

Birch Lake State of Health 2020

The Birch Lake Association has assembled the following report to describe the current state of Birch Lake, including:

- Water Quality Testing
- Aquatic Invasive Species Sampling

Water Quality Testing for Birch Lake

The (3) critical water quality tests below have been sampled by Birch Lake volunteers for many decades.

Water samples are taken each month (non-winter, typically 5 samples per year)

- **Total Phosphorus**

- Phosphorus, important for plant growth. In most lakes, phosphorus is the limiting nutrient, meaning the more phosphorus is available, the more plants and algae there are in the lake. Major sources of phosphorus include **human and animal wastes, soil erosion, detergents, septic systems and runoff from farmland or fertilized lawns.**

- **Chlorophyll-a**

- Chlorophyll-a is tested in lakes to determine how much algae is in the lake. Algae adds oxygen to the water, but if there is too much algae in a lake it can produce a foul odor and be unpleasant for swimming.

- **Water Transparency (secchi)**

- Water transparency is measured with a Secchi disk. A Secchi disk is a metal disk, 8 inches in diameter that is lowered into the water on a cord. The depth that the Secchi disk can no longer be seen through the water is the Secchi depth.

Generally, as **Phosphorus** increases, **Chlorophyll-a** will increase and **Secchi** depth will decrease.

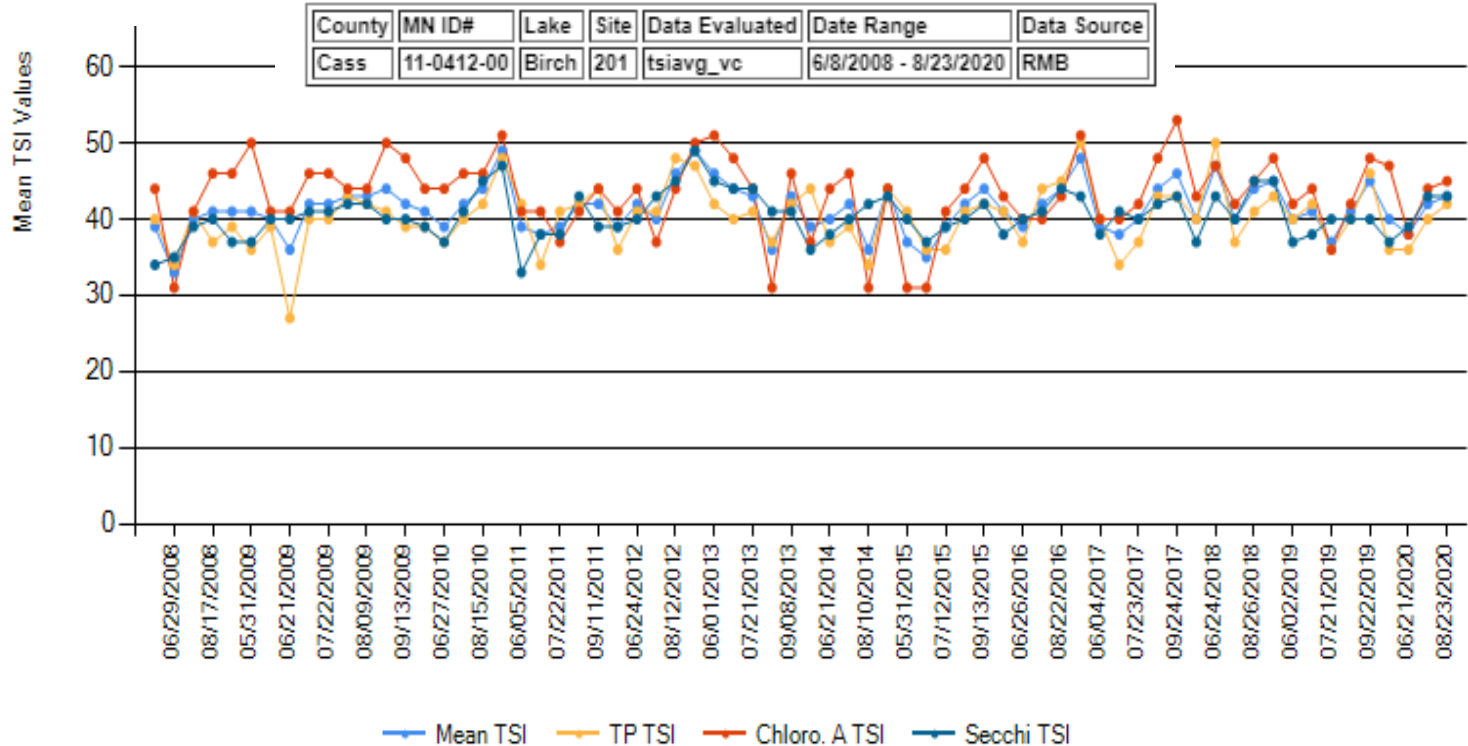
Jim Madland, a Director on the BLA Board, has managed monthly water sampling for many years.

RMB Environmental Labs, Inc., is paid by BLA for lab testing samples, collected by our volunteers.

We also credit RMB Labs for sharing water quality technical information and data included in this report.

Water Quality Test Results for Birch Lake

Mean TSI Seasonal Trends



TSI, (Lake Trophic State), is an index of Phosphorus, Chlorophyll-a and Secchi data, to help define how fertile the lake has become.

- A northern MN, deep, cold, rocky lake may be TSI < 30 (**Oligotrophic state**)
- **Birch Lake** is Mesotrophic Lake (TSI 40-50). means a medium amount of nutrients (Phosphorus and Nitrogen). Mesotrophic lakes are usually found in central Minnesota and have clear water with some algal blooms in late summer.
- A southern MN lake, fertile soils, agricultural area, may be TSI > 70 (**Eutrophic state**)

The data shows great stability in Birch Lake water quality.
The phosphorus level, specifically, is better than expected for our ecoregion.

Zebra Mussel Sampling Devices in Birch Lake

- The yellow stars below, indicate a Zebra sampling device that has been in Birch Lake and monitored by our volunteers (most locations have been monitored for several years).
- Devices include PVC tubes suspended off lake bottom or cement blocks submerged in the lake.
- Keep in mind, any structure in the lake can be used to detect Zebra Mussels, including: Dock posts, boat-lifts, rafts, buoy anchors, and natural rocks that are submerged.



The yellow star locations indicate where a BLA volunteer is maintaining a sampling device, and carefully checking it for Zebra mussels. These results are documented in the DNR's database at the end of summer.

We will use this history to pinpoint the time and location of any future Zebra mussel infestation, giving us a better chance to take control actions.

Open Water Zebra Mussel Veliger Sampling at Birch Lake

- Samples from (3) locations in Birch Lake, using a Plankton net.
- Locations were roughly 15 feet deep, net dropped to 10 feet from surface, vertically towed upward and concentrated into a sample.
- The lab evaluation by RMB Labs found no evidence of Zebra mussel veligers.



This is an encouraging result, indicating that Zebra mussel veligers detected in Ten Mile Lake in 2019, likely have not yet made their way down the Boy River to Birch Lake.

AIS Survey at Birch Lake public access and fishing pier

- Below shows the area covered by (9) “rake-throws” within the area, sampling the aquatic plants.
- The blue star shows where a Zebra Mussel tube sampler has been hung, below public dock, each year. No sign of mussels found in this survey.



- We do not identify every species of aquatic plants/animals we find in Birch Lake. But, we CAN identify the below **AIS**. So, our approach is to go looking for these (which we did NOT find in the 2020 surveys):



Starry Stonewort



Hydrilla



Zebra Mussel

Curly-leaf Pondweed.

