White Lake at a Glance

Assessing the health of White Lake is a complex exercise which requires scientifically gathered data and expert interpretation of this data. However, nature has a clever way of summarizing all of this data and making it obvious to us when things are not going well. She does this by creating algal blooms when the nutrient content of the lake water becomes too high. Although the presence of algae in a lake is normal and beneficial to aquatic life, excess algae in the form of blue-green algal blooms can in some cases produce toxins harmful to us and can even cause serious illness if ingested. Blue-green algal blooms have been documented in White Lake every year since 2013, and some of these blooms have produced toxins. Algal blooms can also be detrimental to fish life and make the lake unattractive due to poor water colour, and the sight of strings of algae clinging to rocks and vegetation. Left untended, a lake could enter a phase of decay where dangerous algal blooms occur more frequently and last longer and eventually lead to the 'death' of the lake itself. Is there cause to worry about White Lake?

White Lake is a shallow lake with an average depth of 10 ft (3.1 M) and a surface area of 22.7 square kilometres. The watershed feeding White Lake is only 211 square kilometres, which is a relatively small area of forest and farmland providing water to the lake. As it turns out, the volume of White Lake is flushed with new water less than once per year. Most lakes are flushed by several lake volumes per year. This means that over the course of a year, some lake water is not flushed out of White Lake resulting in the year over year accumulation of nutrients and other materials in lake sediments.

Over its entire surface area, 90.7% of White Lake has been designated as littoral, a term which means that most of the lake is comprised of marshes or areas considered as shoreline subject to wave action and/or the dense growth of aquatic plants. Consequently, White Lake is classified as a biologically productive lake which is one that produces large quantities of algae, phytoplankton, zooplankton, water plants and aquatic animals such as fish. This can be a good thing unless the lake becomes too productive; then it begins to fill up or, in technical terms, becomes eutrophic.

Phosphorous is a common element and can find its way into the lake from many sources, both natural and as a result of human activity. Natural phosphorus sources include airborne dust and pollen, the dissolution of phosphorus-containing rocks, rainwater run-off, erosion, and the released of stored phosphorus from sediments.

Humans can also contribute significant amounts of phosphorus to the lake. Domestic septic systems and most commercial sewage treatment plants do not remove phosphorus, which then leaves the treatment system and eventually migrates to the lake, especially if there are no trees or shrubs present between the septic system and the lake to absorb released phosphorus. The phosphorus in septic systems comes from phosphorus-containing detergents and cleansers and from human waste. Other man-made sources include fertilizers, pet and farm animal waste.

Phosphorus from all sources concentrates in the bottom sediments of lakes which can contain phosphorus levels hundreds of thousands of times higher than the water above it. Release of sediment-bound phosphorus occurs when the oxygen content of water above the sediments is low and nearing zero as a result of oxygen consumption from the decay of algae and vegetation. Conditions such as these

have been observed in parts of White Lake. The disturbance of lake sediments in shallow areas of the lake by boats, and shoreline erosion from the wakes of fast, large, and wake-boarding boats operating too close to the shoreline can also release sediment bound phosphorus into lake water.

Phosphorus is an element essential to aquatic life, but in excess can cause serious negative consequences for a lake ecosystem. Since 2014, Environment Volunteers have been monitoring White Lake water quality at nine separate sites covering all parts of the lake. Measured are phosphorus, calcium and chloride concentrations, oxygen content, temperature, water clarity and planktonic life. Loon and cormorant populations are monitored and algal blooms are observed, studied and reported to Government Agencies. To find out more about our observations and findings, you are encouraged to read our annual Water Quality Monitoring Reports, Special Reports, and Environment Bulletins which can all be downloaded from the White Lake Science and Information website.

In 2016 the lake was invaded by zebra mussels which are now present in vast numbers in all parts of the lake. Our study results confirm published accounts showing that the presence of zebra mussels alters the chemistry of the lake. Of particular interest is the significant increase in water clarity resulting from the filtering effect of zebra mussels. The total phosphorous levels measured in the lake water decreased by about 50 percent when compared to values obtained prior to the arrival of zebra mussels. The much lower levels of total phosphorous found in the lake since 2016 is entirely due to the transfer of phosphorous (in plankton) from the water column to near-shore sediments by filter-feeding zebra mussels, a process which encourages green and blue-green algal blooms to occur. The effects of zebra mussels as well as climate change are only two of the multiple stressors affecting White Lake which, taken together, make the lake more susceptible to algal blooms due to human activity.

White Lake is by its very nature a sensitive lake. Many government and biological assessment reports going back to the 1970s state that White Lake is on the cusp of becoming eutrophic and needs to be cared for by those who use it and enjoy it. We cannot influence natures input of phosphorus to White Lake, but there is much we can do to limit ours and thus protect its natural beauty. Restoring the natural shoreline, eliminating the use of fertilizers and phosphorus containing products, requiring septic system inspections and upgrades, preventing shoreline erosion and controlling development along the shoreline can contribute to keeping the lake in good condition. All four Municipalities which border White Lake need to collaborate and harmonize bylaws on issues related to the lake and they also need to carefully scrutinize any development plans which could threaten White Lake, which after all belongs to all of us as well as to future generations.

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