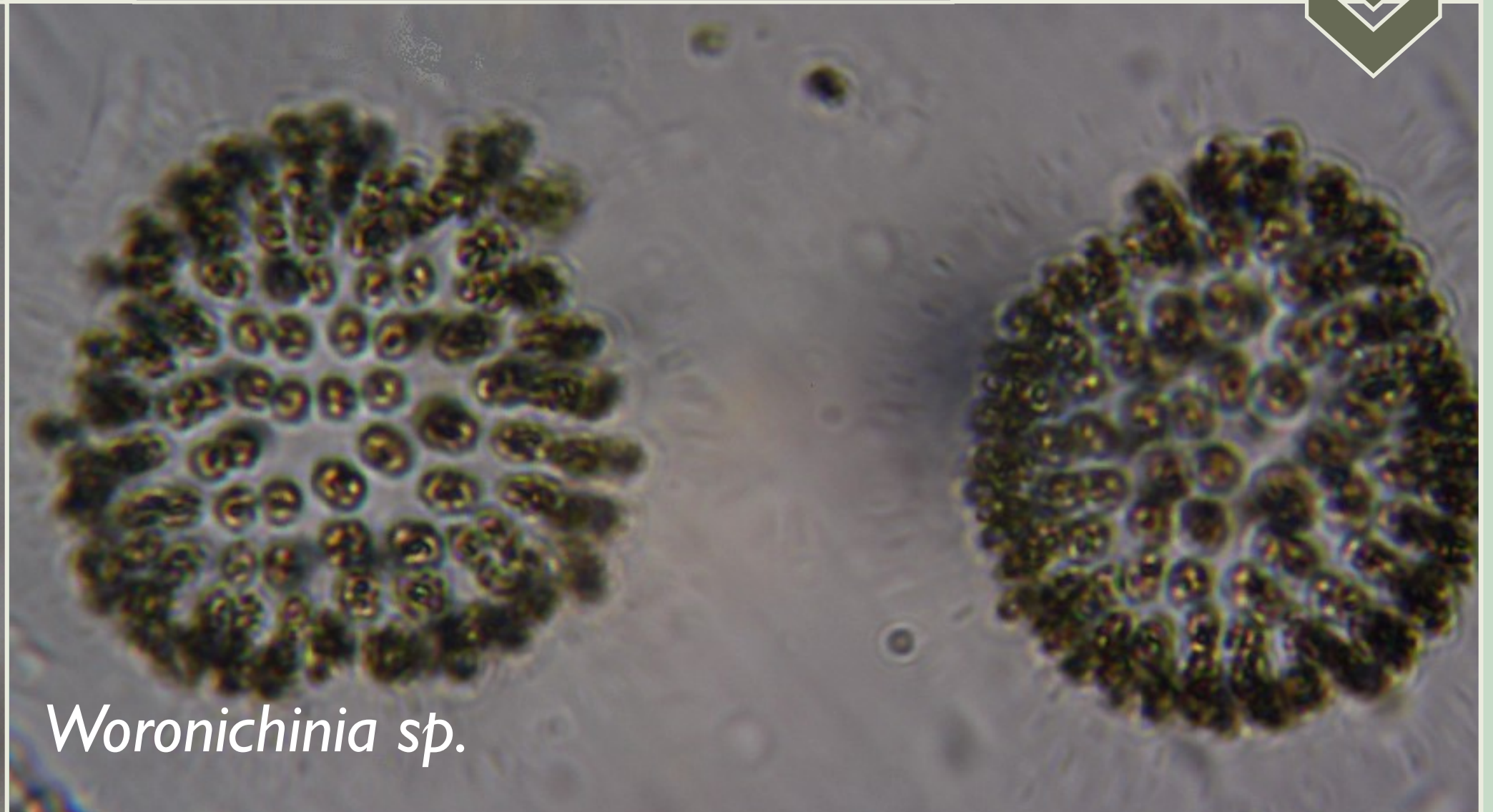
Asterionella is a diatom named for its tendency to join to form a star shape. This observation was made in May of 2019.

Woronichinia is a cyanobacterium often found in Coes. It can produce toxins, though none have yet been detected at the Reservoir. These individuals were found in July of 2019.

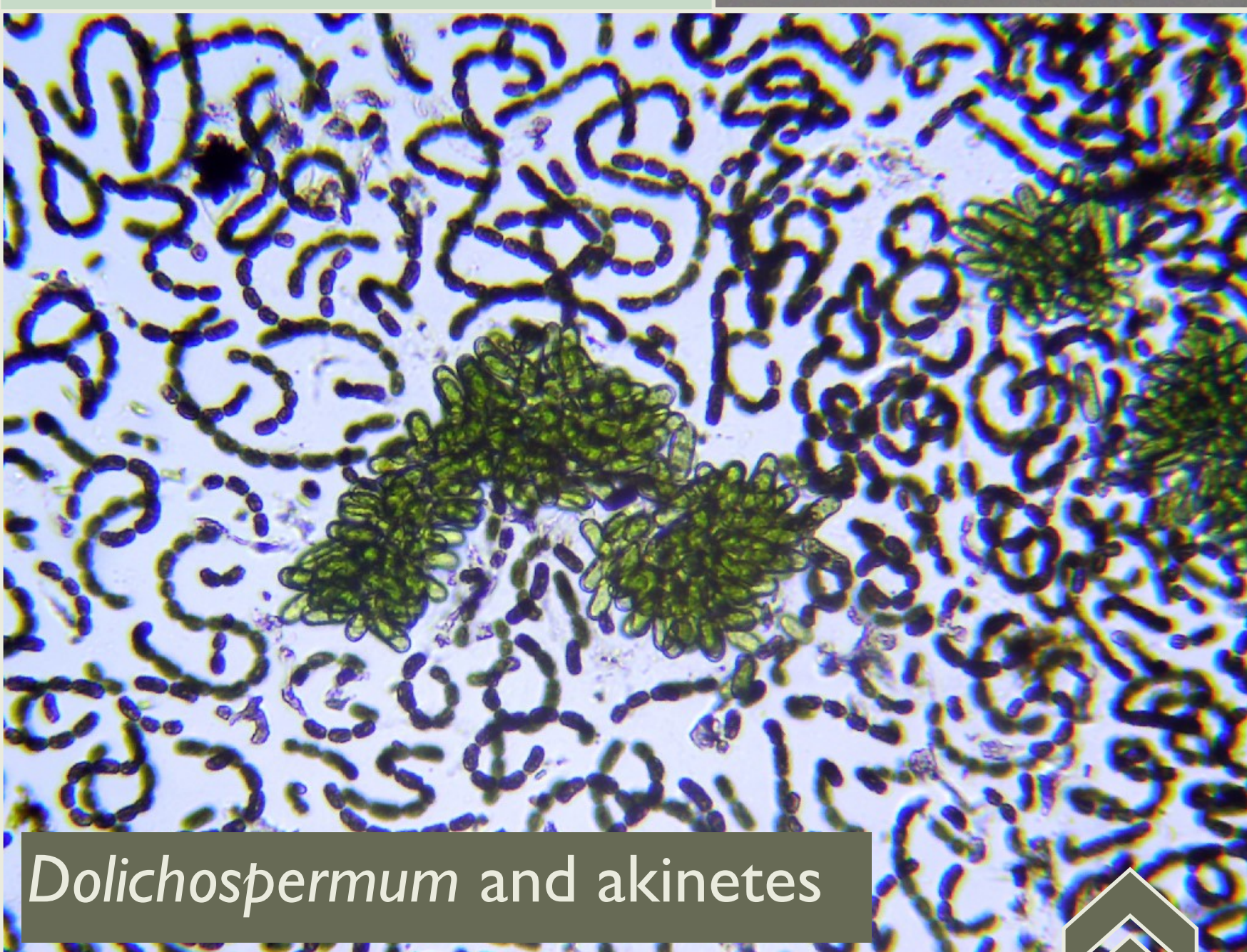
The cyanobacterium *Dolichospermum* can come in many shapes. While it can be curly like in the photo below, it can also make up straighter chains, like in this photo taken in July of 2018.



Dolichospermum sp.



Woronichinia sp.



Dolichospermum and akinetes

This sample was brought to the lab by volunteers in June of 2019 and triggered further investigation. In it we see dense colonies of the cyanobacterium *Dolichospermum* with akinetes, which are dormant cyanobacteria cells that multiply under ideal environmental conditions.

Coes Reservoir is a shallow, 90 acre mill pond at the end of Tatnuck Brook on the western side of the City. It has many stormwater outfalls that empty into the brook and reservoir itself, meaning that it receives a lot of nutrient inputs. Coes Reservoir is managed for HABs by the City of Worcester, and WCMC volunteers help to alert the City to potential problems by identifying the types of organisms present in the planktonic community. Pat Austin and Mary Beth Harrity are the volunteers at Coes Reservoir.

Coes Reservoir



What's next?

The Future of the WCMC

Worcester is on the forefront of monitoring and reacting to Harmful Algal Blooms in our recreational waters, in large part due to our volunteer initiatives. We would like to continue to expand the program, in terms of volunteers trained and geography served, in hopes to generate data that can be used to better understand the local trends that we are seeing and support higher level research nationwide.

Join the WCMC!

Consider joining the WCMC! Volunteers will:

- Gain microscope and water quality sampling skills
- Contribute to a national study on cyanobacteria dynamics
- Report water quality issues and learn how to prevent them
- Meet other clean water advocates and water quality experts

Training and equipment provided. All ages and biological experiences are welcome.



Informational and Training Session: Wednesday, April 22nd, 5:45 pm

Bancroft School Field House, 100 Shore Drive

RSVP @ burmeisterj@worcesterma.gov

Special thanks to the 2019 WCMC Volunteers!

