



## White Lake Algal Blooms – 2022

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During 2022 two algal blooms were recorded. The first type of algal bloom which occurred was from filamentous green algae. This bloom lasted, as in previous years, from mid-June until mid-September.

The second type of bloom was from blue-green algae which covered parts of the lake including Three Mile and Pickerel Bays and extending into the main water body (See Appendix 1). 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”<sup>1</sup>

The authors 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. No Provincial or local authority monitors water bodies for algal blooms. The Ministry of the Environment and local health units respond only to reports from the public at large. Currently only two volunteers are monitoring the 22 Km<sup>2</sup> of White Lake, which has a shoreline stretching nearly 100 km!

### **Green Algal Blooms**

The first algal bloom of the year started in mid-June and continued until the end of summer. This bloom was of a filamentous green alga, which grew in patches along the shoreline.

In 2022, the filamentous green algal bloom was less extensive than in previous years with fewer occurrences than in 2021. The most serious and largest blooms were found immediately adjacent to newly de-treed and landscaped cottage lots, and areas of severely altered shorelines.

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<sup>1</sup> 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.

Algae bloom when conditions are right for its rapid and uncontrolled growth. These conditions include the presence of excess nutrients (phosphorus), favourable water temperature and clarity, sunlight, and the action of wind and waves. For White Lake, the presence of zebra mussels is an additional factor promoting the growth of filamentous green algae. These mussels tend to concentrate nutrients from open waters to the shoreline area where filamentous algal blooms occur. The severity of the algal bloom resulting from the sum of the above factors can be intensified by the runoff of nutrients from areas of shoreline which have been de-treed or altered in such a way that nutrients can enter the lake unmoderated by the presence of trees and other natural shoreline vegetation which prevents or slows entry nutrients into the lake.

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 sinks to the bottom of the lake.



This alga does not produce toxins in the water and so the bloom is considered a nuisance bloom. However, when large mats of algae die and decompose, the water column can become anoxic (no oxygen) causing the release of phosphorus trapped in sediments. Sediments contain about 200,000 times the concentration of phosphorus found in lake water. The released phosphorus can trigger a secondary bloom which could be larger and last longer than the original event.

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

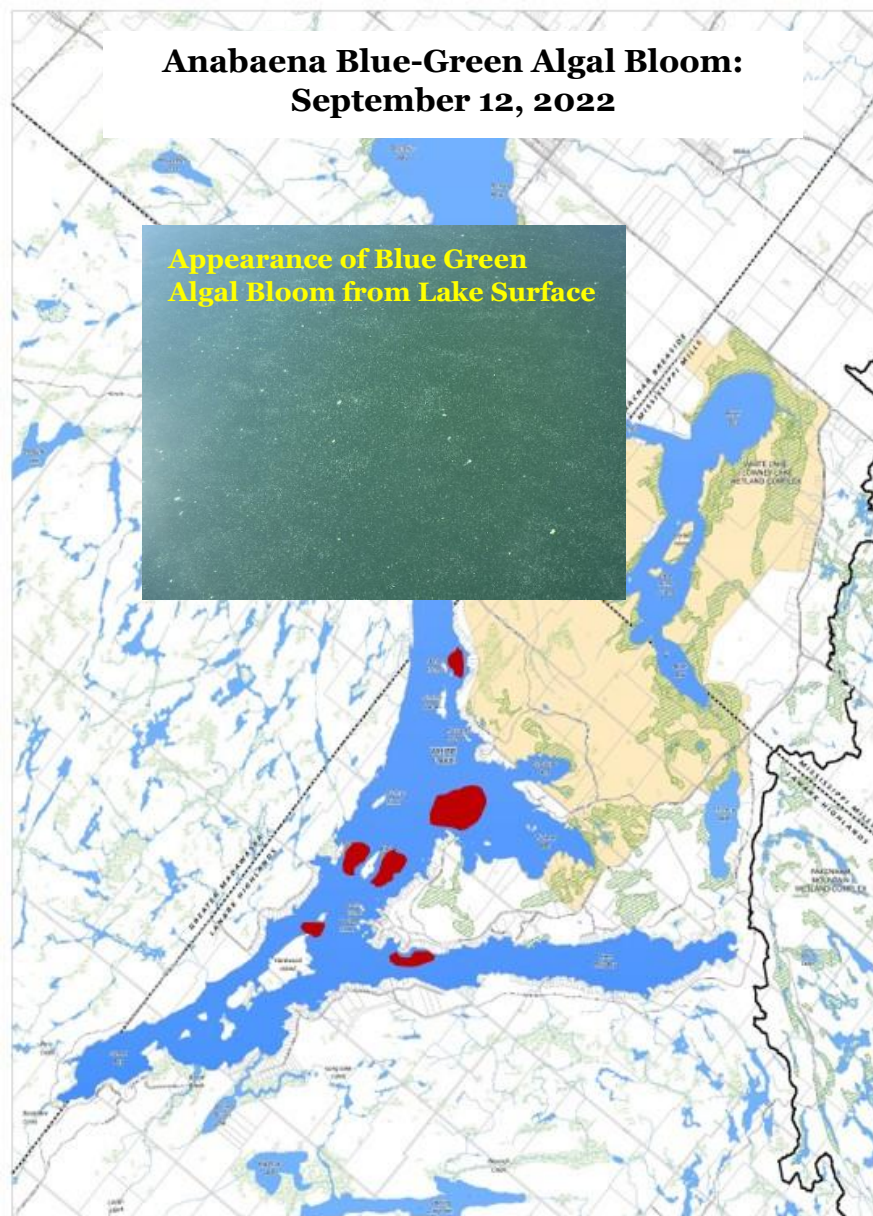
Blue-green algal blooms are not benign and so warrant special attention. When these blooms occur, they can create a public health hazard and anyone using the lake should be apprised of the seriousness of this issue.

In 2022, White Lake hosted one blue-green algal blooms detected on September 12, 2022. The bloom was confined to about 6 patches located in the main water body of White Lake, as shown on the map below. The bloom was identified as anabaena and dissipated within a week.

It should be noted that both anabaena and microcystis are present in all parts of the lake. During most of the water sampling season, it is possible to observe specimens of both of these algae in the water column, usually at very low concentrations

We know from the scientific literature that the presence of zebra mussels favours the propagation of microcystis over anabaena blue-green algae. However, in deeper waters, it may be possible that anabaena could have the advantage over microcystis for two reasons: 1) there are fewer or no zebra mussels present in deeper waters where the lake bottom is muddy; 2) anabaena has the ability to fix nitrogen from the atmosphere; microcystis does not. Both are capable of moving up and down the water column during the day using gas vacuoles, which are like air bubbles held within the algae.

The occurrence of algal blooms is complicated and dependent on a number of factors including wind, temperature, sunlight, water depth, the presence of different phosphorus and sulphur containing compounds, as well as nitrate and nitrite concentrations, to name just a few



## Lake Scum

On May 31st 2022, large areas of the main water body of White Lake were covered with lake scum. At first glance, the scum appeared to be an algal bloom, but on closer examination turned out to be a combination of flotsam from three sources brought together by a gentle wind on the lake surface.

The scum was composed of floating tree pollen grains intermixed with the white, fluffy down released by three in the *Salicaceae* family which includes willow, aspen, cottonwood and poplar trees. The down contains seeds. The third component was discarded exoskeletons (called *an exuviae*) left behind by billions of flies and other insects hatching into adulthood on the lake surface.

It took several days for the action of wind and waves to clear the surface of the lake sending the lake scum to downwind shorelines or sinking to the lake bed.

