White Lake Algal Blooms – 2018

This year five algal blooms were recorded. Three of the blooms were from green algae and two were blue-green. The first blue-green algal bloom contained microcystin toxins at a concentration of 25 ppb (parts per billion). This concentration greatly exceeds the limit for drinking water (1.5 ppb) and also exceeds the limit of 20 ppb for recreational use. The second blue-green algal bloom was reported to the Ministry of the Environment but was not tested by the MOE since it is currently limiting each lake to one sampling per year. The collection and analysis of one sample costs nearly $1,000 and the MOE does not have the resources to follow up on every report. However, the bloom was registered at the Health Unit and classified as *Microcystis* blue-green algae based on photographs of the bloom and photomicrographs of the algae itself which we submitted to the MOE. It is very likely that the second bloom, which was as extensive as the first, was also laden with toxic microcystins. It is worth noting that our group has correctly identified the type and species of all algal blooms which have been documented since the WLPP was founded.

We emphasize that five algal blooms 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!

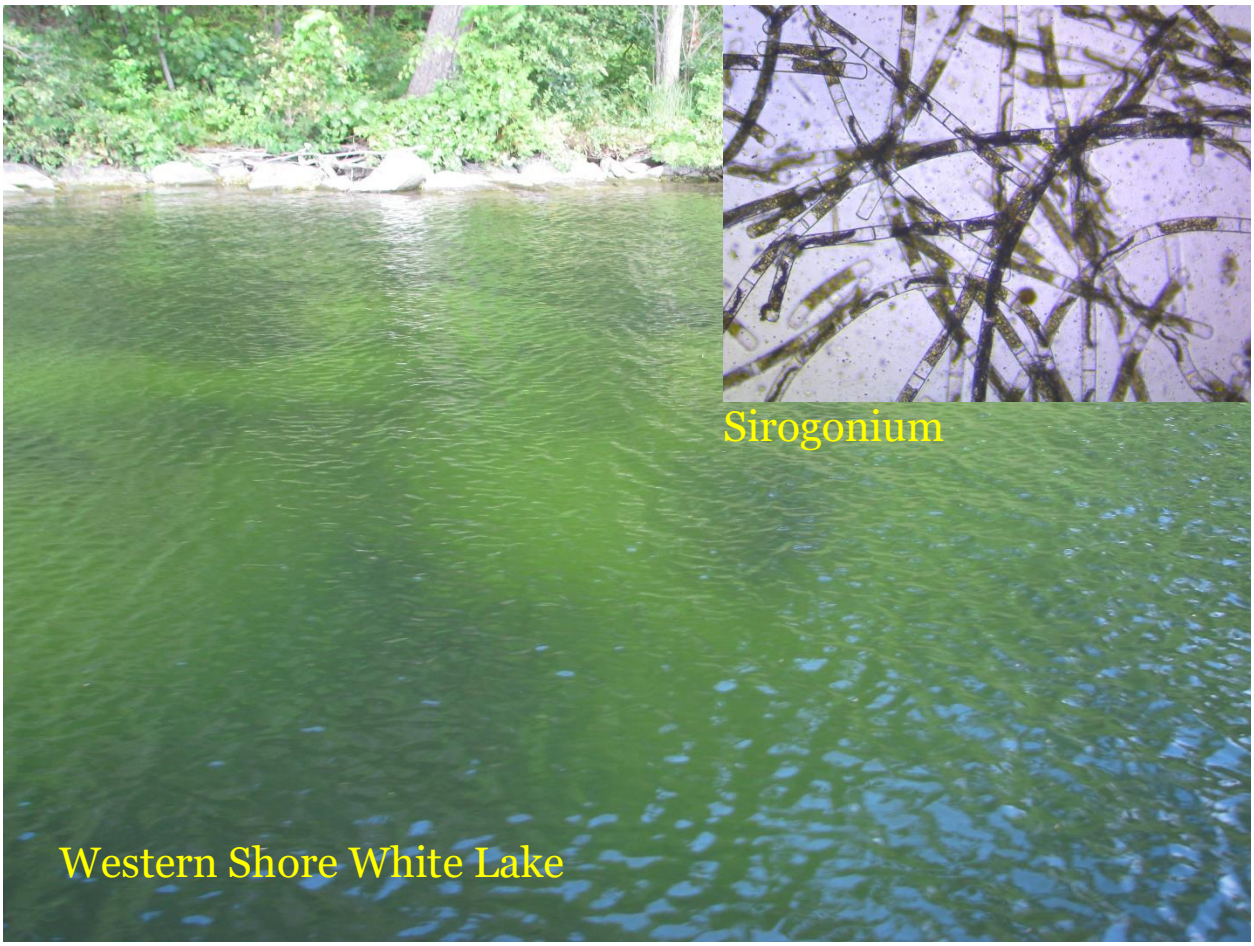
1.3a Green Algal Blooms

The first algal bloom of the season occurred on or about June 10, 2018. This bloom was found in a more remote part of White Lake but was very heavy and extensive in the area of Long Lake Creek East all the way from the creek itself to the point where it met the outflow or Darling Round Lake. This species of green algae is relatively simple to identify because as it dies and decomposes it floats to the surface to form large masses which are often referred to as 'elephant snot'. It is also easy to identify under the microscope.

The second bloom occurred near Sunset Bay extending in patches for about 1 km from the boat launch. The bloom was most intense near the estuary of Boundary Creek. It was evident that wind and wave action were in the process of dissipating the floating masses of algae when it was observed.

The third green algal bloom started in mid-August and continued until the end of September. This filamentous green algae (Sirogonium) grows 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 remains attached to standing aquatic plants resembling bright green garland.



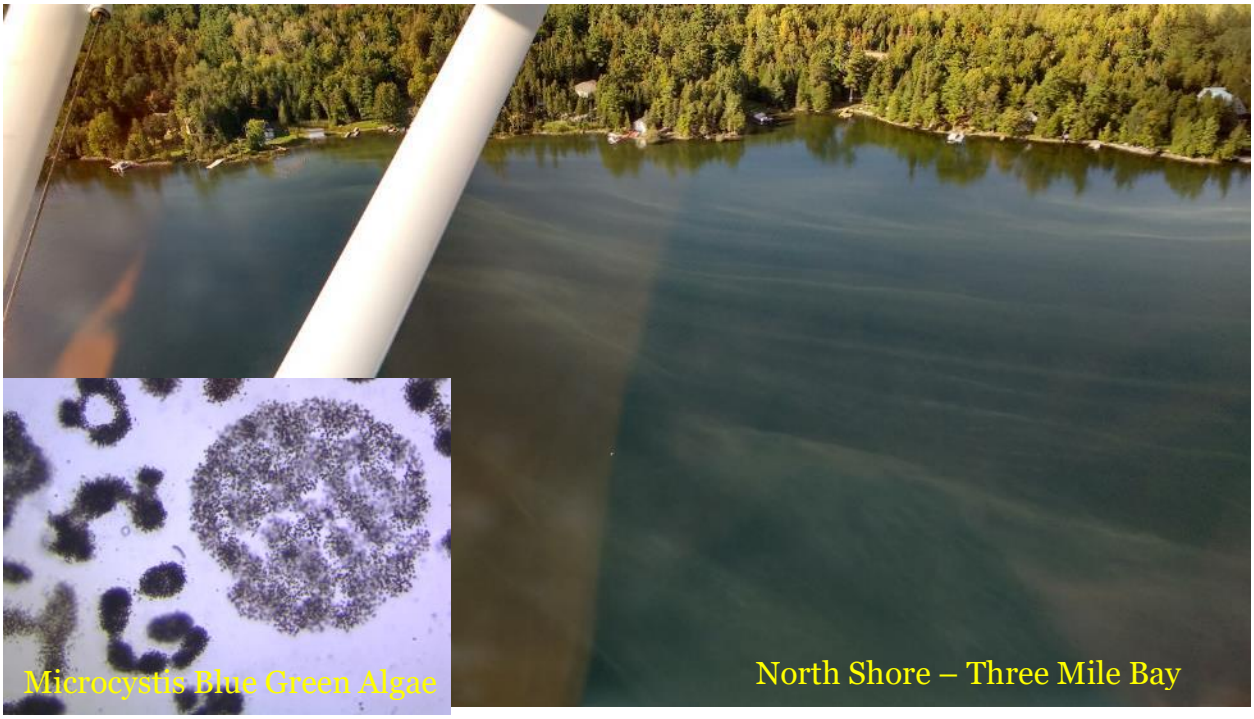
Blooms such as the one pictured above were common in 2018 all along the western shore of White Lake and also in other areas and along island shorelines. This bloom was essentially lake-wide and follows a similar bloom which occurred in 2017.

Blooms of filamentous green algae are a consequence of 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

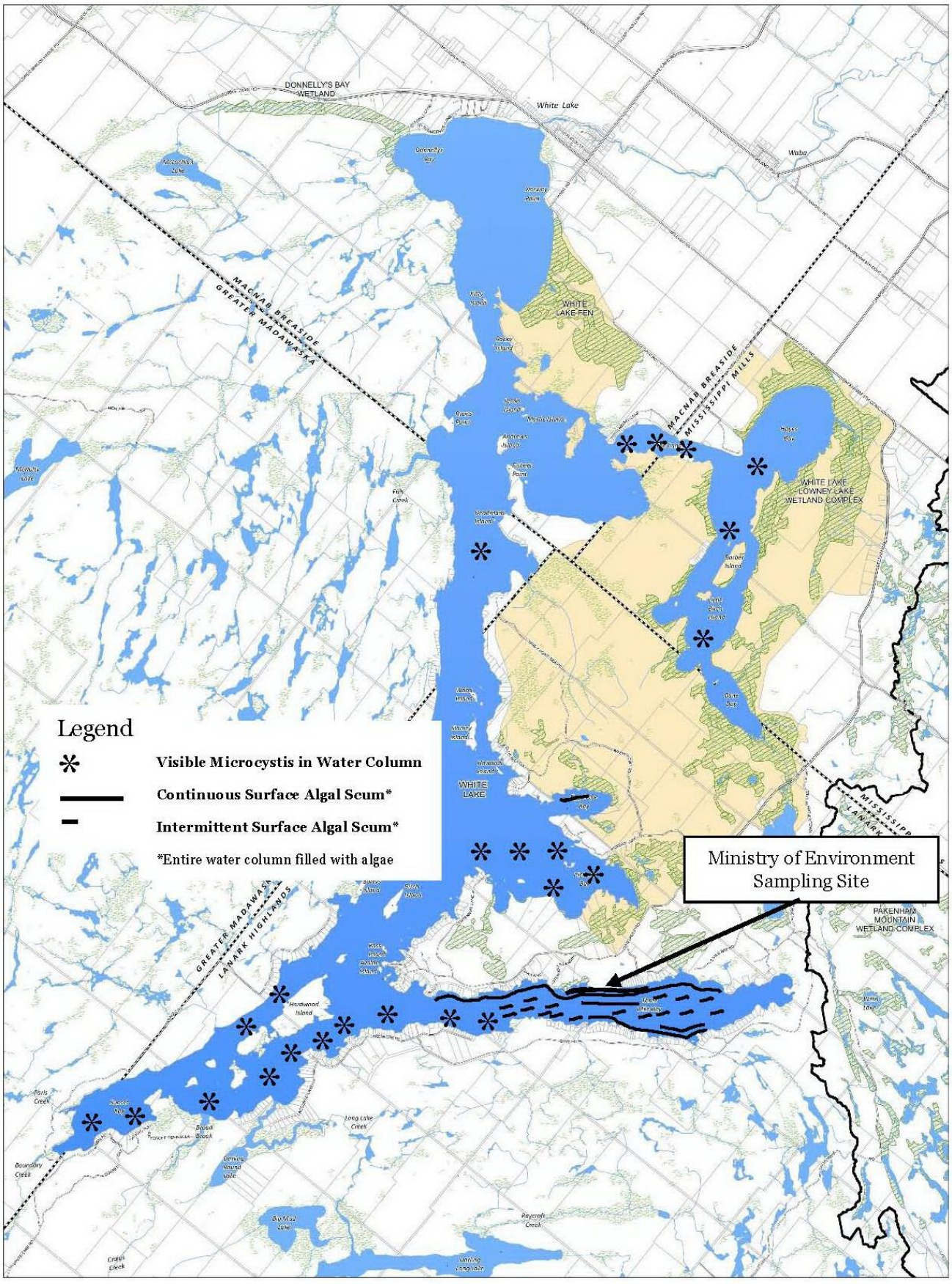
1.3b Blue-Green Algal Blooms

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 two blue-green algal blooms. It may be no coincidence that these blooms took place on the most altered shoreline on White Lake.

The first bloom was discovered on September 13, 2018. The photos below show the nature of the bloom and its appearance both close up and from above in a float plane.



Extent of September 13, 2018 Microcystis Blue Green Algal Bloom



The map above shows the extent and distribution of the September 13, 2018 *Microcystis* blue-green algal bloom. The algal bloom was most intense on the north shore of Three Mile Bay, but was present right across to the south side of the bay. In most of Three Mile Bay colonies of *Microcystis* were clearly visible from the surface of the lake all the way down to the lake bed.

In another part of the lake, a much smaller but similar bloom was present on the north shore of Thumbnail Bay. Elsewhere (*), smaller populations of *Microcystis* were observed, but these had not yet reproduced to the point of producing surface scum. The bloom lasted approximately 10 days at which point the algae had dissipated.

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.

A second blue-green algal bloom was observed on October 10, 2018. Using microscopy, we identified this bloom as *Microcystis*. The occurrence of this bloom as well as photomicrographs of the algae was reported to the Ministry of the Environment. An incident number was assigned, but the MOE declined to return to White Lake for another round of sampling and analysis. Citing costs, the MOE informed us that they are limiting samplings to one per year per lake.

Although we have no data to show that the bloom was toxic, it is highly likely that it was considering that the nature of this bloom was the same as the September 13, 2018 bloom and occurred at the same location.

We know from samplings along the north shore of Three Mile Bay that this bloom was as extensive as the September 13, 2018 bloom.

This bloom persisted in the water column for several weeks after surface scum dissipated. Filtered water samples showed that even after three weeks *Microcystis* not only dominated the algae profile in lake water, it was in fact the only algae present! Note that zebra mussels promote the growth of *Microcystis* blue-green algae.