

## **2021 Lake Partner Program Results Total Phosphorus, Secchi Depth and Calcium**

Mike Dolbey, KLSA Director  
C. Lee, KLSA Director

### **Why measure phosphorus levels in lake water?**

Phosphorus is regarded as the chemical that is most responsible for increased plant and algal growth in freshwater lakes. Sources of phosphorus include shoreline erosion, fertilizers, wildlife, septic systems, sewage treatment plants and pets. Limited fertilizer use and a well-vegetated shoreline are good ways to limit your phosphorus input and keep our lakes clear. The Ontario Ministry of the Environment, Conservation and Parks issued the following guidelines for total phosphorus in our lakes:

- To avoid nuisance concentrations of algae in lakes, average total phosphorus concentrations for the ice-free period should not exceed 20 µg/L (equal to 20 parts per billion, (ppb)).
- A high level of protection against aesthetic deterioration will be provided by a total phosphorus concentration for the ice-free period of 10 µg/L or less.

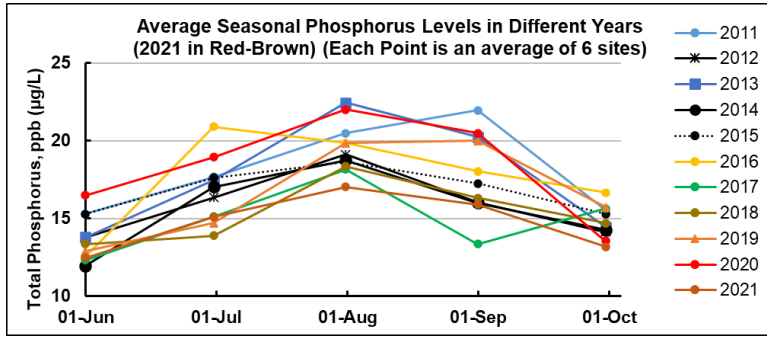
### **2021 Phosphorus Testing Results**

Thank you to all our volunteer testers who were able to collect samples and measurements in 2021. The continuity of these long-term data sets to establish trends in this era of climate change is of great value. If you are unable to continue testing, please let any director in KLSA know, so we can help you find a replacement. The program is free, and kits are mailed to you along with instructions. We have fairly complete coverage of the Kawartha Lakes, but many volunteers would welcome an assistant.

After the COVID-19 pandemic decimated most of the 2020 Lake Partner Program (LPP) sampling season, we are pleased to report that testing in 2021 returned to normal. In 2021, total phosphorus (TP) and Secchi depths were measured at 47 sites on 17 lakes in our area. Four to six samples were collected at most sites between May and October. Samples were analyzed by the Ministry of the Environment, Conservation and Parks' Lake Partner Program. The TP data for hundreds of LPP sites on Ontario lakes can be found on the Federation of Ontario Cottagers' Associations (FOCA) website or in the Province of Ontario's Data Catalogue. Here we provide an analysis of the 2021 results for lakes in KLSA's area. The complete tables of TP measurements, Secchi depths and Calcium levels are presented in Appendix F.

### **Lake to Lake Phosphorus Results**

In most of our Kawartha lakes TP varies seasonally starting low in the spring, increasing to a maximum in August/September before declining in the fall. The average seasonal variation, based on the same six sites across the system, for each of the past ten years is shown in the graph below. In 2021, while the variation remained typical, the maximum was the lowest in the past ten years. Over the years KLSA has attempted to determine what causes differences in TP levels from one year to the next with limited success. However, rainfall and its effect on flow in the Trent-Severn Waterway (TSW) appears to be a significant factor. Localized summer thunderstorms



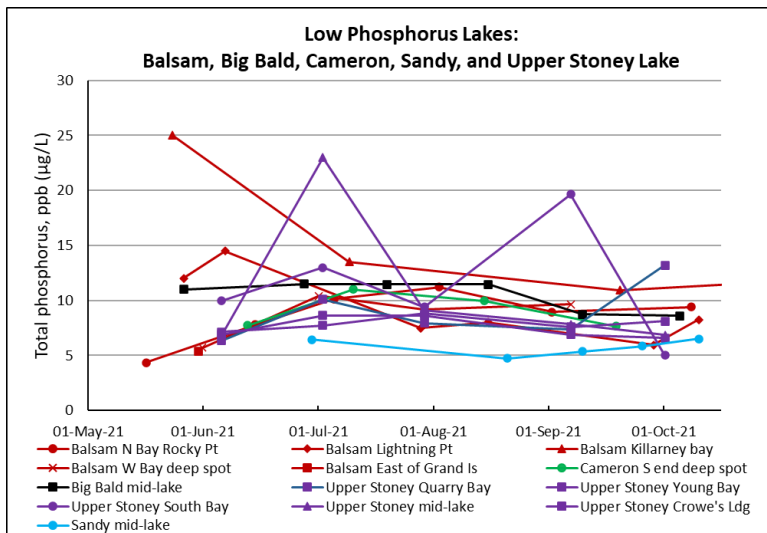
have relatively little effect but a day-long steady rain throughout the watershed often takes a week of high flow to restore TSW water levels. The high flows both flush the system of high phosphorus water and increase mixing of the surface and bottom water which reduces internal loading, i.e. the release of phosphorus from the sediments

during anoxic conditions.

The winter of 2021 was characterized by moderate temperatures and little snow that resulted in an early and modest spring flood. May and June were quite dry followed by widespread rains in July that resulted in higher flow in the Trent-Severn Waterway throughout the month. August was dry with low flow followed by a wet September that again led to increased water flow that continued until late October as the Trent-Severn Waterway drew down the feeder lakes to prepare for next year's freshet. It appears that the widespread rains of July and September resulted in the lower than usual TP levels this year.

In general, the results for individual lakes follow a similar pattern to results from previous years. For consistency with past years, we present the results in graphical form grouped by the type of lake, Low Phosphorus Lakes, Upstream Lakes, Midstream Lakes and Downstream Lakes.

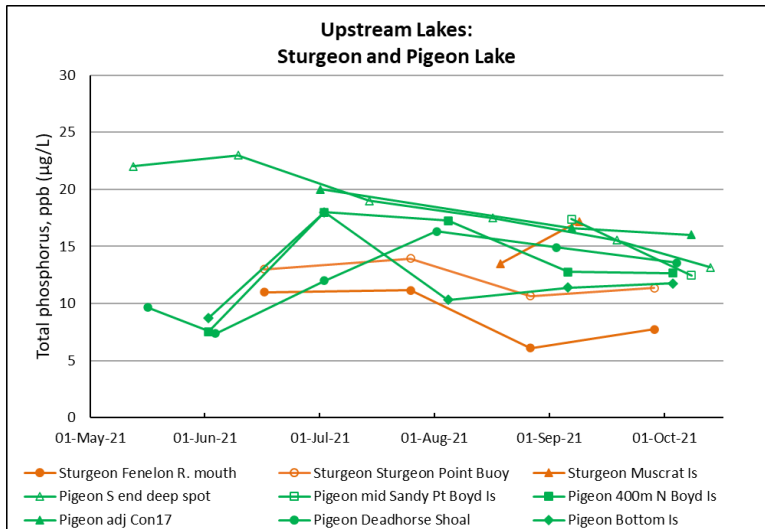
### Low Phosphorus Lakes



The low phosphorus lakes traditionally have low, stable TP levels, being fed with low phosphorus water from the north. The early high readings in 2021 at Balsam Lake's South Bay/Killarney Bay site and Upper Stoney mid-lake are unusual and unexplained. The majority of readings fall between 7 and 12 µg/L, a bit lower than the 7 to 15 µg/L measured in 2019.

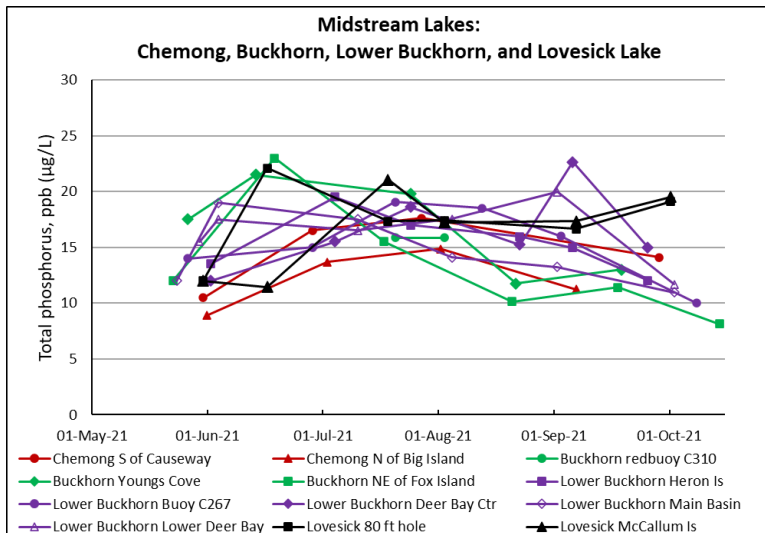
### Upstream Lakes

Sturgeon Lake receives low phosphorus water from the Fenelon River to the north and high phosphorus water from the Scugog River to the south. This is reflected in the low results of the Fenelon River mouth site and higher readings at the Sturgeon Point site where the two flows mix. Unfortunately, we no longer have a test site in the high phosphorus south (Scugog) arm of Sturgeon Lake. Pigeon Lake receives water from Sturgeon Lake moderated by lesser inflows



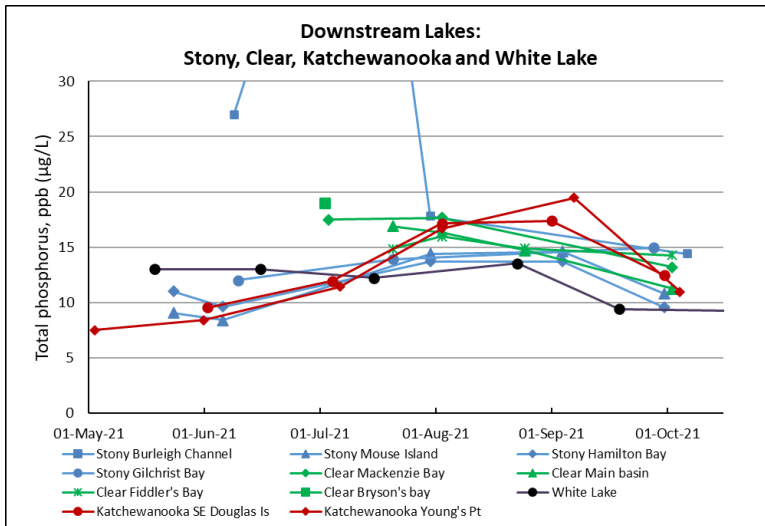
from the Bald Lakes and Nogies Creek to the north and the Pigeon River to the south. The high May and June readings at the Pigeon Lake south end deep spot are similar to 2019 and earlier results but we have little long-term data for this site. It is an important site because it monitors TP in inflow from the agricultural south of the watershed. Otherwise, the readings from Pigeon Lake follow the normal pattern but are generally lower in mid-year than in 2019.

### Midstream Lakes



The midstream lakes usually have similar TP levels to the upstream lakes as was seen in 2021, including the generally lower mid-year levels compared to 2019. Two sites in the west end of Buckhorn Lake, sampled by different testers at about the same time in mid August, got similar low TP results for this time of year. TSW flow had been low for about a month by this time so flushing and mixing do not appear to provide an explanation.

### Downstream Lakes



Higher phosphorus water flowing into Stony Lake from the midstream lakes is diluted with low phosphorus water from Upper Stony Lake resulting in moderate levels of phosphorus in Clear and Katchewanooka Lakes. In 2021 we observed generally lower mid-year TP levels than in 2019 and lower early-year readings than in most years. The exceptionally high early results for the Stony Lake Burleigh Channel site are unusual and unexplained.

**Summary of 2021 TP Results**

In general, TP levels were lower in 2021 than they have been for the past ten years. While rainfall and its effect on TSW flow have been suspected to play some role in this result, no clear correlation has been found. Is it possible that, due to the COVID-19 pandemic, fewer people were visiting the Kawartha Lakes and that this has resulted in reduced phosphorus loading?

## Appendix F: 2021 Phosphorus, Secchi and Calcium Data

### Total Phosphorus (TP) Measurements

In 2021 volunteers tested 47 sites in 17 Kawartha lakes. Results are listed below. A number of TP measurements are in bold type. These were considered outliers, and were not used to calculate the TP average.

STN	Site ID	Lake Name	Site Description	Date	TP1 (µg/L)	TP2 (µg/L)	Avg.TP (µg/L)
6902	2	BALSAM LAKE	N Bay Rocky Pt.	17-May-21	4.20	4.50	4.35
6902	2	BALSAM LAKE	N Bay Rocky Pt.	15-Jun-21	7.60	8.00	7.80
6902	2	BALSAM LAKE	N Bay Rocky Pt.	06-Jul-21	10.10	10.20	10.15
6902	2	BALSAM LAKE	N Bay Rocky Pt.	03-Aug-21	10.70	11.70	11.20
6902	2	BALSAM LAKE	N Bay Rocky Pt.	02-Sep-21	8.20	9.70	8.95
6902	2	BALSAM LAKE	N Bay Rocky Pt.	09-Oct-21	8.80	10.00	9.40
6902	5	BALSAM LAKE	NE end-Lightning Pt	27-May-21	12.00	12.00	12.00
6902	5	BALSAM LAKE	NE end-Lightning Pt	07-Jun-21	13.00	16.00	14.50
6902	5	BALSAM LAKE	NE end-Lightning Pt	29-Jul-21	7.20	7.80	7.50
6902	5	BALSAM LAKE	NE end-Lightning Pt	16-Aug-21	7.60	8.40	8.00
6902	5	BALSAM LAKE	NE end-Lightning Pt	29-Sep-21	5.80	6.10	5.95
6902	5	BALSAM LAKE	NE end-Lightning Pt	11-Oct-21	7.80	8.70	8.25
6902	7	BALSAM LAKE	South B-Killarney B	24-May-21	22.00	28.00	25.00
6902	7	BALSAM LAKE	South B-Killarney B	10-Jul-21	13.00	14.00	13.50
6902	7	BALSAM LAKE	South B-Killarney B	21-Aug-21	<b>133.00</b>	<b>222.00</b>	-
6902	7	BALSAM LAKE	South B-Killarney B	20-Sep-21	9.80	12.10	10.95
6902	7	BALSAM LAKE	South B-Killarney B	27-Oct-21	10.70	12.60	11.65
6902	8	BALSAM LAKE	W Bay2, deep spot	01-Jun-21	5.60	5.80	5.70
6902	8	BALSAM LAKE	W Bay2, deep spot	02-Jul-21	9.80	11.00	10.40
6902	8	BALSAM LAKE	W Bay2, deep spot	30-Jul-21	8.70	9.70	9.20
6902	8	BALSAM LAKE	W Bay2, deep spot	07-Sep-21	9.20	10.10	9.65
6902	9	BALSAM LAKE	E of Grand Is	31-May-21	5.30	5.40	5.35
6941	1	BIG BALD LAKE	Mid Lake, deep spot	27-May-21	11.00	11.00	11.00
6941	1	BIG BALD LAKE	Mid Lake, deep spot	28-Jun-21	11.00	12.00	11.50
6941	1	BIG BALD LAKE	Mid Lake, deep spot	20-Jul-21	11.30	11.60	11.45
6941	1	BIG BALD LAKE	Mid Lake, deep spot	16-Aug-21	10.70	12.20	11.45
6941	1	BIG BALD LAKE	Mid Lake, deep spot	10-Sep-21	8.60	8.90	8.75
6941	1	BIG BALD LAKE	Mid Lake, deep spot	06-Oct-21	8.50	8.70	8.60
363	1	BIG CEDAR LAKE	Mid Lake, deep spot	24-May-21	6.20	6.70	6.45
7131	1	BUCKHORN LAKE (U)	Narrows-redbuoy C310	21-Jul-21	15.50	16.20	15.85
7131	1	BUCKHORN LAKE (U)	Narrows-redbuoy C310	03-Aug-21	15.80	15.90	15.85
7131	9	BUCKHORN LAKE (U)	Young's Cove, Deep Spot	27-May-21	17.00	18.00	17.50
7131	9	BUCKHORN LAKE (U)	Young's Cove, Deep Spot	14-Jun-21	20.00	23.00	21.50
7131	9	BUCKHORN LAKE (U)	Young's Cove, Deep Spot	25-Jul-21	15.40	24.20	19.80
7131	9	BUCKHORN LAKE (U)	Young's Cove, Deep Spot	22-Aug-21	11.40	12.10	11.75
7131	9	BUCKHORN LAKE (U)	Young's Cove, Deep Spot	19-Sep-21	12.90	13.10	13.00

STN	Site ID	Lake Name	Site Description	Date	TP1 (µg/L)	TP2 (µg/L)	Avg.TP (µg/L)
7131	10	BUCKHORN LAKE (U)	NE of Fox Is	23-May-21	12.00	12.00	12.00
7131	10	BUCKHORN LAKE (U)	NE of Fox Is	19-Jun-21	20.00	26.00	23.00
7131	10	BUCKHORN LAKE (U)	NE of Fox Is	18-Jul-21	14.00	17.00	15.50
7131	10	BUCKHORN LAKE (U)	NE of Fox Is	21-Aug-21	10.10	10.20	10.15
7131	10	BUCKHORN LAKE (U)	NE of Fox Is	18-Sep-21	10.40	12.40	11.40
7131	10	BUCKHORN LAKE (U)	NE of Fox Is	15-Oct-21	8.00	8.30	8.15
6905	6	CAMERON LAKE	S end, deep spot	13-Jun-21	7.40	8.10	7.75
6905	6	CAMERON LAKE	S end, deep spot	11-Jul-21	11.00	11.00	11.00
6905	6	CAMERON LAKE	S end, deep spot	15-Aug-21	9.50	10.40	9.95
6905	6	CAMERON LAKE	S end, deep spot	19-Sep-21	7.40	7.90	7.65
6951	9	CHEMONG LAKE	S. of Causeway	31-May-21	10.00	11.00	10.50
6951	9	CHEMONG LAKE	S. of Causeway	29-Jun-21	16.00	17.00	16.50
6951	9	CHEMONG LAKE	S. of Causeway	28-Jul-21	13.10	22.10	17.60
6951	9	CHEMONG LAKE	S. of Causeway	25-Aug-21	<b>348.00</b>	<b>359.00</b>	-
6951	9	CHEMONG LAKE	S. of Causeway	29-Sep-21	13.90	14.30	14.10
6951	11	CHEMONG LAKE	N of Big Island	01-Jun-21	7.80	10.00	8.90
6951	11	CHEMONG LAKE	N of Big Island	03-Jul-21	13.30	14.10	13.70
6951	11	CHEMONG LAKE	N of Big Island	02-Aug-21	14.40	15.30	14.85
6951	11	CHEMONG LAKE	N of Big Island	07-Sep-21	10.20	12.30	11.25
6955	1	CLEAR LAKE	Mackenzie Bay	04-Jul-21	17.00	18.00	17.50
6955	1	CLEAR LAKE	Mackenzie Bay	03-Aug-21	17.60	17.70	17.65
6955	1	CLEAR LAKE	Mackenzie Bay	03-Oct-21	12.50	13.90	13.20
6955	2	CLEAR LAKE	Main Basin-deep spot	21-Jul-21	16.90	16.90	16.90
6955	2	CLEAR LAKE	Main Basin-deep spot	03-Aug-21	16.00	16.70	16.35
6955	2	CLEAR LAKE	Main Basin-deep spot	25-Aug-21	14.30	15.10	14.70
6955	2	CLEAR LAKE	Main Basin-deep spot	03-Oct-21	10.80	11.70	11.25
6955	3	CLEAR LAKE	Fiddlers Bay	21-Jul-21	14.70	15.00	14.85
6955	3	CLEAR LAKE	Fiddlers Bay	03-Aug-21	15.60	16.30	15.95
6955	3	CLEAR LAKE	Fiddlers Bay	25-Aug-21	14.50	15.30	14.90
6955	3	CLEAR LAKE	Fiddlers Bay	03-Oct-21	14.00	14.50	14.25
6955	4	CLEAR LAKE	Brysons Bay	03-Jul-21	19.00		19.00
7075	2	JULIAN LAKE	Mid Lake, deep spot	31-May-21	4.80	6.00	5.40
7076	1	KATCHEWANOOKA LAKE	S/E Douglas Island	02-Jun-21	9.30	9.80	9.55
7076	1	KATCHEWANOOKA LAKE	S/E Douglas Island	05-Jul-21	11.90	12.00	11.95
7076	1	KATCHEWANOOKA LAKE	S/E Douglas Island	03-Aug-21	16.60	17.70	17.15
7076	1	KATCHEWANOOKA LAKE	S/E Douglas Island	01-Sep-21	17.30	17.50	17.40
7076	1	KATCHEWANOOKA LAKE	S/E Douglas Island	01-Oct-21	12.20	12.70	12.45
7076	2	KATCHEWANOOKA LAKE	Young Pt near locks	03-May-21	7.10	7.90	7.50
7076	2	KATCHEWANOOKA LAKE	Young Pt near locks	01-Jun-21	8.20	8.60	8.40
7076	2	KATCHEWANOOKA LAKE	Young Pt near locks	07-Jul-21	10.80	12.00	11.40
7076	2	KATCHEWANOOKA LAKE	Young Pt near locks	03-Aug-21	16.20	17.20	16.70
7076	2	KATCHEWANOOKA LAKE	Young Pt near locks	07-Sep-21	19.30	19.60	19.45
7076	2	KATCHEWANOOKA LAKE	Young Pt near locks	05-Oct-21	10.90	11.00	10.95

STN	Site ID	Lake Name	Site Description	Date	TP1 (µg/L)	TP2 (µg/L)	Avg.TP (µg/L)
7087	1	LOVESICK LAKE	80' hole at N. end	31-May-21	6.30	17.80	12.05
7087	1	LOVESICK LAKE	80' hole at N. end	17-Jun-21	22.10	<b>57.00</b>	22.10
7087	1	LOVESICK LAKE	80' hole at N. end	19-Jul-21	16.20	18.50	17.35
7087	1	LOVESICK LAKE	80' hole at N. end	03-Aug-21	14.30	20.50	17.40
7087	1	LOVESICK LAKE	80' hole at N. end	07-Sep-21	13.60	19.70	16.65
7087	1	LOVESICK LAKE	80' hole at N. end	02-Oct-21	19.10	<b>38.30</b>	19.10
7087	3	LOVESICK LAKE	McCallum Island	31-May-21	7.00	17.00	12.00
7087	3	LOVESICK LAKE	McCallum Island	17-Jun-21	5.90	17.00	11.45
7087	3	LOVESICK LAKE	McCallum Island	19-Jul-21	18.20	23.90	21.05
7087	3	LOVESICK LAKE	McCallum Island	03-Aug-21	13.20	21.30	17.25
7087	3	LOVESICK LAKE	McCallum Island	07-Sep-21	13.80	20.90	17.35
7087	3	LOVESICK LAKE	McCallum Island	02-Oct-21	16.10	22.90	19.50
6990	1	LOWER BUCKHORN LAKE	Heron Island	02-Jun-21	13.00	14.00	13.50
6990	1	LOWER BUCKHORN LAKE	Heron Island	05-Jul-21	18.00	21.00	19.50
6990	1	LOWER BUCKHORN LAKE	Heron Island	25-Jul-21	16.90	17.10	17.00
6990	1	LOWER BUCKHORN LAKE	Heron Island	23-Aug-21	14.90	17.00	15.95
6990	1	LOWER BUCKHORN LAKE	Heron Island	06-Sep-21	14.90	15.00	14.95
6990	1	LOWER BUCKHORN LAKE	Heron Island	26-Sep-21	12.00	12.10	12.05
6990	4	LOWER BUCKHORN LAKE	Deer Bay W-Buoy C267	27-May-21	13.00	15.00	14.00
6990	4	LOWER BUCKHORN LAKE	Deer Bay W-Buoy C267	29-Jun-21	14.00	16.00	15.00
6990	4	LOWER BUCKHORN LAKE	Deer Bay W-Buoy C267	21-Jul-21	18.30	19.80	19.05
6990	4	LOWER BUCKHORN LAKE	Deer Bay W-Buoy C267	13-Aug-21	18.00	19.00	18.50
6990	4	LOWER BUCKHORN LAKE	Deer Bay W-Buoy C267	03-Sep-21	15.70	16.30	16.00
6990	4	LOWER BUCKHORN LAKE	Deer Bay W-Buoy C267	09-Oct-21	9.10	10.90	10.00
6990	6	LOWER BUCKHORN LAKE	Deer Bay-centre	02-Jun-21	11.00	13.00	12.00
6990	6	LOWER BUCKHORN LAKE	Deer Bay-centre	05-Jul-21	14.00	17.00	15.50
6990	6	LOWER BUCKHORN LAKE	Deer Bay-centre	25-Jul-21	17.90	19.30	18.60
6990	6	LOWER BUCKHORN LAKE	Deer Bay-centre	23-Aug-21	15.20	15.30	15.25
6990	6	LOWER BUCKHORN LAKE	Deer Bay-centre	06-Sep-21	21.90	23.40	22.65
6990	6	LOWER BUCKHORN LAKE	Deer Bay-centre	26-Sep-21	14.60	15.40	15.00
6990	7	LOWER BUCKHORN LAKE	Lower Deer Bay, Mid-deep	30-May-21	13.00	18.00	15.50
6990	7	LOWER BUCKHORN LAKE	Lower Deer Bay, Mid-deep	04-Jun-21	17.00	18.00	17.50
6990	7	LOWER BUCKHORN LAKE	Lower Deer Bay, Mid-deep	11-Jul-21	16.00	17.00	16.50
6990	7	LOWER BUCKHORN LAKE	Lower Deer Bay, Mid-deep	05-Aug-21	16.60	18.50	17.55
6990	7	LOWER BUCKHORN LAKE	Lower Deer Bay, Mid-deep	02-Sep-21	17.20	22.70	19.95
6990	7	LOWER BUCKHORN LAKE	Lower Deer Bay, Mid-deep	03-Oct-21	10.90	12.50	11.70
6990	8	LOWER BUCKHORN LAKE	Main basin, deep- spot	24-May-21	12.00		12.00
6990	8	LOWER BUCKHORN LAKE	Main basin, deep- spot	04-Jun-21	18.00	20.00	19.00
6990	8	LOWER BUCKHORN LAKE	Main basin, deep- spot	11-Jul-21	17.00	18.00	17.50
6990	8	LOWER BUCKHORN LAKE	Main basin, deep- spot	05-Aug-21	14.10	<b>45.10</b>	14.10
6990	8	LOWER BUCKHORN LAKE	Main basin, deep- spot	02-Sep-21	12.60	13.90	13.25
6990	8	LOWER BUCKHORN LAKE	Main basin, deep- spot	03-Oct-21	10.40	11.50	10.95
6919	1	PIGEON LAKE	S end, deep spot	13-May-21	22.00	22.00	22.00

STN	Site ID	Lake Name	Site Description	Date	TP1 (µg/L)	TP2 (µg/L)	Avg.TP (µg/L)
6919	1	PIGEON LAKE	S end, deep spot	10-Jun-21	22.00	24.00	23.00
6919	1	PIGEON LAKE	S end, deep spot	15-Jul-21	19.00	19.00	19.00
6919	1	PIGEON LAKE	S end, deep spot	17-Aug-21	16.40	18.60	17.50
6919	1	PIGEON LAKE	S end, deep spot	19-Sep-21	15.50	15.60	15.55
6919	1	PIGEON LAKE	S end, deep spot	14-Oct-21	13.10	13.20	13.15
6919	3	PIGEON LAKE	Middle-SandyPtBoyd I	07-Sep-21	17.40	<b>24.40</b>	17.40
6919	3	PIGEON LAKE	Middle-SandyPtBoyd I	09-Oct-21	11.90	13.00	12.45
6919	12	PIGEON LAKE	N-400m N of Boyd Is.	02-Jun-21	7.10	7.90	7.50
6919	12	PIGEON LAKE	N-400m N of Boyd Is.	03-Jul-21	17.00	19.00	18.00
6919	12	PIGEON LAKE	N-400m N of Boyd Is.	05-Aug-21	16.30	18.20	17.25
6919	12	PIGEON LAKE	N-400m N of Boyd Is.	06-Sep-21	12.50	13.00	12.75
6919	12	PIGEON LAKE	N-400m N of Boyd Is.	04-Oct-21	12.30	13.00	12.65
6919	13	PIGEON LAKE	N end-Adjacent Con17	02-Jul-21	20.00	<b>37.00</b>	20.00
6919	13	PIGEON LAKE	N end-Adjacent Con17	07-Sep-21	16.30	16.90	16.60
6919	13	PIGEON LAKE	N end-Adjacent Con17	09-Oct-21	14.80	17.20	16.00
6919	15	PIGEON LAKE	C340-DeadHorseSho	17-May-21	8.30	11.00	9.65
6919	15	PIGEON LAKE	C340-DeadHorseSho	04-Jun-21	7.10	7.60	7.35
6919	15	PIGEON LAKE	C340-DeadHorseSho	03-Jul-21	12.00	12.00	12.00
6919	15	PIGEON LAKE	C340-DeadHorseSho	02-Aug-21	16.30	<b>24.50</b>	16.30
6919	15	PIGEON LAKE	C340-DeadHorseSho	03-Sep-21	14.60	15.20	14.90
6919	15	PIGEON LAKE	C340-DeadHorseSho	05-Oct-21	13.50	13.60	13.55
6919	16	PIGEON LAKE	N300yds off Bottom I	02-Jun-21	8.50	8.90	8.70
6919	16	PIGEON LAKE	N300yds off Bottom I	03-Jul-21	18.00	18.00	18.00
6919	16	PIGEON LAKE	N300yds off Bottom I	05-Aug-21	10.30	<b>20.20</b>	10.30
6919	16	PIGEON LAKE	N300yds off Bottom I	06-Sep-21	11.40		11.40
6919	16	PIGEON LAKE	N300yds off Bottom I	04-Oct-21	10.90	12.60	11.75
7241	2	SANDY LAKE	Mid Lake, deep spot	30-Jun-21	6.40	6.50	6.45
7241	2	SANDY LAKE	Mid Lake, deep spot	21-Aug-21	4.40	5.10	4.75
7241	2	SANDY LAKE	Mid Lake, deep spot	10-Sep-21	5.30	5.40	5.35
7241	2	SANDY LAKE	Mid Lake, deep spot	26-Sep-21	5.70	6.00	5.85
7241	2	SANDY LAKE	Mid Lake, deep spot	11-Oct-21	5.80	7.20	6.50
7133	4	STONY LAKE	Burleigh locks chan.	09-Jun-21	27.00	27.00	27.00
7133	4	STONY LAKE	Burleigh locks chan.	13-Jul-21	59.00	67.00	63.00
7133	4	STONY LAKE	Burleigh locks chan.	31-Jul-21	17.80	17.80	17.80
7133	4	STONY LAKE	Burleigh locks chan.	07-Oct-21	11.50	17.30	14.40
7133	6	STONY LAKE	Gilchrist Bay	10-Jun-21	12.00	12.00	12.00
7133	6	STONY LAKE	Gilchrist Bay	21-Jul-21	13.10	14.70	13.90
7133	6	STONY LAKE	Gilchrist Bay	28-Sep-21	14.20	15.70	14.95
7133	7	STONY LAKE	Mouse Is.	24-May-21	9.00	9.10	9.05
7133	7	STONY LAKE	Mouse Is.	06-Jun-21	8.30	8.50	8.40
7133	7	STONY LAKE	Mouse Is.	31-Jul-21	14.30	14.50	14.40
7133	7	STONY LAKE	Mouse Is.	04-Sep-21	14.40	14.80	14.60
7133	7	STONY LAKE	Mouse Is.	01-Oct-21	10.60	11.00	10.80



STN	Site ID	Lake Name	Site Description	Date	TP1 (µg/L)	TP2 (µg/L)	Avg.TP (µg/L)
7133	8	STONY LAKE	Hamilton Bay	24-May-21	11.00	11.00	11.00
7133	8	STONY LAKE	Hamilton Bay	06-Jun-21	9.60	9.60	9.60
7133	8	STONY LAKE	Hamilton Bay	31-Jul-21	13.30	14.10	13.70
7133	8	STONY LAKE	Hamilton Bay	04-Sep-21	13.70	13.70	13.70
7133	8	STONY LAKE	Hamilton Bay	01-Oct-21	9.20	9.90	9.55
6924	4	STURGEON LAKE	Muskrat I-Buoy C388	19-Aug-21	13.50	13.50	13.50
6924	4	STURGEON LAKE	Muskrat I-Buoy C388	09-Sep-21	16.90	17.50	17.20
6924	5	STURGEON LAKE	Sturgeon Point Buoy	17-Jun-21	13.00	13.00	13.00
6924	5	STURGEON LAKE	Sturgeon Point Buoy	26-Jul-21	13.90	14.00	13.95
6924	5	STURGEON LAKE	Sturgeon Point Buoy	27-Aug-21	7.10	14.20	10.65
6924	5	STURGEON LAKE	Sturgeon Point Buoy	29-Sep-21	11.10	11.60	11.35
6924	9	STURGEON LAKE	Fenelon R. mouth	17-Jun-21	11.00	11.00	11.00
6924	9	STURGEON LAKE	Fenelon R. mouth	26-Jul-21	11.10	11.20	11.15
6924	9	STURGEON LAKE	Fenelon R. mouth	27-Aug-21	6.10	6.10	6.10
6924	9	STURGEON LAKE	Fenelon R. mouth	29-Sep-21	7.50	8.00	7.75
5178	1	UPPER STONEY LAKE	Quarry Bay	06-Jun-21	5.70	7.00	6.35
5178	1	UPPER STONEY LAKE	Quarry Bay	03-Jul-21	9.20	11.00	10.10
5178	1	UPPER STONEY LAKE	Quarry Bay	30-Jul-21	7.80	8.10	7.95
5178	1	UPPER STONEY LAKE	Quarry Bay	07-Sep-21	7.00	7.70	7.35
5178	1	UPPER STONEY LAKE	Quarry Bay	02-Oct-21	13.20	<b>18.10</b>	13.20
5178	3	UPPER STONEY LAKE	Young Bay	06-Jun-21	6.60	7.20	6.90
5178	3	UPPER STONEY LAKE	Young Bay	03-Jul-21	7.70	9.60	8.65
5178	3	UPPER STONEY LAKE	Young Bay	30-Jul-21	8.10	9.20	8.65
5178	3	UPPER STONEY LAKE	Young Bay	07-Sep-21	6.90	6.90	6.90
5178	3	UPPER STONEY LAKE	Young Bay	02-Oct-21	5.70	7.50	6.60
5178	4	UPPER STONEY LAKE	S Bay, deep spot	06-Jun-21	9.90	10.00	9.95
5178	4	UPPER STONEY LAKE	S Bay, deep spot	03-Jul-21	13.00	<b>18.00</b>	13.00
5178	4	UPPER STONEY LAKE	S Bay, deep spot	30-Jul-21	8.90	9.90	9.40
5178	4	UPPER STONEY LAKE	S Bay, deep spot	07-Sep-21	19.50	19.80	19.65
5178	4	UPPER STONEY LAKE	S Bay, deep spot	02-Oct-21	5.00	13.50	5.00
5178	5	UPPER STONEY LAKE	Crowes Landing	06-Jun-21	6.70	7.60	7.15
5178	5	UPPER STONEY LAKE	Crowes Landing	03-Jul-21	7.10	8.40	7.75
5178	5	UPPER STONEY LAKE	Crowes Landing	30-Jul-21	8.80	<b>18.30</b>	8.80
5178	5	UPPER STONEY LAKE	Crowes Landing	07-Sep-21	7.40	7.80	7.60
5178	5	UPPER STONEY LAKE	Crowes Landing	02-Oct-21	8.10	8.10	8.10
5178	6	UPPER STONEY LAKE	Mid Lake, deep spot	06-Jun-21	6.50	7.00	6.75
5178	6	UPPER STONEY LAKE	Mid Lake, deep spot	03-Jul-21	23.00	23.00	23.00
5178	6	UPPER STONEY LAKE	Mid Lake, deep spot	30-Jul-21	9.10	9.10	9.10
5178	6	UPPER STONEY LAKE	Mid Lake, deep spot	07-Sep-21	7.20	8.50	7.85
5178	6	UPPER STONEY LAKE	Mid Lake, deep spot	02-Oct-21	6.30	7.40	6.85
6963	1	WHITE LAKE (DUMMER)	S end, deep spot	19-May-21	12.00	14.00	13.00
6963	1	WHITE LAKE (DUMMER)	S end, deep spot	16-Jun-21	13.00	13.00	13.00
6963	1	WHITE LAKE (DUMMER)	S end, deep spot	16-Jul-21	11.80	12.60	12.20

STN	Site ID	Lake Name	Site Description	Date	TP1 (µg/L)	TP2 (µg/L)	Avg.TP (µg/L)
6963	1	WHITE LAKE (DUMMER)	S end, deep spot	23-Aug-21	12.40	14.70	13.55
6963	1	WHITE LAKE (DUMMER)	S end, deep spot	19-Sep-21	9.30	9.50	9.40
6963	1	WHITE LAKE (DUMMER)	S end, deep spot	18-Oct-21	9.20	9.30	9.25

## 2021 Secchi Depth and Calcium Measurements

Named after its inventor, Angelo Secchi, a Secchi disk is a device for measuring water clarity. It is a weighted disc 20cm in diameter with alternate black and white quadrants. When lowered into a lake, the depth at which the disc can no longer be seen (the black and white quadrants cannot be distinguished) is called the Secchi depth. The deeper the Secchi depth, the clearer the water. Basic water clarity can be affected by the amount of sediments or Dissolved Organic Matter (DOM) that the water contains. Seasonal variation of water clarity is usually related to the amount of algae it contains resulting in spring and fall Secchi Depths being greater than mid-summer values. The Lake Partner Program (LPP) asks volunteers to measure the Secchi Depth every two weeks between early May to early October. Since 2018, LPP have averaged the Secchi Depths and only provide the seasonal average which is presented here.

Calcium is a nutrient that is required by all living organisms. Aquatic species from zooplankton to crayfish depend on extracting calcium from lake water in order to grow. Levels of calcium below 2.5 mg/L can threaten the survival of many aquatic species. Calcium in lake water is derived from mineral weathering of rocks and atmospheric deposition of calcium-rich dust. Many Ontario lakes on the Precambrian Shield have been found to have very low calcium levels believed to be due to the low rate of weathering of hard, low calcium content rocks and the removal of calcium from the watershed by forest harvesting. As a result, since 2008 the Lake Partner Program (LPP) has been measuring the calcium concentration of some lake water samples for all lakes tested for Total Phosphorus. The average Calcium measurement for each site in 2021 is provided in the table below. As shown in the table, the Kawartha Lakes do not have a calcium deficiency. The limestone bedrock and calcareous soils to the south of the lakes provide more than enough calcium to sustain the aquatic life in our lakes.

STN	Site ID	Lake	Site Description	Date	Secchi Depth (m)	Calcium (mg/L)
6902	2	BALSAM LAKE	N Bay Rocky Pt.	2021 Avg.	5.9	21.4
6902	5	BALSAM LAKE	NE end-Lightning Pt	2021 Avg.	3.9	17.1
6902	7	BALSAM LAKE	South B-Killarney B	2021 Avg.	4.4	21.1
6902	8	BALSAM LAKE	W Bay2, deep spot	2021 Avg.		21.7
6902	9	BALSAM LAKE	E of Grand Is	2021 Avg.	5.1	21.5
6941	1	BIG BALD LAKE	Mid Lake, deep spot	2021 Avg.	3.5	36.9
363	1	BIG CEDAR LAKE	Mid Lake, deep spot	2021 Avg.	5.7	25.8
7131	1	BUCKHORN LAKE (U)	Narrows-redbuoy C310	2021 Avg.		33.6
7131	9	BUCKHORN LAKE (U)	Young's Cove, deep spot	2021 Avg.		34.6
7131	10	BUCKHORN LAKE (U)	NE of Fox Is	2021 Avg.	3.3	26.8
6905	6	CAMERON LAKE	S end, deep spot	2021 Avg.		20.8
6951	9	CHEMONG LAKE	S. of Causeway	2021 Avg.		44.6
6951	11	CHEMONG LAKE	N of Big Island	2021 Avg.		50.8

STN	Site ID	Lake	Site Description	Date	Secchi Depth (m)	Calcium (mg/L)
6955	1	CLEAR LAKE	MacKenzie Bay	2021 Avg.		30.0
6955	2	CLEAR LAKE	Main Basin-deep Spot	2021 Avg.		30.9
6955	3	CLEAR LAKE	Fiddlers Bay	2021 Avg.		32.5
7075	2	JULIAN LAKE	Mid Lake, deep spot	2021 Avg.		42.0
7076	1	KATCHEWANOOKA	S/E Douglas Island	2021 Avg.		32.3
7076	2	KATCHEWANOOKA	Young Pt near locks	2021 Avg.	5.4	31.5
7087	1	LOVESICK LAKE	80' hole at N. end	2021 Avg.		34.1
7087	3	LOVESICK LAKE	McCallum Island	2021 Avg.		32.7
6990	1	LOWER BUCKHORN	Heron Island	2021 Avg.		33.0
6990	4	LOWER BUCKHORN	Deer Bay W-Buoy C267	2021 Avg.		32.0
6990	6	LOWER BUCKHORN	Deer Bay-centre	2021 Avg.		32.6
6990	7	LOWER BUCKHORN	Lower Deer Bay, Mid-deep	2021 Avg.	1.9	30.8
6990	8	LOWER BUCKHORN	Main basin, deep-spot	2021 Avg.	2.6	27.8
6919	1	PIGEON LAKE	S end, deep spot	2021 Avg.	2.6	30.5
6919	3	PIGEON LAKE	Middle-SandyPtBoyd Is	2021 Avg.	3.1	
6919	12	PIGEON LAKE	N-400m N of Boyd Is	2021 Avg.		36.4
6919	13	PIGEON LAKE	N end-Adjacent Con17	2021 Avg.	3.8	
6919	15	PIGEON LAKE	C340-Dead Horse Shoal	2021 Avg.	3.0	37.2
6919	16	PIGEON LAKE	N300yds off Bottom Is	2021 Avg.		36.8
7241	2	SANDY LAKE	Main basin, deep-spot	2021 Avg.	4.6	39.0
7133	4	STONY LAKE	Burleigh locks channel	2021 Avg.		31.1
7133	6	STONY LAKE	Gilchrist Bay	2021 Avg.		30.0
7133	7	STONY LAKE	Mouse Is.	2021 Avg.	4.4	29.6
7133	8	STONY LAKE	Hamilton Bay	2021 Avg.	4.0	27.4
6924	5	STURGEON LAKE	Sturgeon Point Buoy	2021 Avg.	2.9	29.8
6924	9	STURGEON LAKE	Fenelon R. mouth	2021 Avg.	3.1	21.7
5178	1	UPPER STONEY LAKE	Quarry Bay	2021 Avg.		27.5
5178	3	UPPER STONEY LAKE	Young Bay	2021 Avg.		26.6
5178	4	UPPER STONEY LAKE	S Bay, deep spot	2021 Avg.		24.6
5178	5	UPPER STONEY LAKE	Crowes Landing	2021 Avg.		27.8
5178	6	UPPER STONEY LAKE	Mid Lake, deep spot	2021 Avg.		27.1
6963	1	WHITE LAKE	S end, deep spot	2021 Avg.	4.8	31.8