Lake Partner Program – 2019 Overview

The FOCA (Federation of Ontario Cottagers Associations) has partnered for many years with the Ministry of Environment, Conservation and Parks (MECP). on volunteer water-quality monitoring programs. The goal of the Lake Partner Program (LPP) is to better understand and protect the quality of Ontario's inland lakes by involving citizens in a volunteer-based water quality monitoring program.

The LPP monitors three parameters (Total Phosphorus (TP), Calcium Concentrations (Ca) and Water Clarity) in Ontario's lakes. This information will allow the early detection of changes in the nutrient status and/or the water clarity of a lake due to the impacts of shoreline development, climate change and other stresses.

The LPP now includes over 600 volunteers monitoring 550 inland lakes at 800 sampling locations, which include many samples being taken by a Lake St Peter Property Owners Association (LSPPOA) volunteer for Lake St. Peter and Boulter Lake (no current readings being taken), over many years,

Total Phosphorus (TP)

Phosphorus is an essential element for aquatic systems and the organisms that inhabit them. Total Phosphorus concentrations are used to infer a lake's capacity for algal growth, which is called the nutrient (or trophic) status. Increases in phosphorus may stimulate algal growth, resulting in decreased water clarity, reduced deep-water oxygen concentrations, and, in extreme cases, cause algal blooms that may produce toxins, affect the aesthetics of the lake, and/or cause taste and odour problems in the water.

By sampling the total phosphorus each year it is possible to detect a change in the nutrient status of your lake. It is important to note that several years of data must be collected to observe the normal, between-year-differences before a trend can be identified.

Lakes with less than 10 µg/L of TP are considered oligotrophic. These dilute, unproductive lakes rarely experience nuisance algal blooms, and are considered excellent recreational lakes that are highly valued and may support a cold-water fishery, such as lake trout.

From the sample results in Table 1 which span a number of years, (Boulter Lake) and Lake St. Peter have total phosphorus levels that are well within the desired range to support fish species such as Lake Trout.

Calcium Concentrations (Ca)

Calcium is a nutrient that is required by all living organisms. For example, Daphnia, which are tiny organisms called zooplankton and are a primary food for many fish, are very sensitive to declining calcium levels. Daphnia use calcium in the water to form their calcium-rich body coverings.
Calcium concentrations in Canadian Shield lakes are decreasing. Laboratory and field studies by partners working at Dorset Environmental Science Centre (DESC) have shown that calcium loss is an important stressor for many aquatic species, especially when less calcium is combined with lower food availability and the warmer temperatures that are predicted in future climate change scenarios. Decades of acid loading, coupled with logging, have depleted watershed stores of calcium, and further decreases are

predicted in many lakes. Laboratory experiments have shown that the reproduction of most Daphnia species is jeopardized at lake calcium concentrations below 1.5 mg/L.

The majority (74%) of lakes monitored through the LPP have moderate-to-high levels of calcium concentrations, and 97% are above the 1.5 mg/L threshold considered to limit reproduction of large zooplankton.

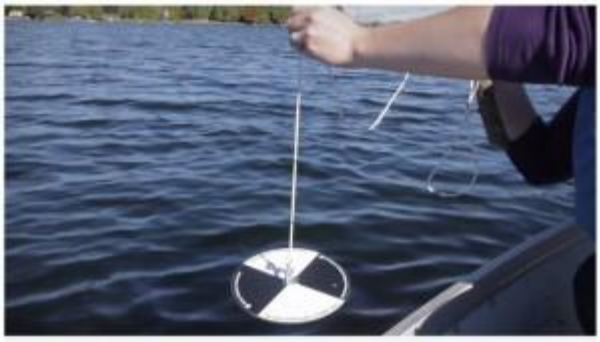
Calcium Concentration sample results (Table 2), Lake St. Peter is well above the 1.5 mg/L threshold to support the continued production of Zooplankton.

Water Clarity and the Secchi Disk

Water clarity (or transparency) is affected by the amount of sunlight that can penetrate into the lake. Thus, water clarity is impacted by fluctuations in algae, detritus, dissolved organic carbon, and other suspended solids in a lake. These, in turn, may be influenced by shoreline development, climate change, acid rain and invasive species, such as zebra mussels. Water clarity impacts the depth at which plant (including algal) photosynthesis can occur. Understanding a lake's water clarity, and how it changes over time, can help us to recognize the changes that may be occurring in a lake's water quality.

The Secchi depth is a measure of lake water clarity, and is measured with a black-and-white disk called a Secchi disk (Figure 1).

Figure 1



While total phosphorus concentrations are the best way to describe the nutrient status of your lake, regular Secchi depths can also help to identify changes in water clarity that are not linked to nutrient status (zebra mussels, climate change, etc.).

(Table 3), the Water Clarity of Lake St. Peter consistently falls within the moderately transparent range (Secchi depth 2 to 4 metres).

Summary

Individuals and communities can work together to help maintain the water quality of Ontario's lakes. To find out more about what you can do to help protect Ontario's lakes, visit FOCA's "Resources" page to access a wealth of information (www.foca.on.ca/resources/).

For more information on the Lake Partner Program at http://desc.ca/programs/LPP, or contact them here:
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1026 Bellwood Acres Rd.
Dorset, ON P0A 1E0
Tel (Toll Free – Ontario Only): 1-800-470-8322
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Appendix

Table 1 – Sample Total Phosphorus (TP) Data for Boulter Lake and Lake St. Peter

Important Note:
TP1 and TP2 are duplicate total phosphorus (TP) concentrations (sample pairs). It is normal for there to be minor differences between these duplicates.
Data will be 'flagged' in YELLOW when there are major differences between TP1 and TP2 *. When there are major differences between TP1 and TP2, it is probable that one of the two samples was contaminated (usually the higher value). Contamination can occur when the sample water contains zooplankton or other debris. Use caution when interpreting TP data that has been flagged.

Table 1 – Total Phosphorus Results – Lake St. Peter 2013 - 2019

Lake Name	Township	STN	Site ID	Site Description	Date	TP1 (µg/L)	TP2 (µg/L)
BOULTER LAKE	MCCLURE	545	1	Mid Lake, deep spot	16-Jul-2002	8.3	7.5
BOULTER LAKE	MCCLURE	545	1	Mid Lake, deep spot	9-Jul-2003	7.5	9.9
BOULTER LAKE	MCCLURE	545	1	Mid Lake, deep spot	21-Jul-2005	6.0	5.6
BOULTER LAKE	MCCLURE	545	1	Mid Lake, deep spot	17-Jul-2006	6.9	6.3
BOULTER LAKE	MCCLURE	545	1	Mid Lake, deep spot	6-Sep-2007	5.6	5.3
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	2	North Basin, deep spot – Gov. or Agency	15-May-2013	7.2	7.8
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	3	South Basin, deep spot Gov. or Agency	15-May-2013	6.4	6.8
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	31-May-2015	5.4	5.0
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	23-May-2016	5.8	7.2
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	25-Jun-2017	7.4	6.6
Lake St. Peter	Hastings Highlands	5147	1	Mid Lake, deep spot	27-May 2018	5.6	5.8
2019	Hastings Highlands	5147	1	Mid Lake, deep spot	26-May 2019	7.0	8.2

Table 2 – Calcium Concentration Data – 2015 – 2019

Lake Name	Township	STN	Site ID	Site Description	Date	(mg/L)
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	31-May-2015	3.7
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	23-May-2016	3.6
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	25-Jun-2017	3.3
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	27-May 2018	3.6
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	26-May 2019	3.1

Table 3 – Secchi Water Transparency Monthly Readings (Averag) 2015 - 2019

Lake Name	Township	STN	Site ID	Site Description	Date	Secchi Depth (Metres)
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	2015	3.0
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	2016	3.5
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep	2017	2.7
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	2018	2.8
LAKE ST. PETER	HASTINGS HIGHLANDS	5147	1	Mid Lake, deep spot	2019	2.5
Search on St. Peter Lake This is taken from LPP/FOCA as one line item average.						