



WHITE LAKE Property Owners Association
Preservation Project



Summary and Highlights

Water Quality Monitoring Program and Research Activities 2020



“Loon Spirit” by Joyce Benham



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2020 Water Quality Monitoring Program and Research

Summary and Highlights

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1. Water Quality

Water quality is a term which can mean different things to different people. Depending on your interest, it could refer to clear water, good fishing, or water suitable for drinking free of toxic chemicals or pathogens. In fact, it is all of these and more. Wikipedia defines it as “the chemical, physical, and biological characteristics of water based on the standards of its usage. The most common standards used to monitor and assess water quality convey the health of ecosystems, safety of human contact, and condition of drinking water”.

For most users of White Lake, good water quality refers to the lake’s suitability for recreational activities and its aesthetic appeal.

The Environment Volunteers monitor a number of parameters which are indicative of water quality and report on these annually. Data obtained over a period of years is also studied for long and short-term trends. A detailed assessment of water quality can be found in our full reports available on the [White Lake Science and Information Website](#).

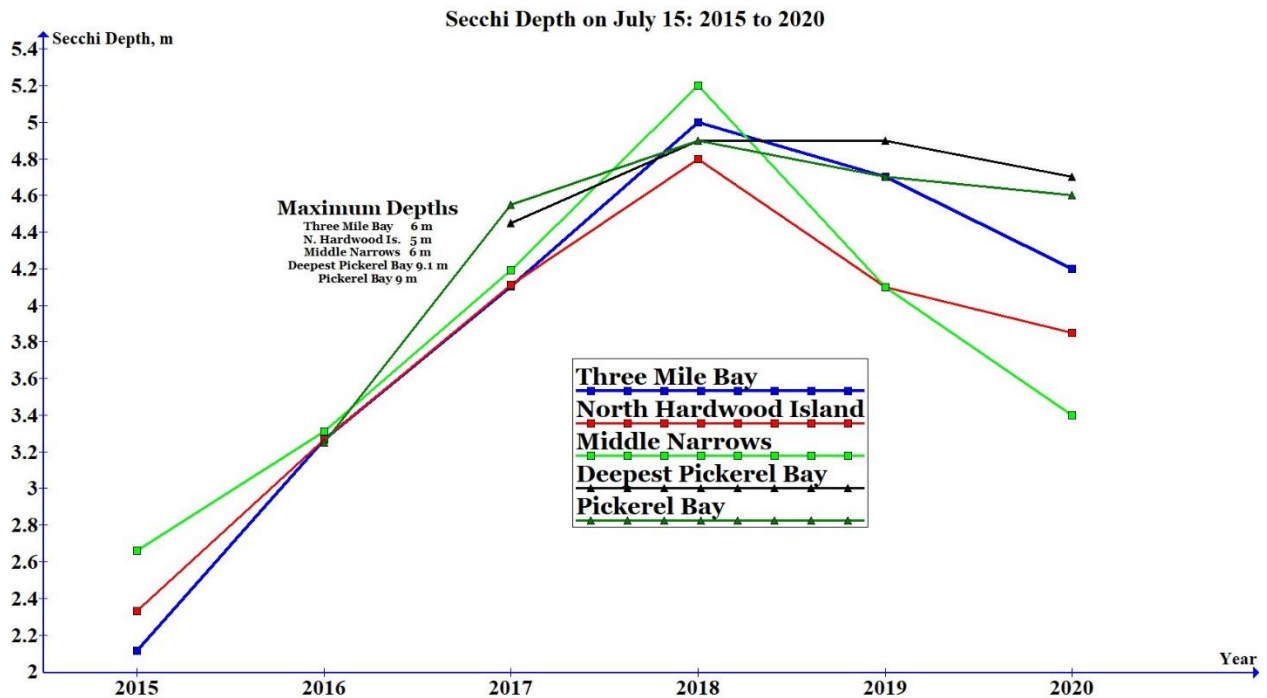
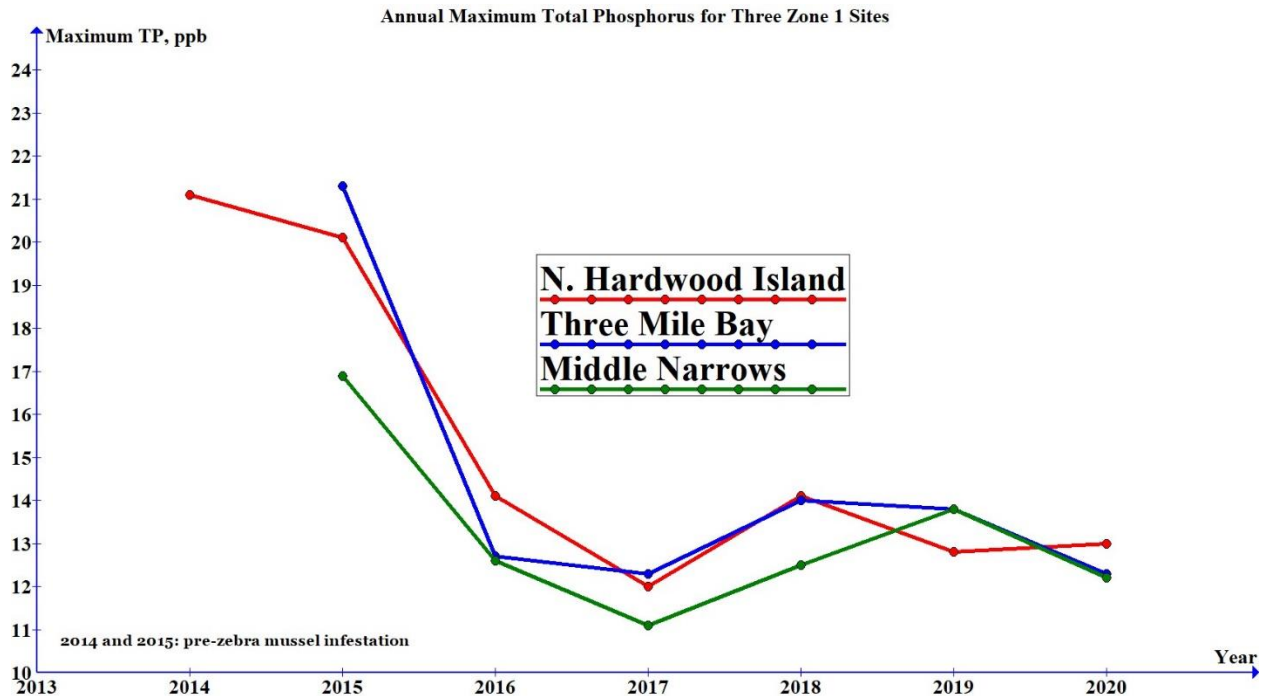
We report here on only a few parameters which are indicative of changes occurring in White Lake as a result of both natural and human factors.

2. Total Phosphorus and Water Clarity

For over seven years we have been monitoring nutrient levels in White Lake in the form of total phosphorus and also keeping track of water clarity. These two parameters have been shown not to be directly related, mainly because of the method used to measure total phosphorous content of White Lake waters.

The defining event effecting both of these parameters was the explosive infestation of White Lake by zebra mussels starting in 2015.

This invasive species has changed the cycling of nutrients in White Lake and for this reason has to be included in any further discussion of water quality in White Lake.



The two graphs above show that since the arrival of zebra mussels, total phosphorus, which represents nutrients available to lake organisms, has decreased by about 50% and water clarity has increased by a factor of two. The graphs also show that even though water clarity has varied somewhat, the concentration of nutrients, expressed as total phosphorus, has changed little since 2017. This is not to say that the total quantity of nutrients entering the lake is not changing. It can still be increasing over time because water samples are filtered prior to analysis for total phosphorus, leaving out particles/plankton larger than 80 microns in size.

What has also not changed in recent years are the effects of the presence of zebra mussels on one of the most important water quality parameters: The occurrence of nuisance and toxic algal blooms.

3. Algal Blooms

One of the well-known characteristics of zebra mussels is their promotion of both green and blue-green algal blooms. There are two reasons for this: 1) zebra mussels are filter feeders and very much like an air filter installed in a corner of your living room, zebra mussels effectively filter out nutrients from lake water and concentrate them where they live, on rocks and aquatic plants in the near shore area; 2) by rejecting toxin-containing algae from their food supply and ingesting only benign algae, they promote the propagation of potentially harmful blue-green algae.

For the past several years we have observed both types of algal blooms in White Lake. The photos below show the now familiar filamentous green algal blooms which occur in early summer and the microcystis algal blooms which occur in the fall.



Filamentous Green Algae: White Lake June 20, 2020



Microcystis Blue-Green Algae: White Lake September 29, 2020

It is likely that these algal blooms will continue to occur in the coming years. Climate, weather and human activity will determine the severity of these blooms, their duration and extent.

4. Zebra Mussel Update

Anyone snorkeling in White Lake during the summer of 2020 could see thousands of open and empty zebra mussel shells seemingly waving goodbye in concert with surface waves. This event marked the death of the first generation of zebra mussels which infested the lake in 2016. The mussels had reached the end of their natural lifetimes.



As second phenomenon also led to the demise of many other mussels. This was the growth and proliferation of a calcareous (calcium carbonate) forming blue-green algae. The algae covered the surface of rocks in a layer which resembled wet cardboard. Younger zebra mussels covered by this mat likely met their demise from lack of food as well as lack of oxygen during the night when respiration takes place.

In other water bodies where zebra mussels thrive, populations have been found to be cyclical with populations rising and falling due to prevailing conditions. White Lake

continues to produce new generations of zebra mussels, which we are confident will thrive into the foreseeable future.

5. Aquatic Plant Study

A major science initiative this year has been the completion of an aquatic plant survey. Some 45 years ago, the Ministry of Natural Resources reported on the presence and density of aquatic plants at nearly 100 sites located in all parts of White Lake.

We have taken on the task of repeating this study and expanding it to different depths. Our goal was to compare the presence of different species of aquatic plants with observations made nearly half a century ago.



We will be writing a Special Report on our observations to be published in 2021. We will also be creating a catalog with photos and descriptions of all of the aquatic plants we have documented in White Lake. This identification guide will be useful to

all lake users interested in what is growing along their lakeshore and docks.

6. Loon and Cormorant Counts

2020 was a devastating year for the Common Loon. The overabundance of a species of black fly, which specifically attacks loons, forced them off of their nests. As a result, the number of loons on the lake was reduced by 34% and the number of chicks reduced by 83%. Population levels of this black fly is cyclical, and loon numbers are expected to bounce back in future years.

For the past two years, we have been observing the number of double-crested cormorants calling White Lake home. So far, our observations indicate that the population is stable and that there are about three nesting pairs on White Lake.

7. Invitation

For more information on the above topics and more, the reader is invited to read the full Water Quality Monitoring Program Report available on the [White Lake Science and Information Website](#).