Preventing a Bloom of Blue Green Algae

Clear water in a lake is highly valued for aesthetics, recreation and a reliable water supply. Protecting those who use the resource of the lake is a high priority. Residents of McKellar Township were alarmed in the summer of 2020 when blue green algae (BGA), also known as cyanobacteria, was identified in Lake Manitouwabing. No toxins were found in the samples.

In lakes, the main plant growth consists of algae, or phytoplankton, which functions to oxygenate earth's atmosphere. Photosynthesis in algae converts the energy of sunlight into food, forming the base of the food web. Most of the growth takes place near the lake surface where the sunlight is stronger. There are different types of algae (such as green algae, golden brown algae) but BGA has an advantage over other algae because it contains gas vesicles, tiny floatation devices which allow it to float to the surface and obtain a position that is most advantageous to exposure to light for photosynthesis. A bloom, or overgrowth, of BGA blocks the light, and thus the growth of other plant species, and may alter the diversity present in the lake. Algae and plants that die in the lake sink to the bottom, using up oxygen as they decompose. Oxygen levels can drop sufficiently to affect the survival of aquatic wildlife. BGA blooms may also release cyanotoxins, which can cause serious and occasionally fatal liver, digestive, neurological and skin diseases in humans and animals.

The rate of plant and algal growth in the lake is primarily dependent on the availability of nutrients. Eutrophication is the term used to describe lakes that have over-fertilization of nutrients. Dissolved phosphorus is the main nutrient that affects the amount of algal growth in a lake. Humans can decrease the chances of a BGA bloom by actively controlling the nutrients, phosphorus in particular, that are generated by human activity and deposited in the lake.

Nutrients are present in human and animal waste and in fertilizers. Phosphorus is present at concentrations thousands of times greater in sewage than in lake water. Phosphorus can generate five hundred times its weight in living algae. Therefore, human activity such as poor septic maintenance, agricultural runoff, use of grass fertilizers, and clearing of large plant growth near the lake shoreline by converting forested lands to grasslands in settled areas, promotes an increased likelihood of a bloom. Clearing shoreline plant growth in the water, and the land plants and trees near the water also removes the land's natural ability to absorb phosphorus and prevent it from flowing into the lake from the land.

Failing to control algal growth by controlling nutrient seepage into the lake has many consequences. Swimming is unpleasant in the areas of algal slime that may be washed ashore. A thick carpeting of algae on the water can drastically reduce light penetration, causing a change in the fish species present or, in severe blooms, fish and aquatic plant life may die off. Both domestic and industrial water filters on lines taking water from the lake have to be changed more frequently. Some types of BGA produce toxins. Sterilization by boiling the water, for example, causes the algae to die and release more toxin, increasing its toxicity to humans, pets and other animals. When there are high levels of nutrients from human or animal waste, there are also high concentrations of bacteria such as Cryptosporidium or Giardia, notorious for causing waterborne disease. Recreational use of the lake slows down, affecting overall enjoyment of the lake and the businesses that are dependent on recreation.

Decreasing our carbon footprint can also help mitigate the overgrowth of BGA in our lakes. Climate change, bringing warmer water temperatures and a longer ice-free season on a lake, warms the temperature of the lake. BGA blooms are more likely in warmer waters, especially in late summer and early fall.

If you see a BGA bloom, here are the steps to take:

Report suspected BGA blooms to the Ministry of Environment and Climate Change Spills Action Centre at the TIPS line 1-866-663-8477 OR at 1-800-268-6060 and the Public Health Unit. Also take photographs, record what the weather has been over the past week (winds, temperature, precipitation) and the GPS location of the bloom, take a sample and put it in the fridge or freezer. MLCA will help with sampling if possible – email us at

mlcawatertesting@gmail.com

Sources – The Algal Bloom by David W. Schindler and John R. Vallentyne (2008). The University of Alberta Press.

Hans W. Paerl and Jef Huisman[2], Blooms Like it Hot, *Science* 04 Apr 2008: Vol. 320, Issue 5872, pp. 57-58.