# Algal Blooms – 2019

This year two algal blooms were recorded in White Lake. The first type of algal bloom which occurred was from filamentous green algae. This bloom lasted, as in previous years, from the end of June until mid-September. Large and small patches of this algae were observed in almost every part of the lake save Hayes Bay and the Village Basin. This is a nuisance bloom which occurs along shorelines and can cover very large areas.

The second type of bloom was from a blue-green alga which was concentrated in the lower half of Three Mile Bay. In September of 2018, there were two blue-green algal blooms which occurred in the same area, but were more extensive covering most of Three Mile Bay and parts of the greater lake. The first of these blooms was certified as toxin producing, the second was not tested, but presumed to likely also be toxic. Note that the Ministry of the Environment policy towards blue-green algal blooms is "MOE regards any cyanobacterial (blue-green algae) bloom as potentially toxic, whether or not toxins are detected in the water upon testing"[1]

We emphasize that the algal blooms observed by our team are the minimum number for White Lake, and there may very well have been others on the lake which went undetected or unreported. Currently only two volunteers are monitoring the 22 $Km^2$ of White Lake, which has a shoreline stretching nearly 100 km!

# Green Algal Blooms

The first algal bloom of the year started in late June and continued until the end of September. This filamentous green algae (Sirogonium) grew in large patches along the shoreline. Nutrients, such as phosphorus, supporting this alga comes from both the sediments as well as dissolved in lake water.

Viewed from underwater, the algae mass forms very large volumes extending from just below the surface of the lake all the way down to the lake floor. Other aquatic plants become enveloped within the growing mass. Over time, the algae die, collapses into itself and falls to the bottom of the lake.

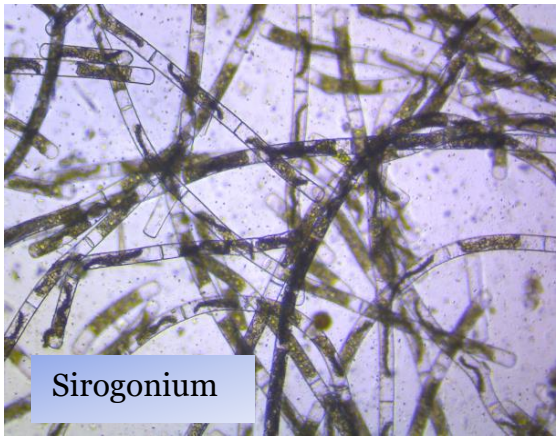
Blooms such as the ones pictured below were common in 2019, as in previous years, all along the western shore of White Lake and also in other areas and along island shorelines and Three Mile Bay. This bloom was essentially lake-wide and similar to blooms which occurred in 2017 and 2018 at the same location.

[1] Algal Blooms in Ontario, Canada: Increase in reports since 1994; J.G. Winter, A.M. DeSellas, R. Fletcher, L. Heintsch, A. Morley, L. Nakamoto, and K. Utsumi (all Ontario Ministry of the Environment scientists); *Lake and Reservoir Management*, 27:107-114, 2011.

Three Mile Bay – July 1, 2019

Waba Island – August 17, 2019

The algae responsible for these blooms is Sirogonium, one of a large family of filamentous green algae found in White Lake. Blooms of filamentous green algae are stimulated by the presence of zebra mussels in White Lake. Zebra mussels concentrate nutrients from deeper parts of the lake and deposit them in shoreline areas where they thrive. Warmer daytime water temperatures, abundant light and nutrients, provide ideal conditions for the propagation of filamentous green algae along shorelines.


Sirogonium

Even with the onset of cooler weather in late September and October, another filamentous green alga of the Zygnema genus thrives where Sirogonium was present earlier in the year. The algae resemble bright green garlands draped over aquatic plant and persists right up to ice formation on the surface of the lake.


Western Shore – October 19, 2019

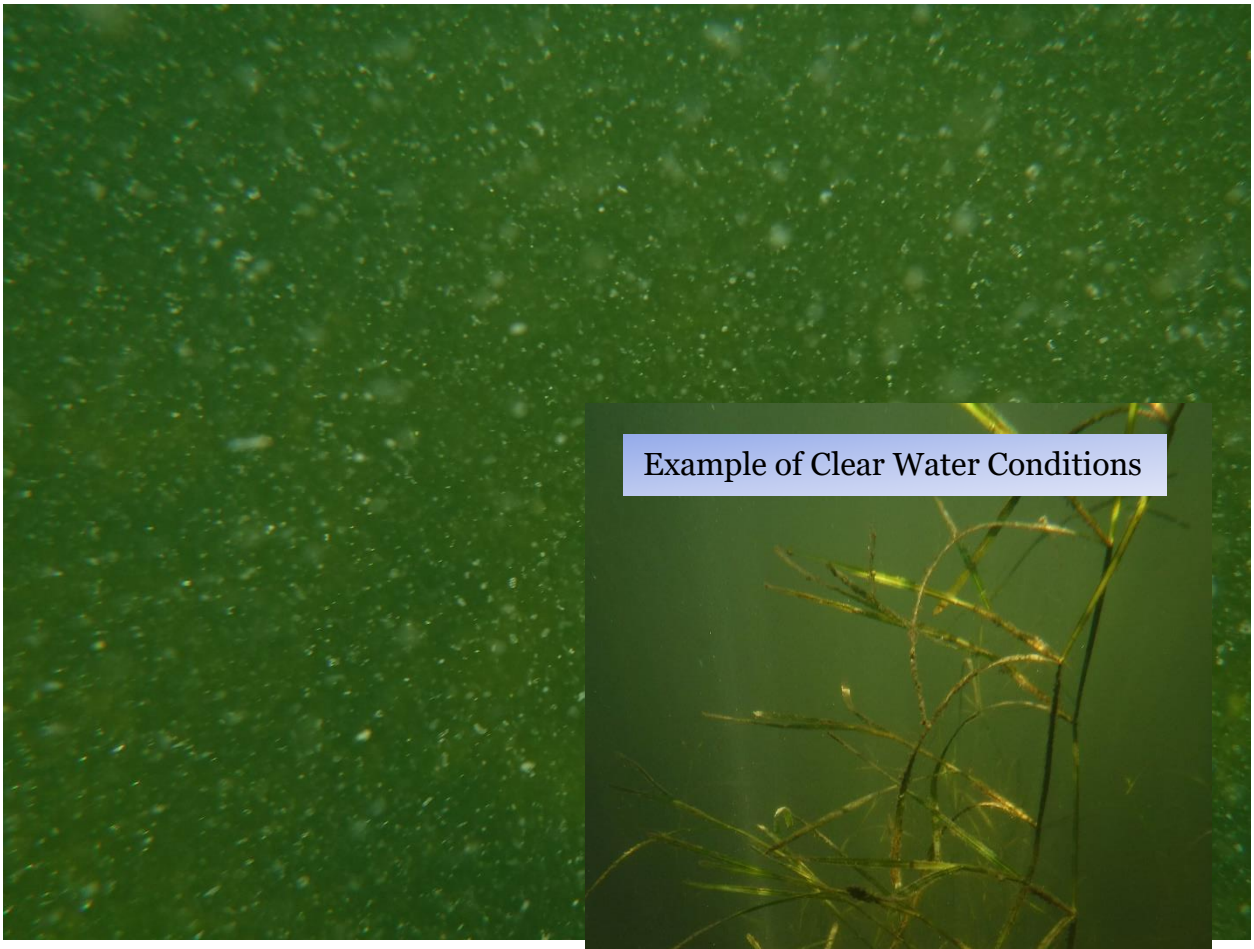

## ***Blue*-Green Algal Blooms**

Blue-green algal blooms are not benign and so warrant special attention. When these blooms occur, they can create a public health hazard and anyone using the lake should be apprised of the seriousness of this issue.

This year, White Lake hosted one blue-green algal bloom. The bloom occurred in the Eastern half of Three Mile Bay and lasted for over a month starting in mid-September.

Although we had identified the blue-green algae as *microcystis*, we did not report it to the Ministry of the Environment or to our local Health Unit. This is because the bloom did not result in a surface scum which signals the large-scale death and decay of the algae. Microcystin toxins are usually released at this stage of the algal bloom.

Instead, the very intense algal bloom filled the water column in this part of the lake. The water was visibly opaque and full of clusters of blue-green algae. The photos below are underwater photos of the affected waters. A comparison photo showing how the water should look at this time of year is provided for comparison purposes. The identifying photomicrograph of the algae itself is also provided.



Example of Clear Water Conditions

Microcystis: Three Mile Bay 2019

It is possible that local conditions such as wind, temperature, etc. moderated this blue-green algal bloom preventing it from developing further before it has a chance to dissipate.

In 2018, there were two such blooms in Three Mile Bay, one of which was determined to be toxic and the other, although not tested, was potentially toxic as well. It may be no coincidence that these blooms took place on the most altered shoreline on White Lake.

Note that monitoring the extent and longevity of an algal bloom requires much time and effort. Although we try to provide current up to date information, we would need more volunteer help to provide a complete picture of any algal bloom. For blue-green blooms, the Leeds, Grenville and Lanark District Health Unit provides a useful guide for individuals to use in assessing when water becomes safe to use after a toxic bloom is identified.

We must keep in mind that the "Ministry of the Environment regards any cyanobacterial (blue-green algae) bloom as potentially toxic, whether or not toxins are detected in the water upon testing". See literature reference above.

Photo by Sue Munro