



By Fred McConnell - Lake Steward

**Lake Steward
Report – Love
Your Lake
Natural Shoreline
Reports –
The Challenge of
Invasive Species**

Environmental Stewardship Action! - Wollaston Lake was one of a select group of lakes in Watersheds Canada's Love Your

Lake program in August 2020. By now you should have received your confidential natural shoreline report along with recommendations for improvements. In this time of climate change uncertainty, it is more important than ever that we protect the first 100 feet (called the Riparian Zone) of shoreline around Wollaston Lake and the Deer River. This zone has a number of critical functions: to minimize water temperature increases, prevent erosion, reduce excess nutrients from entering the lake, and provide habitat for a number of species important for continued lake health.

The program was conducted exclusively from the water. If you have not received your report go to <https://loveyourlake.ca/download-report/> and follow the instructions (do not include the city or town in the address). The WLHCA will receive a summary report of the overall health of the Wollaston Lake shoreline and survey results by the end of June 2021. This information will be presented at our WLHCA 2021 AGM in August and included in a "State of the Lake" review to be drafted at the end of the summer.



**Invasive Species
Management**

Eurasian Watermilfoil is a plant first introduced to the Great Lakes in the 1970's that grows in water approximately 0-10 metres deep.

It spreads rapidly through fragmentation, choking out other

native plants and can in extreme cases make swimming, boating, fishing nearly impossible in infested areas of the lake.

The summer of 2019 marked the start of the program to mark three of the larger milfoil beds so watercraft can drive around them, to avoid inadvertently spreading the plant. This effort was continued in 2020 and expanded to include the marking of two additional beds.

This year WLHCA was awarded a microgrant from Watersheds Canada to assist in promoting the adoption of Love Your Lake recommendations. This new Lake Stewardship Microgrant provides up to \$500 per association for projects that contribute to lake health through shoreline naturalization. We decided to use this grant to fund two prizes of \$250 prizes each for the association members who win our Healthy Shorelines contest.



In addition, drone aerial photography was completed for selected beds to commence a monitoring program to track the rate of growth.

The marking and monitoring effort will again be expanded in 2021 through the formation of a community wide, Milfoil Action Committee chaired by Joanne Podzniak with one of the recommendations being to mark five additional large beds. Refer to Joanne's report for complete update.

Zebra Mussels

Zebra mussels were also introduced to the Great Lakes likely through ships. They are now recognized as an invasive species that can out-compete native mussels and other filter feeding invertebrates for food, putting the native species at risk. In addition, they can clog water intake pipes and make swimming unpleasant due to their very sharp edges. Zebra mussels were first found in the second and third lakes in 2016, through our participation in the Ontario Invasive Species Testing program. In 2019 adult zebra mussels were detected in all lake basins, but veligers (larvae) were only detected in the 3rd lake. Subjectively, based on the number of new growth annually on boats and other hard surfaces, the rate of growth of zebra mussels appears to have decreased. This may be indicative that the population is mature with limited increase in numbers.

2020 Water Quality Results

While we have good reason to be proud of our efforts to promote and maintain lake health, we are faced with a number of challenges that potentially threaten the medium to long term health of Wollaston Lake.

These include but are not limited to negative pressure on the Lake Trout population (and possibly other species), water quality, invasive species, increase in algae,



Summary of 2020 Wollaston Lake Water Quality Testing

Water testing of Phosphorus, Water Clarity, Calcium and Dissolved Oxygen

- Phosphorus – While Satisfactory according to MOECC Guidelines there appears to continue to be a change in the traditional pattern
Actions – Continue the detailed water quality lab analysis started with the MOECP in 2018 and continued through Caduceon labs in 2019, and continue to test Phosphorus monthly through Caduceon labs in addition to the Lake Partner Program
- Water Clarity – Less Than Satisfactory for the fourth consecutive year but improvement compared to 2019
Action(s) – Formed a Partnership with Trent University Faculty of Environmental studies specializing in Algae research via North Kawartha Lake Associations (NORKLA). Continue in 2021
- Calcium – Not Available in 2020
- Dissolved Oxygen – Continued Potential Cause for Concern according to MOECC Guidelines
Action(s) – Conduct a Lake Trout Population study in partnership with the MNRF as a section of the “State of the Lake” review, Summer 2021



and changing water temperature associated with climate change.

Wollaston Lake has and continues to experience very good water quality thanks in no small part to the very special natural environment we inherited, monitored for many years by water quality testing supported by the Federation of Ontario Cottage Associations (FOCA) and the Wollaston Lake Home and Cottage Association (WLHCA).

Due to Covid-19 the Lake Partner Program was suspended for 2020, but it has been announced that it will again operate in 2021.

The WLHCA has been an active participant in the Lake Partner Program since its inception with a database of more than 10 years of water quality data for Wollaston Lake. Rather than disrupt the collection of long term data when the Lake Partner Program was cancelled in 2020, the WLHCA

decided to fund all testing equivalent to the LPP plus detailed water chemistry and dissolved oxygen testing.

2020 Water Quality Testing Results

For 2020, the WLHCA tested four water quality parameters: Total Phosphorus, Water Clarity, Calcium, and Dissolved Oxygen. Trent University, based on a partnership through NORKLA spent the afternoon of August 14, 2020 on Wollaston Lake conducting a number of tests. The Trent U water quality test results are consistent with the testing the WLHCA completed.

Phosphorus (WLHCA through Caduceon Labs)

Prior to 2015, under the Lake Partner Program (LPP), we sampled for phosphorus once a year in early May in the main part of the lake. For Canadian Shield lakes, this is the best way to consistently assess year-to-year trends, since the

The Significance of Phosphorus

Phosphorus is a vital nutrient for the growth of plants and algae and is a critical measure of the nutrient status of the lake. Excessive levels have the potential to trigger unwanted growth of plants and algae blooms.

To prevent such problems, it is important to keep the phosphorus below 10 micrograms per litre (ug/L), which is the Ministry objective for our lake.

water is unstratified (i.e. uniformly mixed) due to the “spring turnover.” For 2015 and 2016, with the agreement of the MOECC, we sampled phosphorus monthly during the summer season, and continued this practice in in 2020.

For our own additional sampling program (“WLHCA Program”) we also measure phosphorus levels in the three main lake basins in midsummer (July) and in the fall (September): the Main Lake, Second Lake, and Third Lake. In 2020 we continued our additional testing via Caduceon labs in Ottawa at the recommendation of Watersheds Canada. At the same time, we added another sampling point at the inlet of the Deer River to Wollaston lake and will continue to sample at that location in 2021.



Total Phosphorus (filtered - all in micrograms per litre - ug./L)					
Date (2020)	Lake Partner Program (MOECC)	WLHCA Program (Caduceon)			
	Main Lake: Deep spot	Main Lake: Deep spot	Second Lake:	Third Lake:	Inlet:
May 28	N/A	7	7	9	6
June 28	N/A	3	3	8	3
July 22	N/A	6	7	7	3
Aug. 25	N/A	7	7	8	8
Sept. 21	N/A	5	4	9	4
2020 Average	8.3 (2019)	5.6	5.6	8.2	4.8
Historical average: 1997 to 2016**	6.7	N/A	N/A	N/A	

**** Historical averages for WLHCA program could not be calculated since most results prior to 2015 were less than the detection limit of the lab. Wollaston program for 2020 is the second year of a new lab (Caduceon) following the closure of the Trent U Dorset lab.**

Interpretation of results

This year's Lake Partner and MOE phosphorus results were not available

due to Covid. The 2019 result was satisfactory, 8.3 ug./L. (micrograms per litre), although above the historical

Water Clarity	Date (2020)	Clarity - Secchi Disk Depth (metres - higher is better)
First Reading	April 25	4.1
Last Reading	Sept. 25	3.5
Low (least clear)	May 22	3.4
High (most clear)	Aug. 25	5.7
Average (of eight samples)	April 25 - Sept. 25	4.0
Prior year's annual average (2001 - 2017)		5.6

average of 6.7 ug/L and an increase over the 2018 average of 7.2 ug/L. The Caduceon lab results for the deep spot were an average of 5.6 ug./L up slightly from the 2019 average of 5.3 ug./L. Both year's results have been lower than the LPP yearly average. The June results were uncharacteristically low with July to September relatively consistent lower levels (7 ug/L and below). The phosphorus levels in Wollaston lake have consistently ranged from 6.0 to 8.5 in the 15 years since 2003, when the program started to use filtered samples.

Conclusion:

Phosphorus levels at the spring turnover and through the summer season continue to be satisfactory according to MOECC guidelines but are trending above the previous historical average prior to 2017.

Water Clarity

Although the Lake Partner Program was suspended, we continued to measure water clarity about every 2-4 weeks from May to October, using a Secchi disk. Clarity, measured in meters, can reflect changing phosphorus levels: increased phosphorus stimulates more algae growth which in turn decreases clarity. Typically, oligotrophic - or unproductive - lakes (like Wollaston) have phosphorus at less than 10 ug/L and Secchi readings of greater than 5 meters. The MOE attended on site on July 26, 2018 and September 27, 2018 with Secchi



readings of 3.5 m and 5.2 m, in line with the WLHCA readings. Based on the recommendation of the MOE the WLHCA commenced detailed water chemistry testing in 2019 and continued the practice in 2020. This provides readings of chlorophyll levels in the water indicative of the level of suspended algae and will provide additional detail trend information.

Interpretation of Results

As anticipated, water clarity reflected phosphorus levels, starting off with relatively low clarity in May, and improving in July and August only to fall in September as the summer progressed. The annual average was slightly less than satisfactory (i.e. less than 5 meters) and below the historical average.

Conclusion:

Clarity was less than satisfactory overall for the fourth year in a row however did improve compared with 2019. It was below average in the May timeframe, reflecting higher phosphorus levels, improved in the mid to late summer and then dropped in September - the improved clarity compared with the previous year may be from the zebra mussels starting to have an effect.

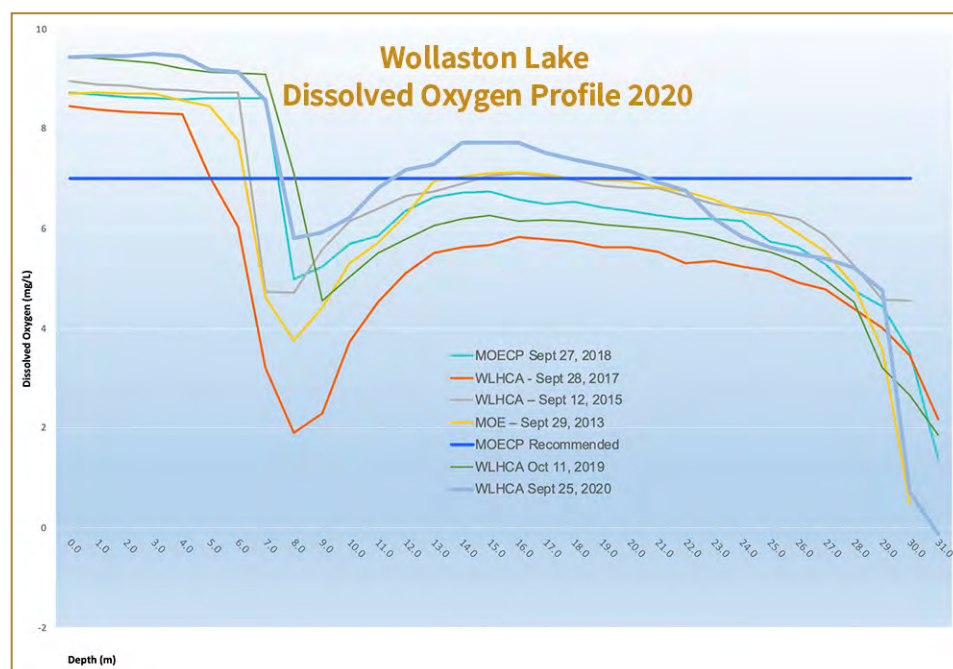
Note: Historical results available on MOECC's web site at <http://www.desc.ca/programs/LPP>

Calcium (Lake Partner Program Not available for 2020)

Calcium is measured in early May as part of the Lake Partner Program. We are looking for high levels of calcium to maintain a healthy population of zooplankton organisms (such as Daphnia - water fleas), as well as other animals with shells or exoskeletons (such as snails and crayfish).

Calcium (mg/L) 2019 Results	
Location	Lake Partner Program (MOECC)
Main Lake - deep spot	25.7
Historical average (2008 - 17)	26.7

Our historical readings for Wollaston show that we have been fortunate to have abundant calcium levels – averaging 27.2 mg/L from 2008 to 2016. The lake is therefore unlikely to suffer from depletion of daphnia or other crustaceans due to lack of Calcium.



Dissolved Oxygen (WLHCA Program)

Adequate dissolved oxygen is important for the survival of lake trout population present in the deeper, colder layer of the main lake. The

MOECC guideline for lake trout lakes is an average of 7mg/l in the cold layer known as the hypolimnion. The average is calculated from a complete depth profile dataset



as the “mean volume-weighted hypolimnetic dissolved oxygen” (MVWHDO).

Using an electronic probe rented from Hoskins Scientific (the same make/model as the MECP), the WLHCA measured dissolved oxygen and temperature every meter from the surface down to the lake bottom, at the deepest part of the Main Lake (about 30 meters). The measurements were taken in late September 2020 when dissolved oxygen tends to reach its lowest levels in a stratified lake. The fall profile is shown on page 6.

Organic matter decay leads to:

“excessive plant and algae growth, resulting in a loss of water clarity, depletion of dissolved oxygen and a loss of habitat for species of cold water fish such as lake trout.”
Source: MOECC Lakeshore Capacity Assessment Handbook

For late September 2020 the average level (MVWHDO) based on the MOECP reviewed and approved test was calculated as 6.02 mg/L, which is below the Ministry standard of 7mg/L, below the previous 2018 MECP average of 6.14 mg/L, the 2015 WLHCA average of 6.7 mg/L and the 2013 average of 6.6 mg/L when the MOECC previously tested. While all four of these averages are below the Ministry standard, the average

in 2020 is still slightly above the level where lake trout populations become stressed.

While this is a marginal improvement over the three consecutive years which indicated a decline, it is important to note that this is not yet enough to be able to determine if this is the start of a sustained downward trend.

While it is not possible, at this time, to conclude the cause of the lower readings in 2017, 2018 and 2019 there are a number of possible explanations. These include a net increase in the total algae and plant matter in the lake (possibly due to

the increase in Eurasian milfoil), climate change effects (2016 2018, 2019 and 2020 were warmer than normal summers with 2017 being a wetter than normal summer), or other reasons.

Conclusion

Readings for dissolved oxygen are lower than the MOECC guidelines for deep cold lake trout lakes. The WLHCA conducted the testing in 2020 compared with the MECP testing in Wollaston Lake in 2018, and 2013. For 2021 the WLHCA will again rent from Hoskins Scientific and conduct the dissolved oxygen tests with the same model of meter and probe utilized by the ME.

Overall Dashboard (WLHCA Program) as Presented at Wollaston Council March Delegation

Species/Issues	Impacts	WL Stage	Activities/Counter Measures
Eurasian Milfoil	Water Quality, Fish Habitat, Lake Enjoyment	Critical Issue to Address	MNRF Permits, Bouys to Mark
Zebra Mussels	Fish Food Depletion Milfoil Reach	Rate of Spread Slowing	Monitor Water Clarity and Chemistry
Stary Stonewart	Broader Reach Than Milfoil	Not currently present but in other regional lakes	Monitoring and Education
Asian Carp	Lake Enjoyment	Not currently present	Monitoring and Education
Nutrients / Pollutants / Erosion	Water Quality, Fish Habitat, Increase Algae	Seeing Warning Signs Negative Water Quality Trends	Runoff Management, Shoreline Naturalization, Septic Management
Congestion / Traffic	Spreads Milfoil, Erosion, Lake Enjoyment	Increased Lake Usage / Boat Traffic	Education, No Wake Zones, No Motor Zones
Climate Change	Warms Water, Promotes Blue Green Algae	Compounds Other Issues / Increases Risk	Naturalize Shorelines Reduce Hardscaping

