

2015 Mississippi Lake State of the Lake Report

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In 2015, MLA volunteers once again were out on the lake collecting samples, as we have each year for the past ten years. In co-operation with the MVCA, as part of the Watershed Watch program, we collected samples three times during the open water part of the year, at the following locations:

- a. at two deep water locations near Burnt Island and Pretties Island to monitor the trophic status of the lake;
- b. just below the Innisville rapids (the Inlet site) to measure water quality coming into the lake; and
- c. 100m upstream of the Highway 7 bridge at Carleton Place (the Outlet site) to examine the water quality leaving the lake.

The MLA added the Inlet and Outlet sites in 2008.

At each of these sites, samples were collected through the euphotic zone (the upper lake level where sunlight remains sufficient for photosynthesis by plants), and 1 meter above the bottom of the lake.

Results

The results of the 2015 MLA/MVCA sampling program which relate to the trophic status of the lake (Burnt Island and Pretties Island sites) are provided in the table below:

Mean of 3 Samples Taken	Pretties Island	Burnt Island	Mean	Trophic Status
Phosphorus, Top Sample ($\mu\text{g/L}$)	19.7	15.7	17.7	Mesotrophic
Secchi Disc (metres)	3.0	2.6	2.8	Eutrophic
Chlorophyll <u>a</u> ($\mu\text{g.L}$)	2.2	1.8	2.0	Mesotrophic

Water Quality Results for 2015

In general, although there is variability in trophic classification based on the results from individual parameters, Mississippi Lake would be classified overall as a **mesotrophic lake in 2015**, similar to observations over the past several decades. Please refer to the Table in the main Water Quality article for definitions of the trophic status while reading the discussions below.

Phosphorus Levels increased but remained within historical range

There was a noticeable increase in the 2015 average lake phosphorus level (17.7 µg/L) compared to the 2014 level of 12.2 µg/L. The higher average was likely due to the high levels found in samples collected in the fall, during the reported blue-green algae bloom. Nevertheless, only one of these samples registered a total phosphorus value exceeding the provincial objective of 20 µg/L (which is the lower boundary for a eutrophic status). Therefore, although the level has increased compared to 2014, it still falls within the range of values for **mesotrophic status** over the past few years.

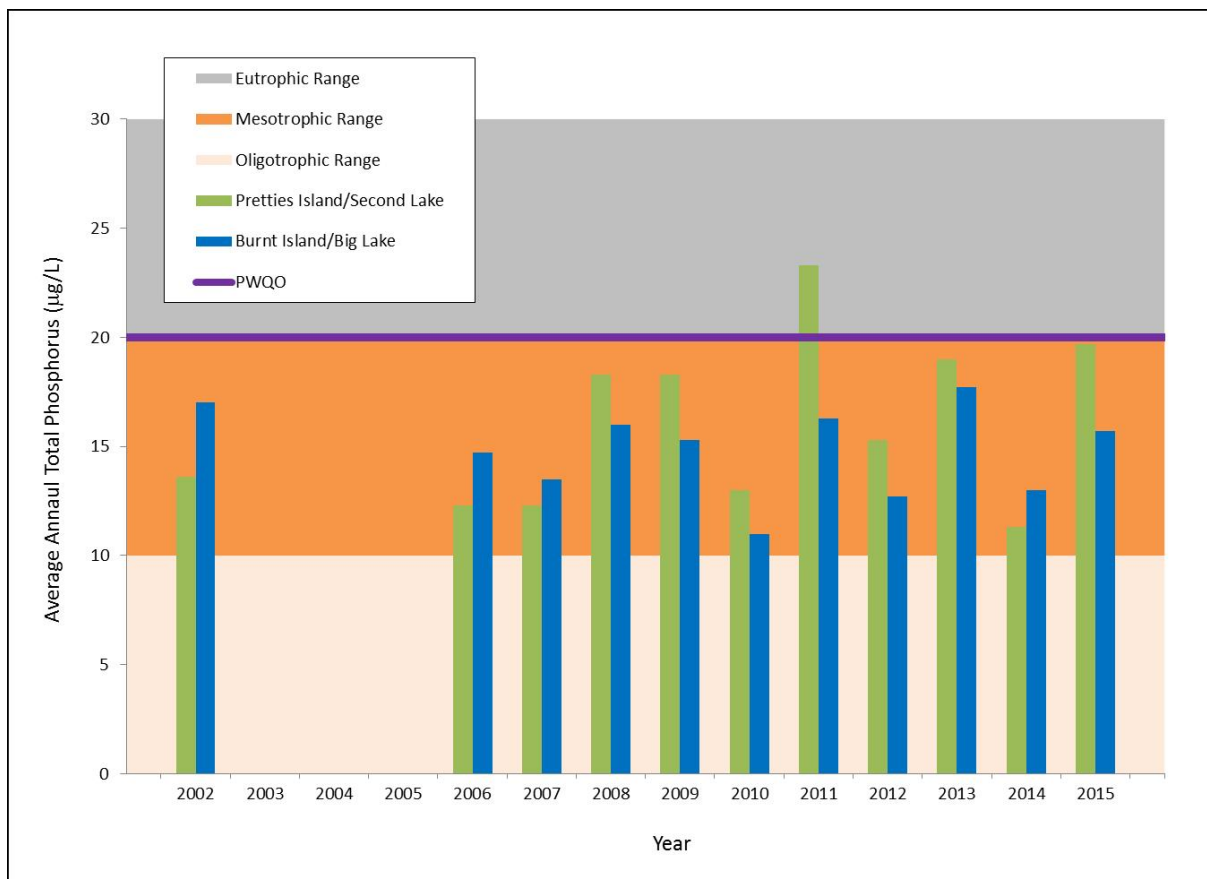


Figure 1 – Total phosphorus results from euphotic zone (depth at which sunlight can penetrate) samples collected as part of the Watershed Watch Program. The PWQO line is the provincial water quality objective.

In Figure 1 above, we present the historical results for the annual total phosphorus concentration in the euphotic zone at each of the Watershed Watch deep water sampling locations. At each of the two stations, we see that the 2015 averages are near the medium to higher range of readings over the period of record.

As phosphorus is generally considered to be the main contributor to eutrophication, further increases in total phosphorus concentration could push Mississippi Lake into Eutrophic status, which would be a further degradation of overall water quality. Continued sampling on the lake will provide data that can be used in any future studies of lake water quality. The MLA, in concert with MVCA, is investigating several options for increasing water sampling efforts to further assist in water quality assessment.

Secchi Disk readings reflect historical levels

In 2015, Secchi Disk readings on Mississippi Lake remained stable. Readings averaged 2.8 m in both 2014 and 2015 at the two deep lake locations, indicating little variation in water clarity. These values are at the lower end of what we have observed over the past 14 years, but nevertheless betray a high level of particulates in the water column. The average reading of 2.8 meters for the lake indicates a **eutrophic status**, based solely on water clarity.

Chlorophyll concentration declined slightly

The average chlorophyll A concentration was 1.2 µg/L in 2015, a decline from 2014 when the average was 5.0 µg/L. This is in the lower range measured in the past 14 years. This indicates a reduced amount of algae and phytoplankton in the lake. The 2015 average reading places the lake in the **mesotrophic status**, based on the ranges set out in the Table in the main article.

Summary

Taken together, the water quality results for 2015 categorize our lake within the **mesotrophic** status. This is consistent with the lake's status observed over the past few decades of monitoring, suggesting that the water quality of the lake has remained relatively stable.

While we have seen multi-year and year-to-year trends and variations in water quality parameters in the past, there is only a poor understanding of why these changes have occurred. We currently have little ability to predict

how the lake will respond to future potential drivers such as climate change, increasing development within the watershed, or zebra mussel population fluctuations, to name a few factors in this complex equation. The MVCA is currently undertaking a number of interesting studies which might provide some answers, or at least provide a sufficiently improved understanding, to the complex issue of assessing water quality and trends.

In the meantime, it is important to continue to monitor the water quality in the lake to provide the information needed by current and future studies. It is also important to be individually responsible stewards of the lake by limiting our nutrient footprint. Use phosphate-free soaps and detergents, minimize your use of lawn fertilizers, maintain a healthy shoreline, keep your septic system in good working order, and properly deal with your grey water. If everyone does their part, Mississippi Lake will remain healthy and productive, and can be enjoyed by our residents and visitor for many generations to come.