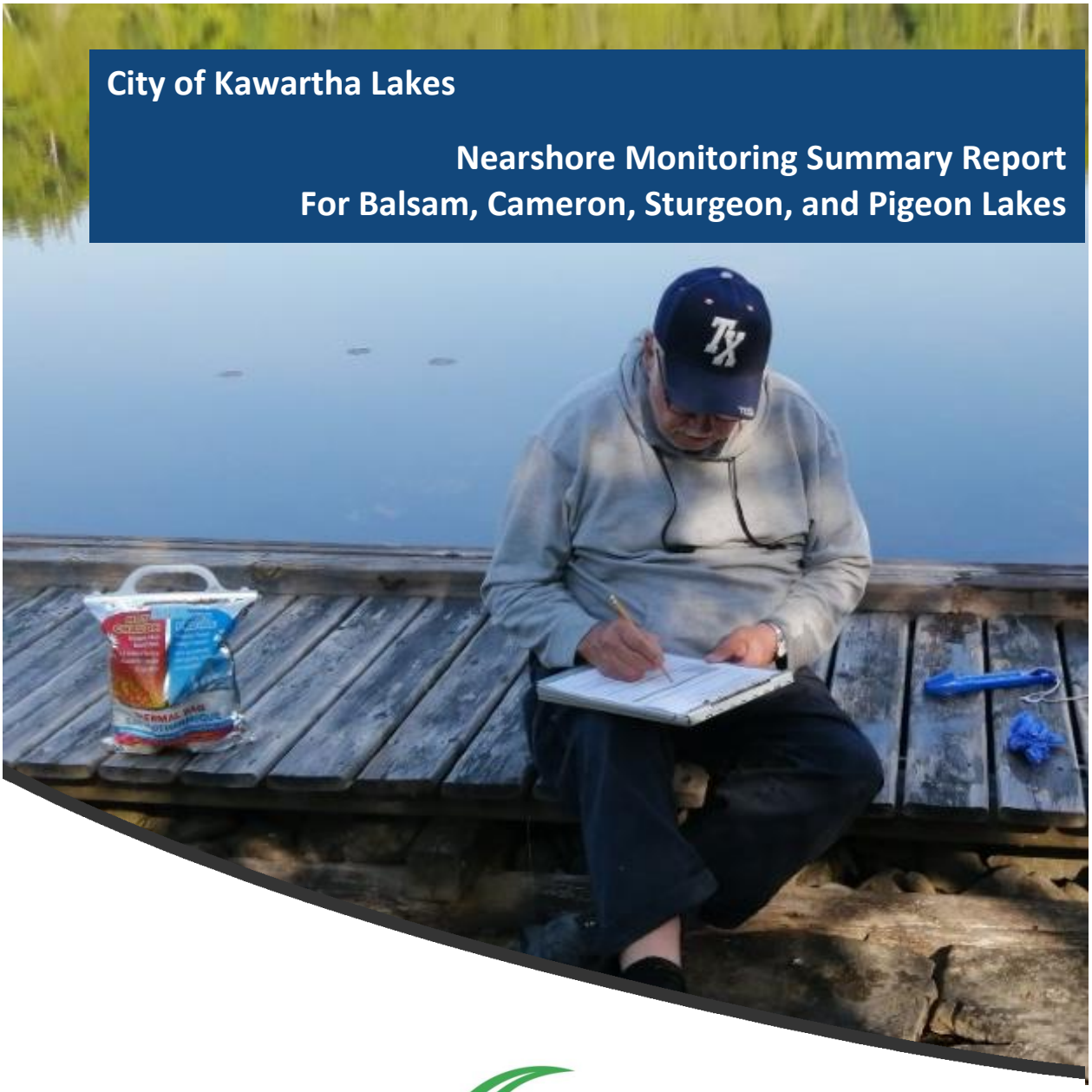
City of Kawartha Lakes

Nearshore Monitoring Summary Report For Balsam, Cameron, Sturgeon, and Pigeon Lakes



KAWARTHA CONSERVATION

Discover · Protect · Restore

About Kawartha Conservation

Who we are

We are a watershed-based organization that uses planning, stewardship, science, and conservation lands management to protect and sustain outstanding water quality and quantity supported by healthy landscapes.

Why is watershed management important?

Abundant, clean water is the lifeblood of the Kawarthas. It is essential for our quality of life, health, and continued prosperity. It supplies our drinking water, maintains property values, sustains an agricultural industry, and contributes to a tourism-based economy that relies on recreational boating, fishing, and swimming. Our programs and services promote an integrated watershed approach that balance human, environmental, and economic needs.

The community we support

We focus our programs and services within the natural boundaries of the Kawartha watershed, which extend from Lake Scugog in the southwest and Pigeon Lake in the east, to Balsam Lake in the northwest and Crystal Lake in the northeast – a total of 2,563 square kilometers.

Our history and governance

In 1979, we were established by our municipal partners under the Ontario Conservation Authorities Act. The natural boundaries of our watershed overlap the six municipalities that govern Kawartha Conservation through representation on our Board of Directors. Our municipal partners include the City of Kawartha Lakes, Region of Durham, Township of Scugog, Township of Brock, Municipality of Clarington, Municipality of Trent Lakes, and Township of Cavan Monaghan.

Kawartha Conservation
T: 705.328.2271 | F: 705.328.2286
277 Kenrei Road, Lindsay ON K9V 4R1
GenInfo@KawarthaConservation.com

Acknowledgements

We would like to acknowledge that many Indigenous Nations have longstanding relationships, both historic and modern, with the territories upon which we are located.

Today, this area is home to many Indigenous peoples from across Turtle Island. We acknowledge that our watershed forms a part of the treaty and traditional territory of the south-eastern Anishinaabeg.

It is on these ancestral and Treaty lands that we live and work. To honour this legacy, we commit to being stewards of the natural environment and undertake to have a relationship of respect with our Treaty partners.

The region of Kawartha Lakes was referred to as Gau-wautae-gummauh, a glistening body of water, in anishinaabemowin. We are thankful to have an opportunity to work with Indigenous Peoples in the continued stewardship and care of this beautiful region.

This report was written by Tanner Liang, Water Quality Specialist, Kawartha Conservation and is based on the work of Smith (2022), which was a collaboration between Ontario Tech University and Kawartha Conservation. Peer editors include Ian McRae, Environmental Communications, Robert Stavinga, Watershed Resource Technician, Nancy Aspden, Acting Manager, Integrated Watershed Management.

Others who have contributed to the development of this project include:

Deborah Balika, Source Water Protection Manager — Conservation Ontario

Dr. Andrea Kirkwood — Ontario Tech University

Dr. Erin Smith — Ontario Tech University

and numerous volunteer citizen scientists who participated actively throughout the watershed.

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Abbreviations

%:	Percentage
µg/L:	Microgram(s) per liter
^{o}C:	Degree Celsius
ABS:	Absorbance
CCME:	Canadian Council of Ministers of the Environment
Chl-a:	Chlorophyll-a
Coli:	Coliforms
CWQG:	Canadian Water Quality Guideline
E. coli	*Escherichia coli*
g/L	Gram(s) per liter
ha:	hectares
m:	meter
mg/L:	Milligram(s) per liter
mL:	Mililiter(s)
MPN:	Most Probable Number
n:	Sample size
NH_x:	Total Ammonia
NO_2:	Nitrite
NO_3:	Nitrate
PWQO:	Provincial Water Quality Objectives
PWQMN	Provincial Water Quality Monitoring Network
Temp.:	Water Temperature
TDP	Total Dissolved Phosphorus
TN:	Total Nitrogen
TON:	Total Organic Nitrogen
TP:	Total Phosphorus
TSS:	Total suspended solids

Summary

The Nearshore Monitoring Program is a volunteer-based community monitoring program that operated on Balsam, Cameron, Sturgeon, and Pigeon Lakes in 2019 and 2021. This resulted in over 300 samples collected across the ice-free period of June to September. Water quality analysis was completed by Smith (2022). This report aims to compare results to existing water quality guidelines and thresholds and to identify areas of elevated exceedance rates.

Results found indicated no exceedances of *E. coli* and nitrate were found during the sample events, while there were higher rates of exceedances for Total Phosphorous (TP) (20% of all samples) and Total Suspended Solids (TSS) (47.6% of all samples). Higher exceedance rates for TP occurred on more productive lakes. There was no clear spatial pattern for elevated TSS levels across the four lakes, but higher levels of TSS were found in areas of higher boat traffic and areas with lower abundances of aquatic plants. Water quality analysis from Smith (2022) suggested that storm events were associated with higher TSS levels, suggesting terrestrial inputs from poor erosion control and possible resuspension of sediment from wave action. Nutrient levels were found to be associated with development. Exceedances of ammonia only occurred at one site during one sampling event. This site also had exceedances of TP and TSS, however it is currently under redevelopment for improved ecological function to provide functional natural habitats.

Proper erosion control (either human-made or by natural systems) is needed, enforced, and maintained to prevent soils from entering the lake, while the establishment of macrophytes is needed to prevent the resuspension of suspended sediments.

Introduction

An identifiable data gap that exists in each of the completed Lake Management Plans (Kawartha Conservation, 2014a, 2015a, and 2018a) is the lack of nearshore water quality (chemical and biological). The nearshore area is under the direct influence of activities performed on the shoreline (urban development, agriculture, specific shoreline alteration), and acts as a transition zone between land and water. The nearshore environment is also where most recreational activities occur, i.e., fishing, swimming, paddling, etc., making it the most "touched" area for humans.

Thus, under the City of Kawartha Lakes – Lake Management Implementation Action Plan, the Nearshore Monitoring Program was proposed. This program builds upon previous Lake Management Plans (Kawartha Conservation, 2014a, 2015a, 2018a) to undertake the following objectives:

1) Fill in knowledge gaps in nearshore water quality, and
2) Identify hotspots/areas of elevated contaminant levels.

Data collected in the nearshore areas can function as an early warning indicator for the lakes, identifying "problem areas" or "hot spots" of degraded water quality and threats to human and animal health, in addition to a decrease in biodiversity and habitat. The information gathered from each survey will also serve as a starting point to initiate specific stewardship priorities and actions.

During the ice-free period of 2019 and 2021, Citizen Scientists (CS) gathered water quality information across four key Kawartha Lakes, Balsam, Cameron, Sturgeon, and Pigeon Lake (Figure 1, 2). Information gathered was used to address the first objective of the Nearshore Monitoring Program. Water quality analysis was completed by Smith (2022). This report will use the information collected to address the second objective of the program:

1) Compare against the Provincial Water Quality Objectives (MOEE, 1994) and the Canadian Water Quality Guidelines (CCME, 2002, 2004, 2010, 2012), and

2) Highlight areas of elevated contaminant levels, which will be used to inform strategic stewardship activities.

Methods

Study Area

The Kawartha Lakes are a chain of lakes situated in the "land in between" where there is a geological transition between limestone and granite bedrock. Lakes that were monitored in this program are Balsam Lake, Cameron Lake, Sturgeon Lake, and Pigeon Lake (Figure 1, 2, Table 1). These lakes are also part of the Trent-Severn Waterway system that links Georgian Bay with Lake Ontario (Bay of Quinte).

Table 1. Physical characteristics of the study lakes and their watersheds. Source (Kawartha Conservation, 2014b, 2015b, 2018 b; Smith, 2022).

Lake	Trophic Status	ha Lake Area	m Average Depth	Watershed - Land Cover (%) Natural	Agricultural	Urban
Balsam	Oligotrophic	48	4.8	55.5	37.8	6.7
Cameron	(Unproductive)	14.7	6.9	51.1	43.2	5.7
Sturgeon	Mesotrophic	45.6	3.5	40.9	49.5	9.7
Pigeon	(Productive)	55	3.3	49.6	44.5	5.9

Of the four lakes, Balsam and Cameron Lake are classified as oligotrophic or unproductive (CCEM, 2004), where total phosphorus concentrations have been found to be less or equal to 10 µg/L (Kawartha Conservation, 2015). Both Sturgeon and Pigeon Lake are more productive or mesotrophic and have been found to have total phosphorus concentrations around 20 µg/L (Kawartha Conservation, 2014, 2016). Geology and land use are some of the main driving factors for the inputs of phosphorus, where lakes located on limestone bedrock or that have less natural cover tend to be more productive. Lakes located on more granite bedrock or that have more natural cover results in less productive lakes.

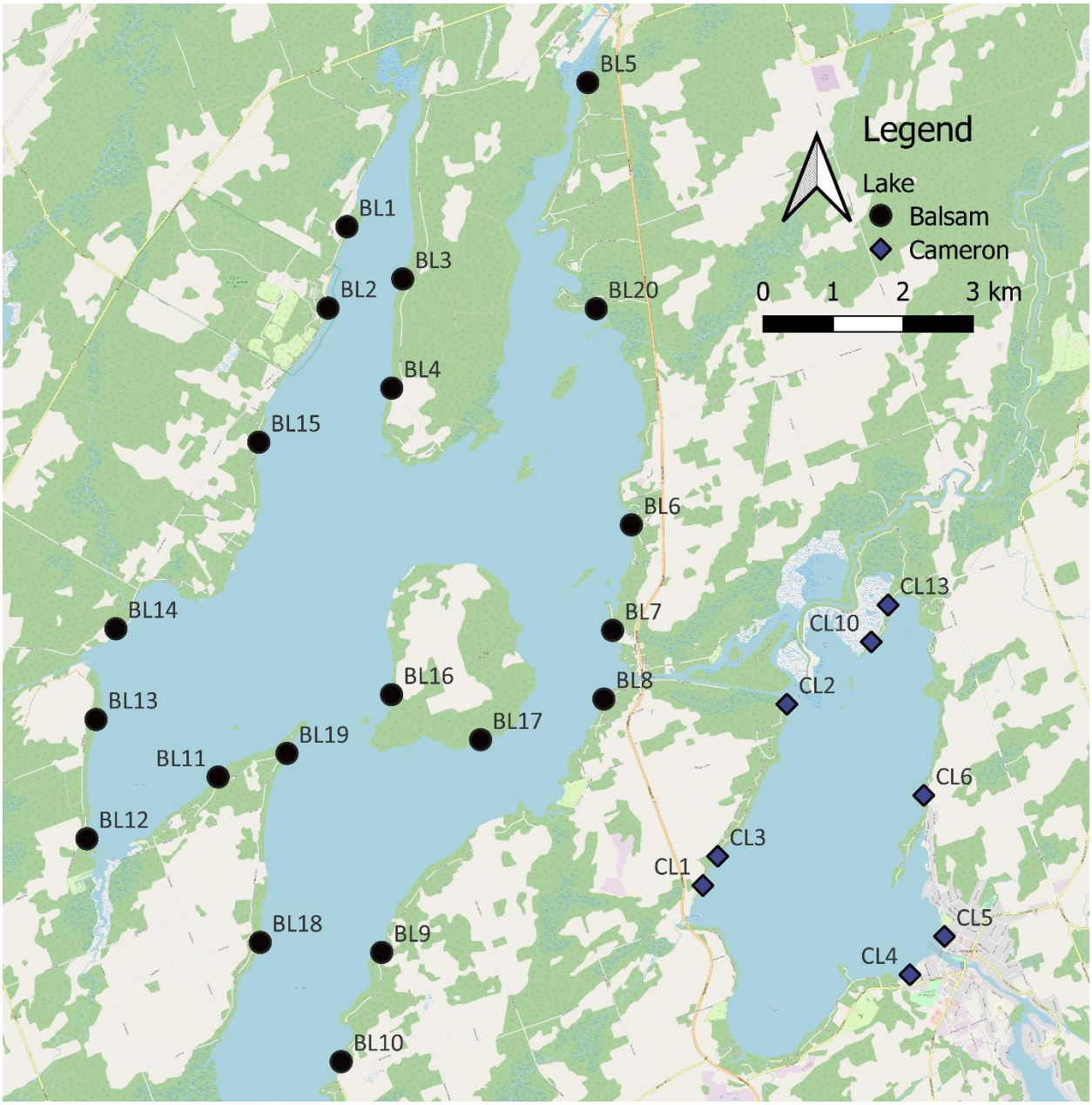

Figure 1. Locations of sampling sites across Balsam Lake (black circles) and Cameron Lake (blue diamonds).

Across Balsam, Cameron, Sturgeon, and Pigeon Lake, 51 sites were monitored in 2019 and 4 sites were monitored in 2021. (Figure 1). Due to the COVID-19 pandemic, the Nearshore Monitoring Program was not implemented in 2020. Sites were mostly located in the nearshore environment of private lots (those

owned by Citizen Scientists), with a few located on public lands, i.e., road allowances, parks, beaches, etc.

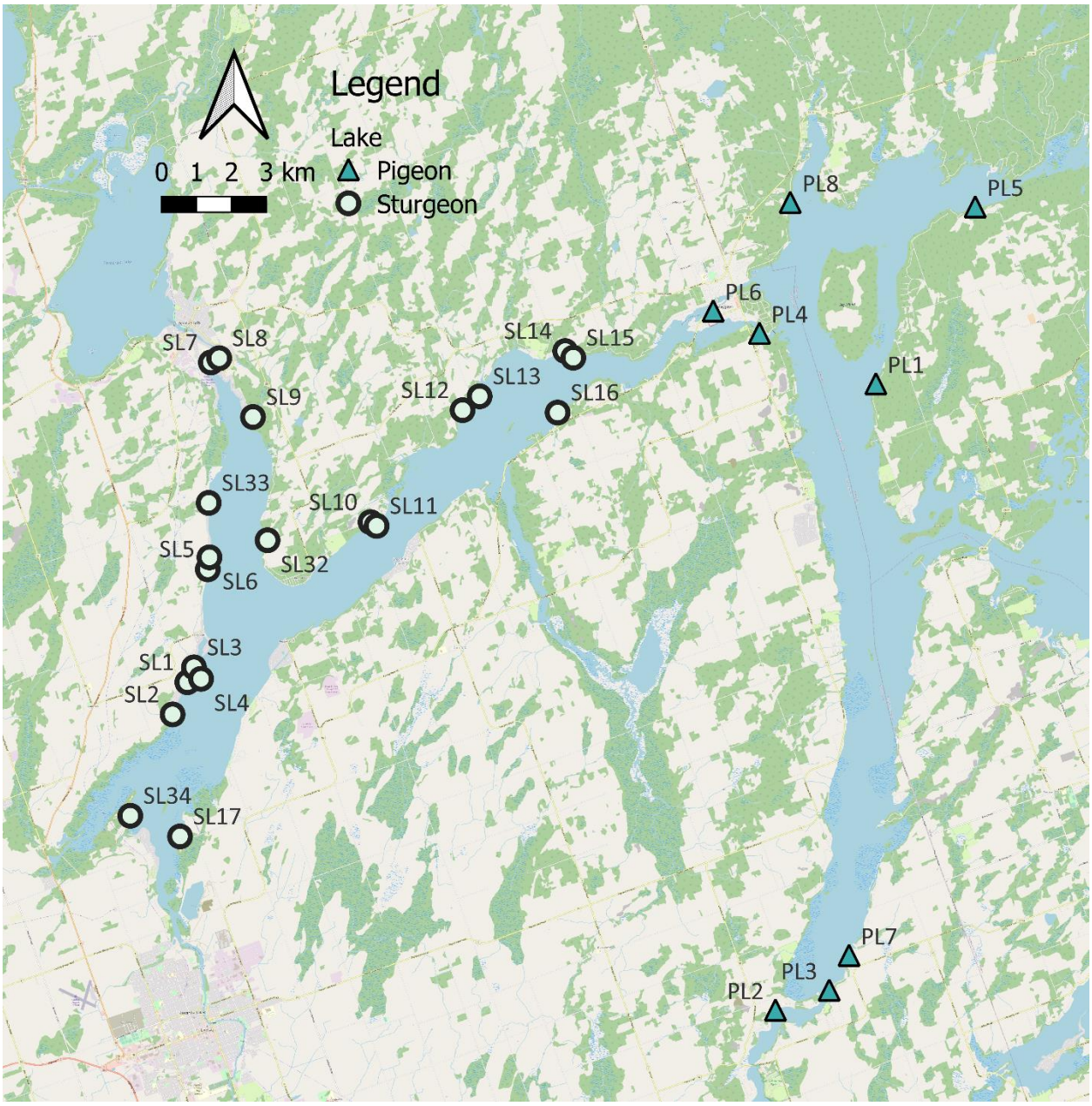

Figure 2. Locations of sampling sites across Sturgeon Lake (light blue circles), and Pigeon Lake (teal triangles).

Field and Lab Methods

From 2019 to 2021, Citizen Scientists were recruited through physical and digital communication methods. Due to the COVID-19 pandemic, the Nearshore Monitoring Program was not implemented in 2020. Prior to any sampling, all Citizen Scientist were required to attend a mandatory training session, where the grab sampling technique was taught, i.e., triple rinsed with the targeted water, followed by filling, and capping the bottle at the 0.15-0.3 m depth. All sampling containers were acid-washed or sterile and were provided by the Kirkwood Lab at Ontario Tech University (Smith, 2022). All samples taken by Citizen Scientists were collected at the 1.0 m depth mark. This was achieved by either sampling from a dock or wading in the water. Those wading into the water were trained to collect the sample after the sedimentation of the disturbed sediment. Details regarding field and laboratory methods can be found in Smith (2022). Parameters of interest were the following:

Parameter	Description	Common Sources
Phosphorus (Total Phosphorus and Total Dissolved Phosphorus)	An essential nutrient for plant and animal growth. It is often the limiting factor in freshwater systems where too much would trigger excessive plant growth and rapid aging of lakes, commonly known as eutrophication.	Fertilizer, sewage, stormwater, fecal matter, and septic systems.
Nitrogen (Ammonia, Nitrate, Nitrite, Total Organic Nitrogen)	An essential nutrient for plant and animal growth. Excess amounts of some nitrogen species can cause excessive plant and/or bacteria growth and be toxic to aquatic life.	Fertilizer application, sewage, cosmetics, stormwater, industrial salts, and animal feed.

Suspended Solids	Suspended particles are an indicator of poor land management (exposed soils and poor erosion control).	Erosion of soils (wind, runoff) and resuspension of lake sediment.
Escherichia coli (*E. coli*)	Indicator of fecal contamination where harmful pathogens may be found.	Bird colonies, livestock agriculture, septic systems.

Data Analysis

To assess ammonia concentrations, values for pH were taken from the Provincial Water Quality Monitoring Network (PWQMN) (MECP, 2022). Background TSS values were also taken from the PWQMN (MECP, 2022). Values taken were from stations on the lake outlets of Balsam (ID: 17002105402; Rosedale), Cameron (ID: 17002102302; Fenelon Falls), and Sturgeon (ID: 17002102102; Bobcaygeon). Background TSS levels were taken from the Pigeon River outlet (into Pigeon Lake; ID: 17002107402).

Water quality results were compared against the Ontario Provincial Water Quality Objectives (PWQO; MOEE, 1994) and the Canadian Water Quality Guidelines (CWQG) for the Protection of Aquatic Life (CCME, 2002, 2004, 2010, 2012). By using both the PWQO and CWQG we can ensure that water quality is satisfactory for the protection of aquatic life and for recreational use.

Since many stewardships and remediation actions are land based, where the goal is to either infiltrate runoff or to provide enhance uptake/processing by microbial/trees/plants, rainfall data (total amount in the previous 24 hours) was obtained to determine possible runoff days, where runoff from rain events is possible. Rainfall data was obtained from Kawartha Conservation's climate stations in Indian Point Provincial Park, Ken Reid Conservation Area, and Emily Provincial Park (Kawartha Conservation, 2022). This data was used to filter sample sites to isolate those that experienced exceedances (those that had higher levels

than those recommended for the protection of aquatic life and recreation use) during rain events.

Results & Discussion

In total, there were 56 sites spread across the four lakes (Figure 1), with the most sites on Balsam and Sturgeon Lake (n=20 each) and fewer on Cameron and Pigeon Lake (n=8 each). This produced over three hundred samples collected across the two monitoring years (Table 2). For a detailed analysis of the water quality of the nearshore environment, please see Smith (2022).

Table 2. Count, mean (average), and median values of chemical parameters per lake (both years). Mean values for *E. coli* are calculated by geometric mean.

Lake	Units Stats	µg/L TP	µg/L TDP	ABS Turb	mg/L TSS	mg/L Chl-a	MPN/100mL Coli
Balsam	Count	134	132	135	135	135	118
	Mean	7.74	1.18	0.002	2357.8	0.84	11.26
Cameron	Count	51	51	51	51	51	48
	Mean	9.07	1.36	0.001	4447.3	1.69	11.53
Sturgeon	Count	104	104	103	108	90	95
	Mean	16.78	4.29	0.001	4772.7	1.83	16.32
Pigeon	Count	48	48	47	49	41	42
	Mean	28.52	4.04	0.003	10914	9.07	10.87
Lake	**Units Stats**	**MPN/100mL *E. coli***	**mg/L TN**	**mg/L NO_2**	**mg/L NO_3**	**mg/L NHx**	**mg/L TON**
Balsam	Count	98	133	133	133	133	133
	Mean	1.15	0.3	0.001	0.05	0.01	0.24
Cameron	Count	36	51	51	51	51	51
	Mean	1.21	0.26	0.001	0.03	0.01	0.223
Sturgeon	Count	83	104	104	104	104	104
	Mean	1.62	0.37	0.001	0.03	0.02	0.32
Pigeon	Count	38	47	48	48	48	47
	Mean	1.47	0.45	0.001	0.03	0.05	0.38

Total Phosphorus

In total, 352 observations for total phosphorus (TP) concentration were collected between the two monitoring years. In the nearshore environment, average concentrations of TP were found to be 29.27 µg/L for Pigeon Lake, 17.45 µg/L for Sturgeon Lake, 9.41 µg/L for Cameron Lake, and 6.42 µg/L for Balsam Lake. This corresponds to the trophic status of meso-eutrophic for Pigeon Lake, mesotrophic for Sturgeon Lake, and oligotrophic for Balsam and Cameron Lake. It should be noted that many exceedances were found in developed areas, which may be biased as these were areas to which citizen scientists were more likely to access.

About 20% of all samples exceeded the interim PWQO for TP which is 20 µg/L for mesotrophic lakes (Sturgeon and Pigeon Lake) and 10 µg/L oligotrophic lakes (Balsam and Cameron Lake) (MOEE, 1994). Levels of TP found above those thresholds can contribute to the nuisance growth of algae and aquatic plants. Between lakes, Pigeon Lake had the highest exceedance percentage (33.3% of all samples), followed by Sturgeon (26.3%), Balsam (13.4 %), and Cameron Lake (10%).

This pattern somewhat continued when encompassing rainfall data, where Pigeon Lake had the highest percentage of exceedance observations (38%), followed by Sturgeon (26%), Balsam (12%), and Cameron (10%) Lake (Figure 3). The sites with observed PWQO exceedances during rain events should be prioritized for landowner outreach and stewardship project implementation (Figure 3, Appendix A. Table 1 for a list of sites).

The differences of exceedance values between with and without rainfall data is the influence of rainfall and stormwater input. Stormwater input has been shown to harbor elevate levels of nutrients, sediment, and contaminants (Mallin *et al.,* 2009). Thus, to mitigate inputs of excess nutrient, sediments, and contaminants, natural infrastructure and Low Impact Development (LID) projects may be implemented to improve water quality.

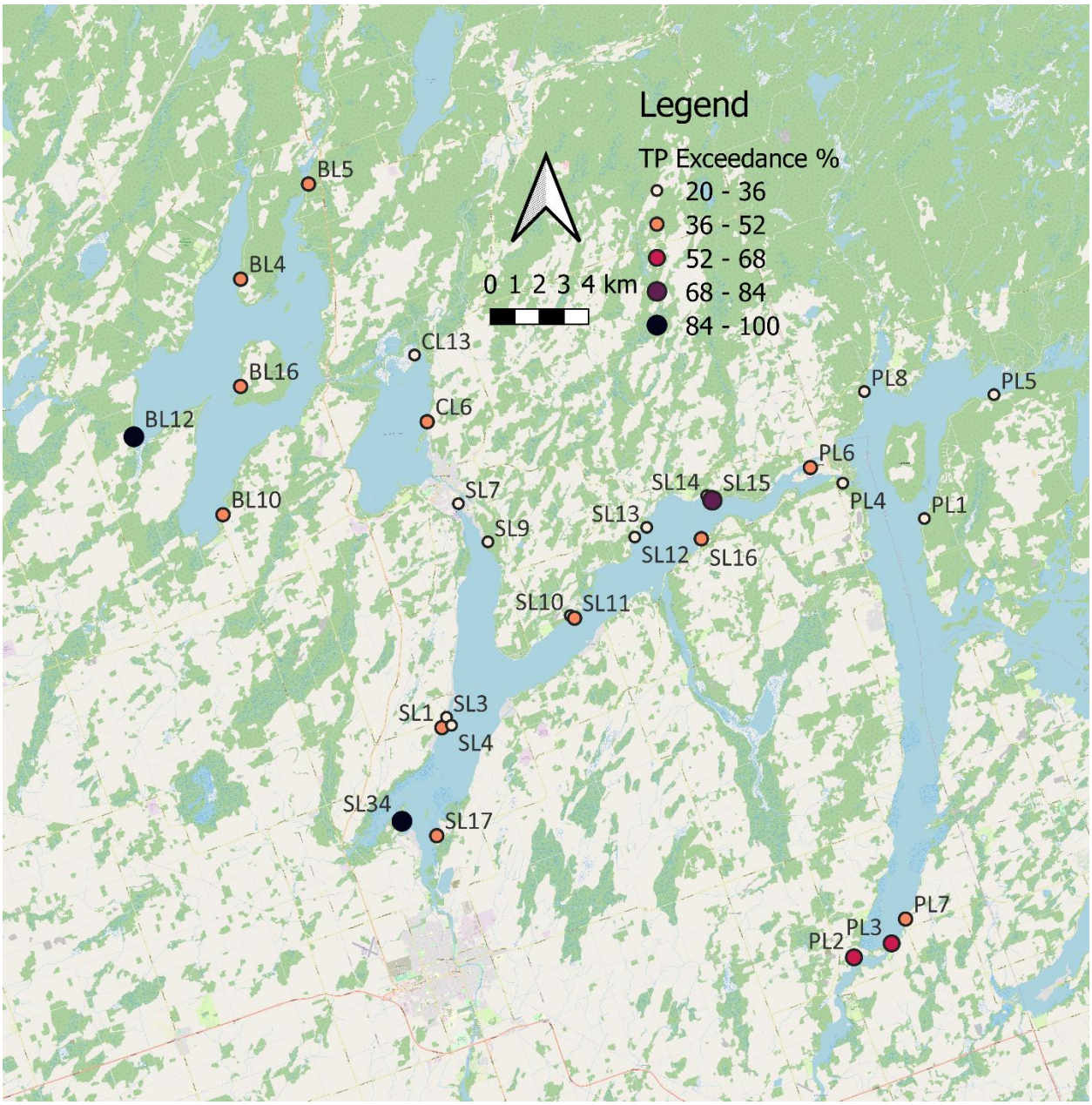

Figure 3. Locations of sites that exceeded the interim PWQO for total phosphorus during rain events. Large circles indicate sites with more frequent exceedances.

For Sturgeon Lake, higher exceedances were found along the eastern portion of the lake and some sporadic sites in the eastern and southern arms (Figure 3), which were found to be associated with land development (Smith, 2022). For Pigeon Lake, sites that had higher exceedance rates were found at the southern end of the lake. This is similar to what Kawartha Conservation (2018a) found

where the southern portion of Pigeon Lake had higher TP levels than the northern portion. This was due to different hydrological contributions, where the northern portion was fed by naturally low phosphorous water from the Canadian Shield, while the southern portion was fed by more productive and developed tributaries (Kawartha Conservation, 2018a). For example, Reforestation Creek was found to be a tributary of concern due to higher phosphorus input (Kawartha Conservation, 2018a). This nutrient rich outflow may have contributed to higher levels of phosphorus in the nearshore. In addition, the southern portion of Pigeon Lake is shallower, resulting in an abundance of plants. These plants temporarily uptake phosphorus during the growing season which is then released back into the water once decomposed. However, the biogeochemistry of phosphorus in shallow systems are dynamic and complex (Reddy *et al.*, 2005).

Nitrogen

Nitrogen is another essential nutrient for plant and animal growth. As nitrogen is cycled through the environment (in both living and nonliving things), it can take the form of different nitrogen species. In this report, we looked at four species of nitrogen: total ammonia, nitrate, nitrite, and total organic nitrogen. Like phosphorus, excessive amounts of certain species of nitrogen can cause nuisance growth of bacteria and plants. In addition, excessive levels of certain species of algae can be toxic to aquatic life. The source of nitrogen can be natural (wetlands, decomposition of organic matter, forest fires, animal waste, etc.) or human-made (wastewater, agricultural fertilizer and runoff, septic beds, landfills, exhaust, etc.).

Total Ammonia

When compared to the PWQO (MOEE, 1994) and CWQG (CCME, 2010) thresholds, almost all values were found to be below except for one site at one time (Figure 4), which represents approximately 0.3% of all samples. This site, which is in the town of Bobcaygeon at the outlet of Sturgeon Lake, also has exceedances of TP and TSS (63%). For the location of the single exceeded site, please see Appendix A. Table 2. Currently, the Bobcaygeon Beach is undergoing redevelopment to improve ecological function and provide water quality

treatment through the implementation of green infrastructures and Low Impact Development.

Figure 4. Location of the single site that exceeded of total ammonia thresholds (PWQO and/or CWQG) during and outside of rain events.

Nitrate

All inorganic forms of nitrogen released into aquatic systems have the potential to be transformed into nitrate through nitrification. Because of this, nitrate is the predominant species of available nitrogen in surface waters (Crouzet *et al.*, 1999) and is also the primary source of nitrogen for aquatic plants. Elevated nitrate levels can also increase the risk of algal blooms and rapid eutrophication, which

can have an impact to water quality (reduce clarity) and fisheries (food chain collapse and loss of cold-water fish species).

Of the 351 observations of nitrate, no samples were above the (long-term) CWQG for the protection of aquatic life, 3.0 mg/L (CCME, 2012). Across both monitoring years, average concentrations were found to be higher among Pigeon (mean = 0.06 mg/L) and Sturgeon Lake (0.06 mg/L) and lower in Cameron (0.04 mg/L) and Balsam Lake (0.01 mg/L). Higher concentrations found in Pigeon and Sturgeon Lake are not of concern as they are within natural, or background levels (< 4.0 mg/L) found in natural waterways (McNeely *et al.*, 1979; CCEM, 2012). Even for unproductive lakes (Balsam and Cameron Lake), levels are within natural levels of 0.4 mg/L (NRC 1978; McNeely *et al.*, 1979; Nordin and Pommen 1986).

Although no exceedance was found, nitrate levels were found to be driven by road density (Smith, 2022). Hard surfaces along the shoreline can amplify nitrate inputs from shoreline septic, and fertilizer use (Smith *et al.*, 2021; Zampella *et al.*, 2007).

Escherichia coli (*E. coli*)

The bacteria *Escherichia coli* (*E. coli*) is a naturally occurring bacteria that can be found in soil, water, sediment, and in the intestine of warm-bodied animals such as birds, mammals, livestock, and humans. Because it is found in the digestive system of warm-bodied animals, it is associated with fecal matter, thus it is used as an indicator of fecal contamination. The presence of fecal contamination in surface water increases the risk of water-borne pathogens to occur. Due to the rural nature of the study area, a number of E. coli sources can originate from humans (wastewater and septic), cattle (Lee *et al.*, 2014), and waterfowl (ducks and geese; Kleinheinz *et al.*, 2006) (Bower *et al.*, 2005).

Table 3. Geometric mean of *E. coli* found per sampling event (June to September) and lake. In addition, geometric means of all E. coli observations found per lake are shown.

Year	Event Number	Lake			
		Balsam	Cameron	Sturgeon	Pigeon
2019	1	0.4	0.7	1.1	1.1
	2	0.8	0.3	1.8	1.8
	3	0.9	0.0	2.1	3.2
	4	0.8	0.7	1.1	0.8
2021	1	1.7	1.3	3.0	1.6
	2	1.9	0.8	2.2	2.2
	3	1.5	3.2	1.0	1.8
	4	1.7	1.6	2.8	0.8
All		1.1	1.0	1.7	1.7

Of the 180 samples taken, *E. coli* values were well below the PWQO of 100 counts of *E. coli* (Table 3). The highest observations of E. coli found in this study was 52 counts, much below the PWQO and even more so for Ontario Recreational Water Quality Guidelines (Single-sample maximum concentration: ≤ 400 E. coli / 100 mL; MOH, 2018). Results from this study do not show fecal contamination of surface waters at the sampling events. However, it should be noted that the interval between sampling events is approximately1 month, where during the period in between sampling, there is a possibility to have fecal contamination, especially during and after storm events.

Total Suspended Solids

The suspension of particles can impact both water quality (less clear) and aquatic life, while also degrading the aesthetic of the water. Less clear waters are often associated with an increase in suspended solids that may originate from biotic (phytoplankton, algae) and abiotic (sand, silt, clay) sources, which may originate from increased input of nutrients, discharge of sewage, erosion problems, etc. These particles can bind to organic and inorganic contaminants (Bodo, 1989;)

allowing for a greater transfer of contaminants from point sources. When suspended solids settle out of the water column, these particles (when abundant) can cover/smother critical spawning nests or incubating eggs (Bash *et al.*, 2001). In addition, suspended solids can impact the gills of aquatic organisms and macroinvertebrates (Bash *et al.*, 2001; Tuttle-Raycraft and Ackerman, 2019). This causes great discomfort among the organism and prolonged exposure can cause mortality (Kjelland *et al.*, 2015). Currently, there is no provincial threshold for TSS however, one exists for the CWQG, where the maximum increase of suspended sediment is 25 mg/L from background levels during clear flow (CCME, 2002). Background concentrations were taken from the PWQMN and are 1.3 mg/L for Balsam, 1.1 mg/L for Cameron, 1.5 mg/L for Sturgeon and 2.4 mg/L for Pigeon Lake (MECP, 2022).

Of the 353 observations for TSS, half (52.4%; Table 5) did not exceed the CWQG (background + 25 mg/L). Of the four lakes, Balsam Lake had the highest exceedance percentage of 55.6% of all observations. Although Cameron Lake had the lowest at 37.3% (Table 5), it had the highest observation of TSS (~325,000 mg/L or 325 g/L). Higher concentrations of TSS in Cameron Lake were suggested to be driven by the lack of macrophytes (aquatic plants) (Smith, 2022). The abundance of macrophytes (all forms; floating-leaved, submerged, and emergent) have been known to reduce the resuspension of sediment (Horppila and Nurminen, 2005). The narrow nearshore zone of Balsam Lake had less growing room for macrophytes, leaving more room for the resuspension of sediment. At a larger scale, Smith (2022) found that TSS concentrations were significantly related to storm events, suggesting that erosion may be a key driver of TSS in nearshore water quality.

Using rainfall data, Pigeon Lake had the highest exceeded observations (44%), followed by Sturgeon (26%), Cameron (19%), and Balsam (7%). Remediation/ restoration/ stewardship activities should focus in these areas with willing landowners (Figure 5, Appendix Table A3). This finding also amplifies the need for proper installation of erosion and sediment control measures and the restoration of healthy riparian zones.

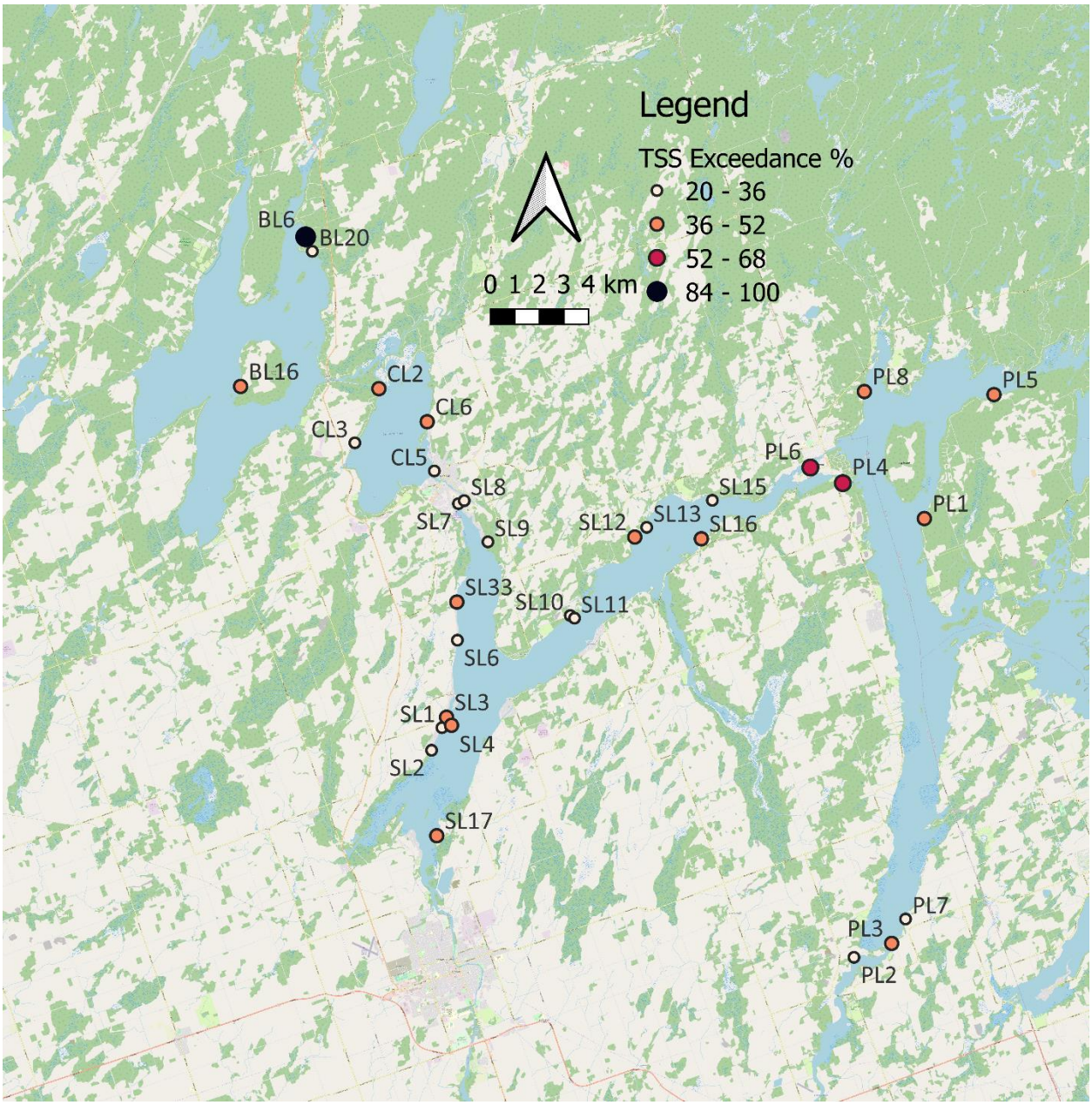

Figure 5. Locations of all sites who have exceedances in the CWQG for suspended solids during rain events.

Conclusion

The goal of this report is to identify hotspots of water quality degradation in the nearshore environment by using data collected by citizen scientists and comparing them to the PWQO (MOEE, 1994) and the CWQG (CCME, 2002, 2004,

2010, 2012). In total, there were 56 sites across Balsam, Cameron, Sturgeon, and Pigeon Lake which produced over 300 samples across two years (2019 and 2021).

In summary, 38 sites were found to have failed one or more water quality objectives or guidelines. Water quality concerns for the nearshore environment indicates that total phosphorus (TP) and total suspended solids (TSS) were the two parameters that showed higher exceedances. Of the two water quality concerns, TSS had more frequent exceedances when compared to exceedances for TP. Nitrate, *E. coli*, and total ammonia show fewer exceedance. Sites with exceedances were isolated with rainfall data (stormwater runoff) to identify hotspots in need of land-based stewardship solutions. Possibilities for exceedances are poor land management (lack of erosion and sediment control) and the lack of vegetation, which is known to reduce the resuspension of sediment (Horppila and Nurminen, 2005; Smith, 2022). Higher phosphorus levels were associated with land development, while TSS levels were associated with storm events, the lack of macrophytes, and highly used boating areas (Smith, 2022).

Table 4. Summary of exceedances (%) of parameters against the PWQO and the CWQG for Balsam, Cameron, Sturgeon, and Pigeon Lake during rain events.

Lake	Grade	TP	NO_3	*E. coli*	NHx	TSS
Balsam	Fail	12%	0%	0%	0%	7%
	Pass	88%	100%	100%	100%	93%
Cameron	Fail	10%	0%	0%	0%	19%
	Pass	90%	100%	100%	100%	81%
Sturgeon	Fail	26%	0%	0%	0%	26%
	Pass	74%	100%	100%	100%	74%
Pigeon	Fail	38%	0%	0%	8%	44%
	Pass	62%	100%	100%	92%	56%

Since phosphorus levels were found to be associated with land development, current and future developments should be designed to limit phosphorus export

from the site. Levels of TSS can be reduced through proper erosion control, either human-made (silt fences) or natural systems (riparian areas), preventing soils from entering the water, and the establishment of native macrophytes to reduce the resuspension of sediment. Improvements to land-use and riparian zone restoration (through stewardship with willing landowners) will assist in the health of the nearshore and thus the remainder of the lake. Monitoring should be co-implemented to track progress and continue to provide the most up-to-date information for adaptive management and implementation.

Recommendations

The following are a list of recommendations for future monitoring.

- Expand future nearshore water quality monitoring program to include sites with other types of landuses.
- Enhance sampling frequency of any future nearshore water quality monitoring program to better understanding of water quality during extreme events, i.e., during and after storm events, during low water periods, during bird migrations, etc.
- Explore the impacts of boating traffic on the resuspension of sediment and the impacts to water quality.
- Expand the scope of any water quality community monitoring program to smaller, unnamed tributaries that also discharge into the lake.
- Explore other contaminants such as pharmaceuticals, artificial sweeteners, etc.
- Expand the nearshore program to include the water quality of stormwater runoff.
- Spatially, explore how the nearshore environments influence the deeper, in-lake environment of the lake.
- Expand the existing volunteer network to monitor other indicators of environmental health, i.e., invasive species (tracking), stream monitoring, precipitation, etc.
- Encourage volunteers to participate in other citizen science programs, i.e., Marsh Monitoring Program, Frog Watch, Lake Partner Program, Loon Watch, etc.
- Increase the landowner network to improve knowledge of and engagement in lake-based stewardship projects, with a target of 75% shoreline vegetation cover as per Kawartha Conservation (2014a, 2015a, 2018a, 2020) and Environment and Climate Change Canada recommendations (2013).

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Appendix

A. List of sites with exceedances

Table A1. Locations of all sites that exceeded the interim PWQO for total phosphorus (ordered by greatest). Sites not listed did not have any exceedances.

Lake	Site	Latitude	Longitude	Exceedance %
Balsam	BL12	44.5545	-78.8948	100
Sturgeon	SL34	44.4107	-78.7625	100
Sturgeon	SL15	44.5253	-78.5987	80
Pigeon	PL2	44.3560	-78.5331	66.7
Pigeon	PL3	44.3607	-78.5136	60
Balsam	BL10	44.5250	-78.8501	50
Balsam	BL16	44.5719	-78.8393	50
Balsam	BL4	44.6113	-78.8378	50
Balsam	BL5	44.6456	-78.8016	50
Cameron	CL6	44.5571	-78.7440	50
Pigeon	PL7	44.3694	-78.5061	50
Sturgeon	SL16	44.5113	-78.6049	50
Sturgeon	SL17	44.4050	-78.7449	50
Pigeon	PL6	44.5363	-78.5479	40
Sturgeon	SL1	44.4446	-78.7407	40
Sturgeon	SL11	44.4835	-78.6712	40
Cameron	CL13	44.5817	-78.7495	33.3
Pigeon	PL4	44.5302	-78.5315	33.3
Sturgeon	SL10	44.4845	-78.6733	33.3
Sturgeon	SL9	44.5124	-78.7145	33.3
Pigeon	PL8	44.5636	-78.5190	25
Sturgeon	SL14	44.5271	-78.6015	25
Sturgeon	SL4	44.4454	-78.7358	25
Pigeon	PL1	44.5163	-78.4902	20
Pigeon	PL5	44.5610	-78.4525	20
Sturgeon	SL12	44.5126	-78.6391	20
Sturgeon	SL13	44.5161	-78.6328	20
Sturgeon	SL3	44.4484	-78.7382	20
Sturgeon	SL7	44.5267	-78.7291	20

Table A2. Locations of the sites that exceeded the CWQG and PWQO for ammonia. Sites not listed did not have any exceedances.

Lake	Site	Latitude	Longitude	Exceedance %
Pigeon	PL6	44.5363	-78.5479	20

Table A3. Locations of all sites that exceeded the CWQG for total suspended solids (ordered by greatest). Sites not listed did not have any exceedances.

Lake	Site	Latitude	Longitude	Exceedance %
Balsam	BL6	44.6262	-78.8038	100
Pigeon	PL4	44.5302	-78.5315	66.7
Pigeon	PL6	44.5363	-78.5479	60
Balsam	BL16	44.5719	-78.8393	50
Cameron	CL2	44.5698	-78.7683	50
Cameron	CL6	44.5571	-78.7440	50
Pigeon	PL8	44.5636	-78.5190	50
Sturgeon	SL16	44.5113	-78.6049	50
Sturgeon	SL17	44.4050	-78.7449	50
Sturgeon	SL33	44.4906	-78.7313	50
Sturgeon	SL4	44.4454	-78.7358	50
Pigeon	PL1	44.5163	-78.4902	40
Pigeon	PL3	44.3607	-78.5136	40
Pigeon	PL5	44.5610	-78.4525	40
Sturgeon	SL12	44.5126	-78.6391	40
Sturgeon	SL3	44.4484	-78.7382	40
Balsam	BL20	44.6209	-78.8006	33.3
Cameron	CL3	44.5501	-78.7814	33.3
Cameron	CL5	44.5390	-78.7410	33.3
Pigeon	PL2	44.3560	-78.5331	33.3
Sturgeon	SL10	44.4845	-78.6733	33.3
Sturgeon	SL8	44.5278	-78.7261	33.3
Sturgeon	SL9	44.5124	-78.7145	33.3
Pigeon	PL7	44.3694	-78.5061	25
Sturgeon	SL1	44.4446	-78.7407	20
Sturgeon	SL11	44.4835	-78.6712	20
Sturgeon	SL13	44.5161	-78.6328	20

Lake	Site	Latitude	Longitude	Exceedance %
Sturgeon	SL15	44.5253	-78.5987	20
Sturgeon	SL2	44.4365	-78.7464	20
Sturgeon	SL6	44.4766	-78.7316	20
Sturgeon	SL7	44.5267	-78.7291	20

B. Raw data

Table B1. The raw dataset used to perform the analysis and comparison for this report.

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chl-a
Balsam	BL1	44.6323	-78.8451	2019-06-04	15	2.364	0.000	0	2999.70	1.2200
Balsam	BL2	44.6219	-78.8489	2019-06-04	11	2.545	-0.364	0	5332.80	0.8133
Balsam	BL3	44.6254	-78.8353	2019-06-04	18	10.182	1.818	0	4666.20	1.6267
Balsam	BL4	44.6114	-78.8378	2019-06-04	17	4.727	2.545	0	4166.25	2.4400
Balsam	BL5	44.65	-78.801	2019-06-04	15.5	5.091	-0.182	0	4166.25	6.1000
Balsam	BL6	44.593	-78.7953	2019-06-04	14.4	6.364	0.727	0	6166.05	3.6600
Balsam	BL7	44.5795	-78.7992	2019-06-04	15	6.364	2.909	0	333.30	3.6600
Balsam	BL8	44.5707	-78.8011	2019-06-04	15	4.545	1.455	0	6832.65	2.0333
Balsam	BL9	44.5389	-78.8423	2019-06-04	14	10.182	0.727	0	5832.75	4.4733
Balsam	BL10	44.525	-78.8501	2019-06-04	15	10.364	0.182	0	0.00	2.4400
Balsam	BL11	44.562	-78.8709	2019-06-04	15	5.273	n/a	0	0.00	1.6267
Balsam	BL12	44.5545	-78.8948	2019-06-04	15	2.364	1.273	0	2166.45	2.0333
Balsam	BL13	44.5698	-78.8926	2019-06-04	14	4.182	-0.545	0	0.00	0.8133
Balsam	BL14	44.5814	-78.8886	2019-06-04	14	4.364	0.000	0	4499.55	1.6267
Balsam	BL15	44.6049	-78.862	2019-06-04	17	17.636	-0.182	0	4999.50	0.8133
Balsam	BL16	44.572	-78.8393	2019-06-04	14	9.273	0.364	0	0.00	0.8133
Balsam	BL17	44.5659	-78.8235	2019-06-04	20	5.636	1.818	0	2833.05	1.6267
Balsam	BL1	44.6323	-78.8451	2019-07-02	15	4.182	4.000	0	4332.90	0.8133
Balsam	BL2	44.6219	-78.8489	2019-07-02	11	3.636	1.273	0.0005	4666.20	0.8133
Balsam	BL3	44.6254	-78.8353	2019-07-02	18	4.727	4.000	0	8665.80	0.4067

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chla
Balsam	BL4	44.6114	-78.8378	2019-07-02	17	4.909	2.000	0	4666.20	0.8133
Balsam	BL5	44.65	-78.801	2019-07-02	15.5	5.273	1.091	0	5999.40	1.2200
Balsam	BL6	44.593	-78.7953	2019-07-02	14.4	7.818	1.818	0	6166.05	0.4067
Balsam	BL7	44.5795	-78.7992	2019-07-02	15	8.727	1.091	0	5499.45	1.6267
Balsam	BL8	44.5707	-78.8011	2019-07-02	15	8.364	2.364	0	6666.00	2.0333
Balsam	BL9	44.5389	-78.8423	2019-07-02	14	8.909	2.545	0	333.30	1.2200
Balsam	BL10	44.525	-78.8501	2019-07-02	15	8.545	1.273	0.0005	1333.20	2.8467
Balsam	BL18	44.5406	-78.8641	2019-07-02	21	9.818	2.182	0	1166.55	1.6267
Balsam	BL11	44.562	-78.8709	2019-07-02	15	8.364	2.364	0	1833.15	1.2200
Balsam	BL19	44.5648	-78.8584	2019-07-02	0	12.182	3.636	0	3166.35	1.6267
Balsam	BL12	44.5545	-78.8948	2019-07-02	15	8.727	0.909	0	1333.20	0.8133
Balsam	BL13	44.5698	-78.8926	2019-07-02	14	5.818	1.091	0	1499.85	0.8133
Balsam	BL14	44.5814	-78.8886	2019-07-02	14	6.000	2.727	0	2999.70	0.0000
Balsam	BL15	44.6049	-78.862	2019-07-02	17	6.727	1.636	0	3499.65	0.8133
Balsam	BL16	44.572	-78.8393	2019-07-02	14	6.000	0.364	0	2333.10	0.8133
Balsam	BL17	44.5659	-78.8235	2019-07-02	20	5.273	3.455	0	3666.30	1.6267
Balsam	BL1	44.6323	-78.8451	2019-08-06	15	6.815	3.852	0.001	7332.60	1.6267
Balsam	BL2	44.6219	-78.8489	2019-08-06	11	2.185	2.000	0.001	5666.10	1.2200
Balsam	BL3	44.6254	-78.8353	2019-08-06	18	5.333	3.111	0.0015	5332.80	1.6267
Balsam	BL4	44.6114	-78.8378	2019-08-06	17	4.963	5.519	0.001	5999.40	1.2200
Balsam	BL5	44.65	-78.801	2019-08-06	15.5	3.111	2.926	0.001	4832.85	-1.2200
Balsam	BL20	44.6209	-78.8006	2019-08-06	25	7.741	2.926	0.001	5999.40	0.8133
Balsam	BL6	44.593	-78.7953	2019-08-06	14.4	4.778	2.741	0	3999.60	0.0000
Balsam	BL7	44.5795	-78.7992	2019-08-06	15	6.074	2.000	0.0005	4999.50	0.4067

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chla
Balsam	BL8	44.5707	-78.8011	2019-08-06	15	6.444	2.000	0.0005	4666.20	0.4067
Balsam	BL9	44.5389	-78.8423	2019-08-06	14	6.630	1.259	0.001	7332.60	0.8133
Balsam	BL10	44.525	-78.8501	2019-08-06	15	12.370	1.630	0.002	8499.15	0.8133
Balsam	BL18	44.5406	-78.8641	2019-08-06	21	11.074	2.185	0.001	8832.45	-0.4067
Balsam	BL11	44.562	-78.8709	2019-08-06	15	10.519	4.222	0	2999.70	-0.8133
Balsam	BL19	44.5648	-78.8584	2019-08-06	0	9.593	3.667	0	3166.35	0.0000
Balsam	BL12	44.5545	-78.8948	2019-08-06	15	7.370	3.852	0.001	3499.65	0.0000
Balsam	BL13	44.5698	-78.8926	2019-08-06	14	10.704	3.667	0.0005	3666.30	0.0000
Balsam	BL14	44.5814	-78.8886	2019-08-06	14	9.593	2.000	0	2999.70	0.0000
Balsam	BL15	44.6049	-78.862	2019-08-06	17	8.111	1.444	0.001	7165.95	0.0000
Balsam	BL16	44.572	-78.8393	2019-08-06	14	9.037	1.815	0	2333.10	0.4067
Balsam	BL17	44.5659	-78.8235	2019-08-06	20	12.185	2.000	0	5166.15	1.2200
Balsam	BL1	44.6323	-78.8451	2019-09-03	15	9.407	0.889	0.0005	2999.70	0.0000
Balsam	BL2	44.6219	-78.8489	2019-09-03	11	18.296	-1.333	0.0015	2999.70	0.4067
Balsam	BL3	44.6254	-78.8353	2019-09-03	18	7.185	-1.704	0.001	2333.10	0.0000
Balsam	BL4	44.6114	-78.8378	2019-09-03	17	5.889	-0.963	0	1499.85	0.0000
Balsam	BL5	44.65	-78.801	2019-09-03	15.5	3.667	0.148	0	2499.75	0.0000
Balsam	BL20	44.6209	-78.8006	2019-09-03	25	2.741	-1.889	0	1833.15	0.0000
Balsam	BL6	44.593	-78.7953	2019-09-03	14.4	3.296	4.963	0	2333.10	0.0000
Balsam	BL7	44.5795	-78.7992	2019-09-03	15	9.593	-0.407	0.0005	1499.85	0.0000
Balsam	BL8	44.5707	-78.8011	2019-09-03	15	4.222	-0.593	0	2666.40	0.0000
Balsam	BL9	44.5389	-78.8423	2019-09-03	14	8.852	-3.000	0.0005	3499.65	0.0000
Balsam	BL10	44.525	-78.8501	2019-09-03	15	9.407	5.148	0	4166.25	0.0000
Balsam	BL18	44.5406	-78.8641	2019-09-03	21	6.074	-1.519	0.00055	21164.55	0.0000

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chla
Balsam	BL11	44.562	-78.8709	2019-09-03	15	n/a	n/a	0.001	0.00	0.0000
Balsam	BL19	44.5648	-78.8584	2019-09-03	0	7.000	-2.444	0.001	5832.75	0.0000
Balsam	BL12	44.5545	-78.8948	2019-09-03	15	7.000	4.222	0	4666.20	0.0000
Balsam	BL13	44.5698	-78.8926	2019-09-03	14	6.444	-2.074	0.001	5166.15	0.0000
Balsam	BL14	44.5814	-78.8886	2019-09-03	14	5.519	-2.444	0.0005	3832.95	0.0000
Balsam	BL15	44.6049	-78.862	2019-09-03	17	5.333	-0.963	0.0055	4999.50	0.0000
Balsam	BL16	44.572	-78.8393	2019-09-03	14	4.037	n/a	0.001	3832.95	0.0000
Balsam	BL17	44.5659	-78.8235	2019-09-03	20	12.926	-1.333	0.002	4832.85	0.0000
Balsam	BL1	44.6323	-78.8451	2021-06-01	13	2.352	0.000	0	0.00	0.4067
Balsam	BL3	44.62541	-78.8353	2021-06-01	14	4.740	0.000	0	0.00	1.2200
Balsam	BL4	44.61137	-78.8378	2021-06-01	0	0.637	0.000	0	0.00	0.0000
Balsam	BL5	44.64563	-78.8016	2021-06-01	0	7.615	0.729	0	0.00	0.0000
Balsam	BL20	44.6209	-78.8006	2021-06-01	17	5.090	0.140	0	0.00	0.0000
Balsam	BL6	44.62627	-78.8038	2021-06-01	16	5.315	2.031	0	0.00	0.0000
Balsam	BL7	44.57945	-78.7992	2021-06-01	0	0.013	0.000	0	0.00	0.0000
Balsam	BL8	44.57067	-78.8011	2021-06-01	0	7.121	0.000	0	0.00	0.0000
Balsam	BL9	44.53892	-78.8423	2021-06-01	13.5	3.071	0.000	0	0.00	0.0000
Balsam	BL10	44.52505	-78.8501	2021-06-01	13.5	3.429	0.094	0	0.00	0.0000
Balsam	BL12	44.55453	-78.8948	2021-06-01	0	4.075	0.521	0	0.00	0.0000
Balsam	BL13	44.56981	-78.8926	2021-06-01	18	3.890	0.706	0	0.00	0.0000
Balsam	BL14	44.57741	-78.8939	2021-06-01	24	2.656	0.638	0	0.00	0.0000
Balsam	BL15	44.60488	-78.862	2021-06-01	0	0.760	0.000	0	0.00	0.0000
Balsam	BL16	44.57198	-78.8393	2021-06-01	15	1.915	0.688	0	0.00	0.0000
Balsam	BL17	44.56592	-78.8235	2021-06-01	16	3.558	1.754	0	0.00	0.0000

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chl-a
Balsam	BL16	44.57198	-78.8393	2021-07-05	16	11.756	1.756	0.002	1999.80	1.6267
Balsam	BL1	44.6323	-78.8451	2021-07-06	17	1.292	0.000	0	0.00	1.6267
Balsam	BL3	44.62541	-78.8353	2021-07-06	15	3.958	0.000	0	0.00	0.8133
Balsam	BL4	44.61137	-78.8378	2021-07-06	14	11.552	0.000	0	0.00	0.0000
Balsam	BL5	44.64563	-78.8016	2021-07-06	15	6.479	0.000	0	0.00	0.0000
Balsam	BL20	44.6209	-78.8006	2021-07-06	14	6.315	0.000	0	833.25	0.4067
Balsam	BL6	44.62627	-78.8038	2021-07-06	13	4.675	1.179	0	0.00	0.8133
Balsam	BL7	44.57945	-78.7992	2021-07-06	0	3.875	0.000	0	0.00	0.0000
Balsam	BL8	44.57067	-78.8011	2021-07-06	0	5.192	0.000	0	0.00	0.8133
Balsam	BL9	44.53892	-78.8423	2021-07-06	13.5	5.477	0.000	0	0.00	0.0000
Balsam	BL12	44.55453	-78.8948	2021-07-06	22	10.440	1.025	0	0.00	0.0000
Balsam	BL13	44.56981	-78.8926	2021-07-06	17.5	5.094	0.000	0	0.00	0.0000
Balsam	BL14	44.57741	-78.8939	2021-07-06	0	5.879	0.621	0	0.00	0.0000
Balsam	BL17	44.56592	-78.8235	2021-07-06	16	5.879	0.000	0	0.00	0.0000
Balsam	BL15	44.60488	-78.862	2021-07-07	15	5.337	0.000	0	0.00	0.0000
Balsam	BL10	44.52505	-78.8501	2021-07-13	15	12.802	1.842	0	0.00	0.8133
Balsam	BL1	44.6323	-78.8451	2021-08-03	17	6.888	0.929	0	0.00	2.0333
Balsam	BL3	44.62541	-78.8353	2021-08-03	15	3.142	1.067	0	0.00	0.8133
Balsam	BL4	44.61137	-78.8378	2021-08-03	14	6.217	0.000	0	0.00	1.2200
Balsam	BL5	44.64563	-78.8016	2021-08-03	15	2.398	0.000	0	0.00	1.6267
Balsam	BL20	44.6209	-78.8006	2021-08-03	14	5.354	0.317	0	0.00	2.4400
Balsam	BL6	44.62627	-78.8038	2021-08-03	13	5.756	0.994	0.0005	0.00	2.8467
Balsam	BL7	44.57945	-78.7992	2021-08-03	0	6.662	0.779	0	0.00	1.2200
Balsam	BL8	44.57067	-78.8011	2021-08-03	0	4.944	0.040	0	0.00	0.4067

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chl-a
Balsam	BL9	44.53892	-78.8423	2021-08-03	13.5	3.429	0.000	0	0.00	1.2200
Balsam	BL10	44.52505	-78.8501	2021-08-03	15	8.083	0.000	0.002	0.00	1.2200
Balsam	BL12	44.55453	-78.8948	2021-08-03	22	7.015	0.000	0	0.00	0.0000
Balsam	BL13	44.56981	-78.8926	2021-08-03	17.5	6.515	0.000	0	0.00	0.4067
Balsam	BL14	44.57741	-78.8939	2021-08-03	0	3.423	0.000	0	0.00	1.6267
Balsam	BL15	44.60488	-78.862	2021-08-03	15	7.688	0.000	0	0.00	0.8133
Balsam	BL16	44.57198	-78.8393	2021-08-03	16	18.583	0.000	0	0.00	1.2200
Balsam	BL17	44.56592	-78.8235	2021-08-03	16	6.781	0.000	0.0005	0.00	0.0000
Balsam	BL3	44.62541	-78.8353	2021-08-31	15	6.288	0.840	0.002	0.00	1.2200
Balsam	BL4	44.61137	-78.8378	2021-08-31	14	3.879	0.000	0.0015	0.00	0.0000
Balsam	BL5	44.64563	-78.8016	2021-08-31	15	13.156	4.890	0.003	0.00	3.6600
Balsam	BL20	44.6209	-78.8006	2021-08-31	14	9.656	0.000	0.0015	0.00	1.2200
Balsam	BL6	44.62627	-78.8038	2021-08-31	13	6.935	0.000	0.0015	1833.15	1.6267
Balsam	BL9	44.53892	-78.8423	2021-08-31	13.5	5.481	0.629	0.002	0.00	0.0000
Balsam	BL10	44.52505	-78.8501	2021-08-31	15	7.269	0.000	0.0025	0.00	0.4067
Balsam	BL13	44.56981	-78.8926	2021-08-31	17.5	4.860	0.000	0.002	0.00	0.0000
Balsam	BL15	44.60488	-78.862	2021-08-31	15	5.785	0.000	0.0015	0.00	0.0000
Balsam	BL16	44.57198	-78.8393	2021-08-31	16	6.833	0.325	0.002	1499.85	0.0000
Balsam	BL17	44.56592	-78.8235	2021-08-31	16	7.204	0.000	0.0015	0.00	0.0000
Cameron	CL1	44.5464	-78.7842	2019-06-04	14.5	6.909	0.909	0.0005	0.00	1.6267
Cameron	CL2	44.5694	-78.7682	2019-06-04	15	7.273	-1.818	0.001	0.00	2.4400
Cameron	CL3	44.5501	-78.7814	2019-06-04	0	4.545	-1.273	0	0.00	2.8467
Cameron	CL4	44.5342	-78.7474	2019-06-04	0	4.364	0.364	0	166.65	1.2200
Cameron	CL5	44.539	-78.741	2019-06-04	16.6	3.273	-0.182	0	0.00	2.0333

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chla
Cameron	CL6	44.5572	-78.744	2019-06-04	14.4	18.909	0.000	0	0.00	2.0333
Cameron	CL1	44.5464	-78.7842	2019-07-02	14.5	4.364	1.818	0.0005	2166.45	0.0000
Cameron	CL3	44.5501	-78.7814	2019-07-02	0	3.636	1.455	0.0005	166650.00	0.8133
Cameron	CL4	44.5342	-78.7474	2019-07-02	0	6.000	1.818	0.0005	0.00	0.8133
Cameron	CL5	44.539	-78.741	2019-07-02	16.6	4.182	2.909	0	1499.85	0.0000
Cameron	CL6	44.5572	-78.744	2019-07-02	14.4	4.909	1.091	0	3166.35	0.8133
Cameron	CL1	44.5464	-78.7842	2019-08-06	14.5	7.741	2.741	0	3999.60	0.8133
Cameron	CL3	44.5501	-78.7814	2019-08-06	0	7.556	2.741	0	3499.65	0.4067
Cameron	CL4	44.5342	-78.7474	2019-08-06	0	28.852	27.741	0	19664.70	1.2200
Cameron	CL5	44.539	-78.741	2019-08-06	16.6	36.815	8.296	0	2999.70	1.2200
Cameron	CL6	44.5572	-78.744	2019-08-06	14.4	8.852	4.407	0	3999.60	0.0000
Cameron	CL1	44.5464	-78.7842	2019-09-03	14.5	2.741	2.741	0	2666.40	0.0000
Cameron	CL3	44.5501	-78.7814	2019-09-03	0	1.630	-2.259	0.001	4499.55	0.0000
Cameron	CL4	44.5342	-78.7474	2019-09-03	0	-0.407	-2.074	0.0005	3166.35	0.4067
Cameron	CL5	44.539	-78.741	2019-09-03	16.6	4.037	-2.444	0.0005	1499.85	2.0333
Cameron	CL6	44.5572	-78.744	2019-09-03	14.4	3.667	-1.148	0.001	4832.85	0.4067
Cameron	CL1	44.5465	-78.7842	2021-06-01	13	3.638	1.123	0	0.00	0.0000
Cameron	CL2	44.5698	-78.7683	2021-06-01	0	7.162	0.838	0	0.00	0.4067
Cameron	CL3	44.55014	-78.7814	2021-06-01	14	3.388	3.510	0	0.00	0.0000
Cameron	CL4	44.53423	-78.7474	2021-06-01	0	7.058	1.383	0	0.00	0.4067
Cameron	CL10	44.57711	-78.7527	2021-06-01	0	3.096	0.000	0	0.00	0.0000
Cameron	CL5	44.53903	-78.741	2021-06-01	17	3.663	1.356	0	0.00	0.0000
Cameron	CL6	44.55716	-78.744	2021-06-01	16	1.310	1.681	0	0.00	0.0000
Cameron	CL13	44.58179	-78.7495	2021-06-01	0	5.231	1.135	0.0005	0.00	0.8133

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chl-a
Cameron	CL6	44.55716	-78.744	2021-07-05	13	3.094	0.000	0	0.00	1.2200
Cameron	CL1	44.5465	-78.7842	2021-07-06	17	4.133	0.000	0	0.00	2.4400
Cameron	CL2	44.5698	-78.7683	2021-07-06	0	9.037	1.958	0	166.65	2.8467
Cameron	CL3	44.55014	-78.7814	2021-07-06	15	5.294	0.000	0	0.00	1.2200
Cameron	CL4	44.53423	-78.7474	2021-07-06	14	5.146	0.000	0	0.00	2.4400
Cameron	CL5	44.53903	-78.741	2021-07-06	14	6.154	0.000	0.0005	333.30	2.4400
Cameron	CL13	44.58179	-78.7495	2021-07-06	0	6.113	2.408	0	0.00	1.2200
Cameron	CL10	44.57711	-78.7527	2021-07-13	15	5.154	0.648	0.0005	0.00	1.2200
Cameron	CL1	44.5465	-78.7842	2021-08-03	17	4.538	0.029	0	0.00	1.6267
Cameron	CL2	44.5698	-78.7683	2021-08-03	0	6.640	1.004	0	0.00	0.8133
Cameron	CL3	44.55014	-78.7814	2021-08-03	15	6.960	0.563	0.002	0.00	0.8133
Cameron	CL4	44.53423	-78.7474	2021-08-03	14	6.196	2.375	0	0.00	0.8133
Cameron	CL5	44.53903	-78.741	2021-08-03	14	9.456	0.142	0	0.00	0.0000
Cameron	CL6	44.55716	-78.744	2021-08-03	13	15.763	0.577	0	325134.15	1.6267
Cameron	CL13	44.58179	-78.7495	2021-08-03	0	13.671	0.000	0	0.00	2.0333
Cameron	CL1	44.5465	-78.7842	2021-08-31	13	4.692	0.000	0.0015	0.00	2.0333
Cameron	CL3	44.55014	-78.7814	2021-08-31	15	4.081	0.000	0.004	5832.75	1.2200
Cameron	CL4	44.53423	-78.7474	2021-08-31	14	5.769	0.000	0.0015	0.00	1.6267
Cameron	CL10	44.57711	-78.7527	2021-08-31	15	3.631	0.000	0.001	0.00	1.6267
Cameron	CL5	44.53903	-78.741	2021-08-31	14	5.858	0.000	0.002	0.00	1.2200
Cameron	CL6	44.55716	-78.744	2021-08-31	13	4.958	0.785	0.003	0.00	1.2200
Cameron	CL13	44.58179	-78.7495	2021-08-31	0	9.052	0.000	0.003	0.00	1.6267
Pigeon	PL1	44.5163	-78.4902	2019-06-06	0	11.455	0.727	0	0.00	2.0333
Pigeon	PL2	44.356	-78.5331	2019-06-06	0	131.636	7.818	0.004	8165.85	4.8800

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chl-a
Pigeon	PL3	44.3607	-78.5136	2019-06-06	16	20.909	4.000	0.001	2666.40	7.7267
Pigeon	PL4	44.5302	-78.5315	2019-06-06	12	19.273	2.545	0.003	3333.00	16.2667
Pigeon	PL5	44.561	-78.4525	2019-06-06	16	7.818	2.000	0.0005	833.25	1.6267
Pigeon	PL6	44.5363	-78.5479	2019-06-06	19	13.273	2.909	0	6999.30	2.4400
Pigeon	PL1	44.5163	-78.4902	2019-07-04	0	11.636	5.273	0.0005	3832.95	2.0333
Pigeon	PL2	44.356	-78.5331	2019-07-04	0	29.818	6.727	0.002	0.00	4.0667
Pigeon	PL3	44.3607	-78.5136	2019-07-04	16	19.091	5.091	0.001	5666.10	0.8133
Pigeon	PL4	44.5302	-78.5315	2019-07-04	12	15.818	4.182	0.001	4499.55	2.0333
Pigeon	PL5	44.561	-78.4525	2019-07-04	16	13.818	2.909	0.0005	0.00	2.8467
Pigeon	PL6	44.5363	-78.5479	2019-07-04	19	16.182	5.455	0.001	3832.95	2.4400
Pigeon	PL1	44.5163	-78.4902	2019-08-08	0	25.818	19.636	n/a	2166.45	n/a
Pigeon	PL7	44.36949	-78.5061	2019-08-08	15	21.091	8.364	0.0005	5166.15	n/a
Pigeon	PL2	44.356	-78.5331	2019-08-08	0	39.636	16.909	0.001	0.00	n/a
Pigeon	PL3	44.3607	-78.5136	2019-08-08	16	28.000	12.000	0	4332.90	n/a
Pigeon	PL4	44.5302	-78.5315	2019-08-08	12	23.818	8.364	0	4499.55	n/a
Pigeon	PL5	44.561	-78.4525	2019-08-08	16	21.091	7.091	0	0.00	n/a
Pigeon	PL6	44.5363	-78.5479	2019-08-08	19	27.273	14.000	0.001	5166.15	n/a
Pigeon	PL8	44.5636	-78.519	2019-08-08	24	22.727	10.909	0.001	4832.85	n/a
Pigeon	PL1	44.5163	-78.4902	2019-09-05	0	17.000	3.852	0.001	4166.25	8.9467
Pigeon	PL7	44.36949	-78.5061	2019-09-05	15	n/a	n/a	n/a	n/a	0.0000
Pigeon	PL2	44.356	-78.5331	2019-09-05	0	14.037	5.333	0	0.00	3.6600
Pigeon	PL3	44.3607	-78.5136	2019-09-05	16	18.111	6.259	0.001	0.00	1.6267
Pigeon	PL4	44.5302	-78.5315	2019-09-05	12	12.370	4.037	0	0.00	1.6267
Pigeon	PL5	44.561	-78.4525	2019-09-05	16	16.815	3.667	0.002	833.25	9.3533

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chl-a
Pigeon	PL6	44.536	-78.55	2019-09-05	19	513.667	9.593	0.101	135319.80	251.3200
Pigeon	PL8	44.564	-78.52	2019-09-05	24	19.963	4.963	0.001	3333.00	9.3533
Pigeon	PL1	44.516	-78.49	2021-06-03	15	4.350	0.000	0.0125	0.00	0.0000
Pigeon	PL7	44.369	-78.51	2021-06-03	14	33.356	3.323	0.0155	0.00	1.2200
Pigeon	PL3	44.361	-78.51	2021-06-03	14	29.185	0.000	0.011	0.00	1.2200
Pigeon	PL5	44.561	-78.45	2021-06-03	0	12.858	0.000	0.0085	0.00	0.8133
Pigeon	PL6	44.536	-78.55	2021-06-03	0	7.902	0.871	0.0125	0.00	0.4067
Pigeon	PL8	44.564	-78.52	2021-06-03	13.5	3.023	2.040	0.012	0.00	0.0000
Pigeon	PL1	44.516	-78.49	2021-07-08	15	6.388	0.000	0	0.00	4.0667
Pigeon	PL7	44.369	-78.51	2021-07-08	14	15.283	0.687	0.0045	0.00	1.6267
Pigeon	PL3	44.361	-78.51	2021-07-08	14	13.819	9.404	0	0.00	0.4067
Pigeon	PL5	44.561	-78.45	2021-07-08	0	13.179	0.000	0.0015	0.00	4.8800
Pigeon	PL6	44.536	-78.55	2021-07-08	0	8.575	0.000	0.005	0.00	4.8800
Pigeon	PL8	44.564	-78.52	2021-07-08	13.5	15.821	0.000	0.0015	0.00	3.6600
Pigeon	PL1	44.516	-78.49	2021-08-05	15	5.992	0.000	0.002	0.00	2.0333
Pigeon	PL7	44.369	-78.51	2021-08-05	14	23.331	2.267	0.003	0.00	6.1000
Pigeon	PL3	44.361	-78.51	2021-08-05	14	21.052	0.000	0.003	0.00	4.8800
Pigeon	PL6	44.536	-78.55	2021-08-05	0	9.333	0.000	0.003	0.00	2.4400
Pigeon	PL8	44.564	-78.52	2021-08-05	13.5	9.702	0.000	0.002	0.00	2.8467
Pigeon	PL1	44.516	-78.49	2021-09-02	15	13.167	1.519	0.002	1999.80	2.4400
Pigeon	PL5	44.561	-78.45	2021-09-02	0	11.706	9.606	0.0025	666.60	2.0333
Pigeon	PL6	44.536	-78.55	2021-09-02	0	10.346	0.000	0.0035	999.90	1.6267

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chla
Pigeon	PL8	44.564	-78.52	2021-09-02	13.5	17.338	5.921	0.003	999.90	4.0667
Sturgeon	SL1	44.445	-78.74	2019-06-06	13	38.364	4.182	0	0.00	4.0667
Sturgeon	SL2	44.437	-78.75	2019-06-06	15.5	13.636	1.273	0	0.00	1.2200
Sturgeon	SL3	44.448	-78.74	2019-06-06	14	6.000	0.727	0	2833.05	0.8133
Sturgeon	SL4	44.445	-78.74	2019-06-06	0	0.000	0.182	0	2499.75	0.4067
Sturgeon	SL5	44.474	-78.73	2019-06-06	0	8.727	0.364	0	0.00	3.6600
Sturgeon	SL6	44.477	-78.73	2019-06-06	17	6.909	2.364	0	0.00	2.4400
Sturgeon	SL7	44.527	-78.73	2019-06-06	16	8.545	3.636	0	0.00	2.0333
Sturgeon	SL8	44.528	-78.73	2019-06-06	0	9.273	2.182	0	0.00	1.6267
Sturgeon	SL9	44.512	-78.71	2019-06-06	0	8.727	2.364	0	0.00	1.6267
Sturgeon	SL10	44.485	-78.67	2019-06-06	13.5	28.364	8.182	0	0.00	0.0000
Sturgeon	SL11	44.484	-78.67	2019-06-06	15	26.545	5.636	0	0.00	0.8133
Sturgeon	SL12	44.513	-78.64	2019-06-06	13	10.545	1.455	0	0.00	1.2200
Sturgeon	SL13	44.516	-78.63	2019-06-06	17	7.636	2.364	0	0.00	3.2533
Sturgeon	SL14	44.527	-78.6	2019-06-06	0	9.818	1.636	0	0.00	2.4400
Sturgeon	SL15	44.525	-78.6	2019-06-06	18	27.091	6.000	0	666.60	7.3200
Sturgeon	SL1	44.445	-78.74	2019-07-04	13	49.273	8.364	0.003	3499.65	8.9467
Sturgeon	SL2	44.437	-78.75	2019-07-04	15.5	8.182	4.364	0	2499.75	1.6267
Sturgeon	SL3	44.448	-78.74	2019-07-04	14	7.818	1.818	0	833.25	1.6267
Sturgeon	SL4	44.445	-78.74	2019-07-04	0	6.364	2.727	0	1999.80	0.4067
Sturgeon	SL5	44.474	-78.73	2019-07-04	0	7.455	2.182	0	1833.15	1.2200
Sturgeon	SL6	44.477	-78.73	2019-07-04	17	10.000	2.545	0	0.00	1.6267

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chl-a
Sturgeon	SL7	44.527	-78.73	2019-07-04	16	8.909	5.091	0	3166.35	2.0333
Sturgeon	SL8	44.528	-78.73	2019-07-04	0	12.182	4.000	0	2833.05	0.0000
Sturgeon	SL9	44.512	-78.71	2019-07-04	0	13.636	4.364	0	0.00	0.4067
Sturgeon	SL16	44.511	-78.6	2019-07-04	13.5	14.364	4.364	0.001	2666.40	1.2200
Sturgeon	SL11	44.484	-78.67	2019-07-04	15	13.091	3.818	0	2833.05	0.8133
Sturgeon	SL12	44.513	-78.64	2019-07-04	13	19.818	5.818	0.001	3333.00	0.4067
Sturgeon	SL13	44.516	-78.63	2019-07-04	17	14.909	7.091	0	2999.70	1.2200
Sturgeon	SL14	44.527	-78.6	2019-07-04	0	12.000	5.273	0	2999.70	0.4067
Sturgeon	SL15	44.525	-78.6	2019-07-04	18	27.636	6.182	0.0005	4332.90	0.4067
Sturgeon	SL17	44.405	-78.74	2019-07-04	24	59.273	15.636	0.0015	2999.70	0.0000
Sturgeon	SL1	44.445	-78.74	2019-08-08	13	46.182	18.909	0.0025	9332.40	n/a
Sturgeon	SL2	44.437	-78.75	2019-08-08	15.5	17.455	8.364	0.001	6666.00	n/a
Sturgeon	SL3	44.448	-78.74	2019-08-08	14	8.364	4.909	0	136986.30	n/a
Sturgeon	SL4	44.445	-78.74	2019-08-08	0	10.909	8.182	0	3333.00	n/a
Sturgeon	SL5	44.474	-78.73	2019-08-08	0	17.091	12.364	0	0.00	n/a
Sturgeon	SL6	44.477	-78.73	2019-08-08	17	18.909	6.364	0.0015	2999.70	n/a
Sturgeon	SL7	44.527	-78.73	2019-08-08	16	21.455	7.818	0.0005	3166.35	n/a
Sturgeon	SL8	44.528	-78.73	2019-08-08	0	17.273	8.909	0	2833.05	n/a
Sturgeon	SL9	44.512	-78.71	2019-08-08	0	20.182	8.364	0.001	6332.70	n/a
Sturgeon	SL10	44.485	-78.67	2019-08-08	13.5	n/a	n/a	n/a	3666.30	n/a
Sturgeon	SL16	44.511	-78.6	2019-08-08	13.5	21.455	11.273	0	6166.05	n/a
Sturgeon	SL11	44.484	-78.67	2019-08-08	15	23.818	8.364	0.0005	7332.60	n/a

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chl-a
Sturgeon	SL12	44.513	-78.64	2019-08-08	13	55.818	12.909	0.0005	5166.15	n/a
Sturgeon	SL13	44.516	-78.63	2019-08-08	17	17.455	8.545	0	4499.55	n/a
Sturgeon	SL14	44.527	-78.6	2019-08-08	0	25.273	9.636	n/a	0.00	n/a
Sturgeon	SL15	44.525	-78.6	2019-08-08	18	29.091	10.364	0.001	0.00	n/a
Sturgeon	SL17	44.405	-78.74	2019-08-08	24	67.091	10.364	0.01	54327.90	n/a
Sturgeon	SL1	44.445	-78.74	2019-09-05	13	17.370	1.074	0.0005	0.00	3.2533
Sturgeon	SL2	44.437	-78.75	2019-09-05	15.5	9.407	-0.963	0.002	0.00	2.8467
Sturgeon	SL3	44.448	-78.74	2019-09-05	14	6.444	-2.630	0	0.00	1.2200
Sturgeon	SL4	44.445	-78.74	2019-09-05	0	5.889	-3.926	0	n/a	0.8133
Sturgeon	SL5	44.474	-78.73	2019-09-05	0	11.074	1.259	0.001	0.00	2.0333
Sturgeon	SL6	44.477	-78.73	2019-09-05	17	13.111	1.815	0.001	0.00	2.4400
Sturgeon	SL7	44.527	-78.73	2019-09-05	16	9.407	0.519	0	0.00	0.4067
Sturgeon	SL8	44.528	-78.73	2019-09-05	0	n/a	n/a	n/a	n/a	0.0000
Sturgeon	SL9	44.512	-78.71	2019-09-05	0	12.556	6.074	0	0.00	0.8133
Sturgeon	SL10	44.485	-78.67	2019-09-05	13.5	n/a	n/a	n/a	n/a	0.0000
Sturgeon	SL16	44.511	-78.6	2019-09-05	13.5	39.778	3.667	0.001	0.00	10.9800
Sturgeon	SL11	44.484	-78.67	2019-09-05	15	15.148	4.037	0	0.00	2.0333
Sturgeon	SL12	44.513	-78.64	2019-09-05	13	13.111	2.370	0	0.00	0.8133
Sturgeon	SL13	44.516	-78.63	2019-09-05	17	22.926	2.000	0	0.00	3.6600
Sturgeon	SL14	44.527	-78.6	2019-09-05	0	n/a	n/a	n/a	0.00	0.0000
Sturgeon	SL15	44.525	-78.6	2019-09-05	18	15.889	-0.778	0	0.00	1.6267
Sturgeon	SL17	44.405	-78.74	2019-09-05	24	87.000	3.667	0	36663.00	1.6267

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chl-a
Sturgeon	SL7	44.513	-78.64	2021-07-08	13	16.271	0.000	0.002	0.00	1.6267
Sturgeon	SL16	44.511	-78.6	2021-07-08	15	9.692	0.352	0	n/a	3.2533
Sturgeon	SL11	44.507	-78.61	2021-07-08	18	7.402	0.000	0.0015	0.00	0.8133
Sturgeon	SL13	44.484	-78.65	2021-07-08	13	7.342	0.000	0.0005	0.00	2.0333
Sturgeon	SL15	44.421	-78.73	2021-07-08	17.5	31.215	2.869	0	0.00	5.6933
Sturgeon	SL17	44.471	-78.7	2021-07-08	0	7.385	0.000	0.001	0.00	3.6600
Sturgeon	SL32	44.481	-78.71	2021-07-08	15	4.085	0.000	0	0.00	2.0333
Sturgeon	SL34	44.411	-78.76	2021-07-08	16	20.798	0.602	0.0005	0.00	2.0333
Sturgeon	SL1	44.458	-78.7	2021-08-05	17	22.375	1.983	0	0.00	0.8133
Sturgeon	SL2	44.474	-78.73	2021-08-05	0	10.181	0.000	0	0.00	2.0333
Sturgeon	SL3	44.525	-78.73	2021-08-05	15	11.433	0.000	0	0.00	1.6267
Sturgeon	SL5	44.483	-78.67	2021-08-05	15	9.396	0.000	0	0.00	4.0667
Sturgeon	SL6	44.484	-78.67	2021-08-05	14	8.112	0.000	0	0.00	2.4400
Sturgeon	SL7	44.513	-78.64	2021-08-05	13	6.075	0.000	0	0.00	2.8467
Sturgeon	SL16	44.511	-78.6	2021-08-05	15	15.723	0.000	0.0005	0.00	2.0333
Sturgeon	SL11	44.507	-78.61	2021-08-05	18	6.812	0.000	0.001	0.00	2.4400
Sturgeon	SL12	44.505	-78.61	2021-08-05	13	9.900	2.312	0.001	0.00	1.2200
Sturgeon	SL13	44.484	-78.65	2021-08-05	13	8.398	0.246	0.001	0.00	2.0333
Sturgeon	SL14	44.453	-78.71	2021-08-05	22	32.113	0.000	0.001	0.00	5.2867
Sturgeon	SL15	44.421	-78.73	2021-08-05	17.5	36.358	0.000	0.005	1999.80	10.9800
Sturgeon	SL17	44.471	-78.7	2021-08-05	0	9.627	0.000	0.001	666.60	1.6267
Sturgeon	SL32	44.481	-78.71	2021-08-05	15	8.935	0.331	0.0015	333.30	2.4400

Lake	ID	Latitude	Longitude	Sample date	Temp.	µg/L TP	µg/L TDP	ABS Turbidity	mg/L TSS	mg/L Chl-a
Sturgeon	SL33	44.491	-78.73	2021-08-05	16	45.417	0.000	0.001	1666.50	0.0000
Sturgeon	SL34	44.411	-78.76	2021-08-05	16	25.477	1.965	0.001	17998.20	2.4400
Sturgeon	SL2	44.474	-78.73	2021-09-02	0	10.894	3.260	0.0015	42829.05	0.8133
Sturgeon	SL3	44.525	-78.73	2021-09-02	15	10.325	24.944	0.002	10665.60	1.2200
Sturgeon	SL4	44.535	-78.74	2021-09-02	14	4.738	6.606	0.001	9499.05	0.0000
Sturgeon	SL5	44.483	-78.67	2021-09-02	15	13.142	20.519	0	8499.15	0.4067
Sturgeon	SL6	44.484	-78.67	2021-09-02	14	13.588	21.302	0	8165.85	0.8133
Sturgeon	SL7	44.513	-78.64	2021-09-02	13	9.835	6.050	0	7332.60	0.0000
Sturgeon	SL16	44.511	-78.6	2021-09-02	15	54.590	5.648	0.0025	22831.05	4.8800
Sturgeon	SL12	44.505	-78.61	2021-09-02	13	9.912	4.606	0.0005	7832.55	0.0000
Sturgeon	SL15	44.421	-78.73	2021-09-02	17.5	29.508	5.440	0.0025	11165.55	3.6600
Sturgeon	SL32	44.481	-78.71	2021-09-02	15	13.217	18.313	0.0015	7999.20	0.0000
Sturgeon	SL33	44.491	-78.73	2021-09-02	16	14.681	0.681	0.0015	7832.55	0.0000

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Balsam	BL1	44.632	-78.85	2019-06-04	0	0	0.234	0	0.054	0	0.18
Balsam	BL2	44.622	-78.85	2019-06-04	0	0	0.236	0	0.056	0.05	0.13
Balsam	BL3	44.625	-78.84	2019-06-04	3	0	0.217	0	0.047	0.05	0.12
Balsam	BL4	44.611	-78.84	2019-06-04	11	8	0.233	0	0.043	0	0.19
Balsam	BL5	44.65	-78.8	2019-06-04	13	0	0.234	0	0.054	0.05	0.13
Balsam	BL6	44.593	-78.8	2019-06-04	0	0	0.278	0	0.038	0.04	0.2
Balsam	BL7	44.58	-78.8	2019-06-04	0	0	0.227	0	0.027	0	0.2
Balsam	BL8	44.571	-78.8	2019-06-04	3	0	0.256	0	0.046	0.04	0.17
Balsam	BL9	44.539	-78.84	2019-06-04	11	3	0.28	0	0	0	0.28
Balsam	BL10	44.525	-78.85	2019-06-04	5	0	0.248	0	0.008	0.04	0.2
Balsam	BL11	44.562	-78.87	2019-06-04	22	0	n/a	n/a	n/a	n/a	n/a
Balsam	BL12	44.555	-78.89	2019-06-04	3	0	0.302	0	0.062	0.05	0.19
Balsam	BL13	44.57	-78.89	2019-06-04	3	0	0.237	0	0.037	0	0.2
Balsam	BL14	44.581	-78.89	2019-06-04	3	0	0.224	0	0.064	0	0.16
Balsam	BL15	44.605	-78.86	2019-06-04	3	0	0.263	0	0.063	0.04	0.16
Balsam	BL16	44.572	-78.84	2019-06-04	0	5	0.251	0	0.051	0	0.2
Balsam	BL17	44.566	-78.82	2019-06-04	5	3	0.227	0	0.037	0	0.19
Balsam	BL1	44.632	-78.85	2019-07-02	3	0	0.256	0	0.026	0.04	0.19
Balsam	BL2	44.622	-78.85	2019-07-02	3	0	0.209	0	0.019	0	0.19
Balsam	BL3	44.625	-78.84	2019-07-02	3	3	0.226	0	0.016	0.05	0.16
Balsam	BL4	44.611	-78.84	2019-07-02	0	0	0.257	0	0.027	0.04	0.19

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Balsam	BL5	44.65	-78.8	2019-07-02	8	8	0.285	0	0.035	0	0.25
Balsam	BL6	44.593	-78.8	2019-07-02	8	3	0.171	0	0.011	0	0.16
Balsam	BL7	44.58	-78.8	2019-07-02	3	3	0.207	0	0.017	0.04	0.15
Balsam	BL8	44.571	-78.8	2019-07-02	0	0	0.224	0	0.014	0	0.21
Balsam	BL9	44.539	-78.84	2019-07-02	3	0	0.24	0	0	0	0.24
Balsam	BL10	44.525	-78.85	2019-07-02	0	0	0.3	0	0	0.04	0.26
Balsam	BL18	44.541	-78.86	2019-07-02	3	3	0.24	0	0	0	0.24
Balsam	BL11	44.562	-78.87	2019-07-02	8	0	0.263	0	0.023	0.04	0.2
Balsam	BL19	44.565	-78.86	2019-07-02	69	8	0.225	0	0.015	0.04	0.17
Balsam	BL12	44.555	-78.89	2019-07-02	0	0	0.227	0	0.017	0	0.21
Balsam	BL13	44.57	-78.89	2019-07-02	3	0	0.12	0	0.01	0	0.11
Balsam	BL14	44.581	-78.89	2019-07-02	3	0	0.247	0	0.017	0	0.23
Balsam	BL15	44.605	-78.86	2019-07-02	0	0	0.247	0	0.027	0	0.22
Balsam	BL16	44.572	-78.84	2019-07-02	3	3	0.164	0	0.024	0	0.14
Balsam	BL17	44.566	-78.82	2019-07-02	5	3	0.24	0	0	0	0.24
Balsam	BL1	44.632	-78.85	2019-08-06	0	0	0.451	0	0.011	0.13	0.31
Balsam	BL2	44.622	-78.85	2019-08-06	0	0	0.27	0	0	0	0.27
Balsam	BL3	44.625	-78.84	2019-08-06	16	5	0.28	0	0	0	0.28
Balsam	BL4	44.611	-78.84	2019-08-06	19	0	0.189	0	0.009	0	0.18
Balsam	BL5	44.65	-78.8	2019-08-06	8	8	0.18	0	0	0	0.18
Balsam	BL20	44.621	-78.8	2019-08-06	n/a	n/a	0.36	0	0	0	0.36

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Balsam	BL6	44.593	-78.8	2019-08-06	5	5	0.28	0	0	0	0.28
Balsam	BL7	44.58	-78.8	2019-08-06	0	0	0.23	0	0	0	0.23
Balsam	BL8	44.571	-78.8	2019-08-06	5	5	0.18	0	0	0	0.18
Balsam	BL9	44.539	-78.84	2019-08-06	0	0	0.18	0	0	0	0.18
Balsam	BL10	44.525	-78.85	2019-08-06	0	0	0.27	0	0	0	0.27
Balsam	BL18	44.541	-78.86	2019-08-06	3	3	0.26	0	0	0	0.26
Balsam	BL11	44.562	-78.87	2019-08-06	0	0	0.318	0	0.108	0	0.21
Balsam	BL19	44.565	-78.86	2019-08-06	0	0	0.3	0	0	0	0.3
Balsam	BL12	44.555	-78.89	2019-08-06	3	3	0.27	0	0	0	0.27
Balsam	BL13	44.57	-78.89	2019-08-06	5	5	0.21	0	0	0	0.21
Balsam	BL14	44.581	-78.89	2019-08-06	3	0	0.19	0	0	0	0.19
Balsam	BL15	44.605	-78.86	2019-08-06	3	0	0.17	0	0	0	0.17
Balsam	BL16	44.572	-78.84	2019-08-06	5	0	0.19	0	0	0	0.19
Balsam	BL17	44.566	-78.82	2019-08-06	5	5	0.2	0	0	0	0.2
Balsam	BL1	44.632	-78.85	2019-09-03	0	0	0.25	0	0	0	0.25
Balsam	BL2	44.622	-78.85	2019-09-03	3	0	0.26	0	0	0	0.26
Balsam	BL3	44.625	-78.84	2019-09-03	5	3	0.27	0	0	0	0.27
Balsam	BL4	44.611	-78.84	2019-09-03	5	3	0.24	0	0	0	0.24
Balsam	BL5	44.65	-78.8	2019-09-03	0	0	0.297	0	0.007	0	0.29
Balsam	BL20	44.621	-78.8	2019-09-03	3	3	0.23	0	0	0	0.23
Balsam	BL6	44.593	-78.8	2019-09-03	3	3	0.39	0	0	0.12	0.27

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Balsam	BL7	44.58	-78.8	2019-09-03	13	0	0.17	0	0	0	0.17
Balsam	BL8	44.571	-78.8	2019-09-03	0	0	0.22	0	0	0	0.22
Balsam	BL9	44.539	-78.84	2019-09-03	0	0	0.24	0	0	0	0.24
Balsam	BL10	44.525	-78.85	2019-09-03	11	0	0.37	0	0	0	0.37
Balsam	BL18	44.541	-78.86	2019-09-03	25	3	0.2	0	0	0	0.2
Balsam	BL11	44.562	-78.87	2019-09-03	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Balsam	BL19	44.565	-78.86	2019-09-03	0	0	0.21	0	0	0	0.21
Balsam	BL12	44.555	-78.89	2019-09-03	3	0	0.12	0	0	0	0.12
Balsam	BL13	44.57	-78.89	2019-09-03	16	3	0.07	0	0	0	0.07
Balsam	BL14	44.581	-78.89	2019-09-03	0	0	0.13	0	0	0	0.13
Balsam	BL15	44.605	-78.86	2019-09-03	22	3	0.274	0	0.014	0	0.26
Balsam	BL16	44.572	-78.84	2019-09-03	0	0	0.19	0	0	0	0.19
Balsam	BL17	44.566	-78.82	2019-09-03	39	39	0.259	0.003	0.006	0	0.25
Balsam	BL1	44.632	-78.85	2021-06-01	<3	<3	0.208	0	0.018	0	0.19
Balsam	BL3	44.625	-78.84	2021-06-01	8	<3	0.2	0	0	0	0.2
Balsam	BL4	44.611	-78.84	2021-06-01	3	3	0.17	0	0.02	0	0.15
Balsam	BL5	44.646	-78.8	2021-06-01	3	3	0.2	0	0	0	0.2
Balsam	BL20	44.621	-78.8	2021-06-01	13	11	0.27	0	0	0	0.27
Balsam	BL6	44.626	-78.8	2021-06-01	<3	<3	0.21	0	0	0	0.21
Balsam	BL7	44.579	-78.8	2021-06-01	3	<3	0.2	0	0	0	0.2
Balsam	BL8	44.571	-78.8	2021-06-01	8	<3	0.21	0	0	0	0.21

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Balsam	BL9	44.539	-78.84	2021-06-01	13	5	0.2	0	0	0	0.2
Balsam	BL10	44.525	-78.85	2021-06-01	30	11	0.271	0	0.011	0	0.26
Balsam	BL12	44.555	-78.89	2021-06-01	<3	<3	0.202	0	0.012	0	0.19
Balsam	BL13	44.57	-78.89	2021-06-01	3	3	0.23	0	0	0	0.23
Balsam	BL14	44.577	-78.89	2021-06-01	<3	<3	0.379	0	0.029	0.18	0.17
Balsam	BL15	44.605	-78.86	2021-06-01	11	3	0.183	0.013	0	0	0.17
Balsam	BL16	44.572	-78.84	2021-06-01	16	8	0.2	0	0	0	0.2
Balsam	BL17	44.566	-78.82	2021-06-01	3	<3	0.242	0	0.012	0	0.23
Balsam	BL16	44.572	-78.84	2021-07-05	52	3	0.27	0	0	0	0.27
Balsam	BL1	44.632	-78.85	2021-07-06	3	3	0.21	0	0	0	0.21
Balsam	BL3	44.625	-78.84	2021-07-06	19	5	0.23	0	0	0	0.23
Balsam	BL4	44.611	-78.84	2021-07-06	25	<3	0.531	0	0.031	0.05	0.45
Balsam	BL5	44.646	-78.8	2021-07-06	98	8	0.23	0	0	0	0.23
Balsam	BL20	44.621	-78.8	2021-07-06	5	3	0.16	0	0	0	0.16
Balsam	BL6	44.626	-78.8	2021-07-06	8	3	0.24	0	0	0	0.24
Balsam	BL7	44.579	-78.8	2021-07-06	22	<3	0.13	0	0	0	0.13
Balsam	BL8	44.571	-78.8	2021-07-06	11	11	0.17	0	0	0	0.17
Balsam	BL9	44.539	-78.84	2021-07-06	39	8	0.23	0	0	0.05	0.18
Balsam	BL12	44.555	-78.89	2021-07-06	28	<3	0.264	0	0.014	0	0.25
Balsam	BL13	44.57	-78.89	2021-07-06	28	3	0.287	0	0.027	0.06	0.2
Balsam	BL14	44.577	-78.89	2021-07-06	<3	<3	0.293	0	0.013	0.04	0.24

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Balsam	BL17	44.566	-78.82	2021-07-06	11	<3	0.28	0	0	0	0.28
Balsam	BL15	44.605	-78.86	2021-07-07	13	3	0.256	0	0.016	0	0.24
Balsam	BL10	44.525	-78.85	2021-07-13	5	<3	0.292	0	0.012	0	0.28
Balsam	BL1	44.632	-78.85	2021-08-03	5	3	0.2	0	0	0	0.2
Balsam	BL3	44.625	-78.84	2021-08-03	<3	<3	0.17	0	0	0	0.17
Balsam	BL4	44.611	-78.84	2021-08-03	3	3	0.22	0	0	0	0.22
Balsam	BL5	44.646	-78.8	2021-08-03	33	33	0.18	0	0	0	0.18
Balsam	BL20	44.621	-78.8	2021-08-03	11	<3	0.13	0	0	0	0.13
Balsam	BL6	44.626	-78.8	2021-08-03	<3	<3	0.21	0	0	0	0.21
Balsam	BL7	44.579	-78.8	2021-08-03	3	<3	0.224	0	0.014	0	0.21
Balsam	BL8	44.571	-78.8	2021-08-03	5	5	0.19	0	0	0	0.19
Balsam	BL9	44.539	-78.84	2021-08-03	19	<3	0.19	0	0	0	0.19
Balsam	BL10	44.525	-78.85	2021-08-03	3	<3	0.25	0	0	0	0.25
Balsam	BL12	44.555	-78.89	2021-08-03	13	5	0.24	0	0	0	0.24
Balsam	BL13	44.57	-78.89	2021-08-03	<3	<3	0.223	0	0.013	0	0.21
Balsam	BL14	44.577	-78.89	2021-08-03	3	<3	0.19	0	0	0	0.19
Balsam	BL15	44.605	-78.86	2021-08-03	<3	<3	0.18	0	0	0	0.18
Balsam	BL16	44.572	-78.84	2021-08-03	19	5	0.19	0	0	0	0.19
Balsam	BL17	44.566	-78.82	2021-08-03	8	<3	0.19	0	0	0	0.19
Balsam	BL3	44.625	-78.84	2021-08-31	8	<3	0.24	0	0	0	0.24
Balsam	BL4	44.611	-78.84	2021-08-31	5	5	0.25	0	0	0	0.25

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Balsam	BL5	44.646	-78.8	2021-08-31	156	3	0.369	0	0.009	0	0.36
Balsam	BL20	44.621	-78.8	2021-08-31	<3	<3	0.26	0	0	0	0.26
Balsam	BL6	44.626	-78.8	2021-08-31	3	<3	0.3	0	0	0.04	0.26
Balsam	BL9	44.539	-78.84	2021-08-31	8	5	0.301	0.028	0.033	0	0.24
Balsam	BL10	44.525	-78.85	2021-08-31	5	<3	0.25	0	0	0	0.25
Balsam	BL13	44.57	-78.89	2021-08-31	25	3	0.16	0	0	0	0.16
Balsam	BL15	44.605	-78.86	2021-08-31	5	5	0.3	0	0	0.07	0.23
Balsam	BL16	44.572	-78.84	2021-08-31	n/a	n/a	0.29	0	0	0	0.29
Balsam	BL17	44.566	-78.82	2021-08-31	13	3	0.292	0	0.012	0	0.28
Cameron	CL1	44.546	-78.78	2019-06-04	0	0	0.189	0	0.059	0	0.13
Cameron	CL2	44.569	-78.77	2019-06-04	3	3	0.278	0	0.028	0	0.25
Cameron	CL3	44.55	-78.78	2019-06-04	3	3	0.202	0	0.082	0	0.12
Cameron	CL4	44.534	-78.75	2019-06-04	5	3	0.143	0	0.043	0	0.1
Cameron	CL5	44.539	-78.74	2019-06-04	3	0	0.292	0	0.052	0	0.24
Cameron	CL6	44.557	-78.74	2019-06-04	3	0	0.289	0.004	0.055	0.04	0.19
Cameron	CL1	44.546	-78.78	2019-07-02	0	0	0.177	0	0.017	0	0.16
Cameron	CL3	44.55	-78.78	2019-07-02	3	0	0.171	0	0.021	0	0.15
Cameron	CL4	44.534	-78.75	2019-07-02	5	3	0.187	0	0.017	0.06	0.11
Cameron	CL5	44.539	-78.74	2019-07-02	n/a	n/a	0.161	0	0.011	0	0.15
Cameron	CL6	44.557	-78.74	2019-07-02	19	0	0.158	0	0.018	0	0.14
Cameron	CL1	44.546	-78.78	2019-08-06	0	0	0.13	0	0	0	0.13

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Cameron	CL3	44.55	-78.78	2019-08-06	0	0	0.218	0	0.008	0	0.21
Cameron	CL4	44.534	-78.75	2019-08-06	0	0	0.09	0	0	0.04	0.05
Cameron	CL5	44.539	-78.74	2019-08-06	0	0	0.127	0	0.007	0	0.12
Cameron	CL6	44.557	-78.74	2019-08-06	5	0	0.16	0	0	0.04	0.12
Cameron	CL1	44.546	-78.78	2019-09-03	0	0	0.133	0	0.013	0	0.12
Cameron	CL3	44.55	-78.78	2019-09-03	16	0	0.19	0	0	0	0.19
Cameron	CL4	44.534	-78.75	2019-09-03	5	5	0.29	0	0.01	0	0.28
Cameron	CL5	44.539	-78.74	2019-09-03	5	0	0.09	0	0	0	0.09
Cameron	CL6	44.557	-78.74	2019-09-03	8	3	0.2	0	0	0	0.2
Cameron	CL1	44.547	-78.78	2021-06-01	<3	<3	0.39	0	0.06	0	0.33
Cameron	CL2	44.57	-78.77	2021-06-01	5	<3	0.29	0	0.01	0	0.28
Cameron	CL3	44.55	-78.78	2021-06-01	19	<3	0.313	0	0.053	0	0.26
Cameron	CL4	44.534	-78.75	2021-06-01	62	13	0.309	0.004	0.025	0	0.28
Cameron	CL10	44.577	-78.75	2021-06-01	3	<3	0.31	0	0.05	0	0.26
Cameron	CL5	44.539	-78.74	2021-06-01	13	5	0.318	0	0.038	0	0.28
Cameron	CL6	44.557	-78.74	2021-06-01	3	<3	0.3	0	0	0	0.3
Cameron	CL13	44.582	-78.75	2021-06-01	3	<3	0.332	0	0.052	0	0.28
Cameron	CL6	44.557	-78.74	2021-07-05	n/a	n/a	0.21	0	0	0	0.21
Cameron	CL1	44.547	-78.78	2021-07-06	5	3	0.23	0	0	0	0.23
Cameron	CL2	44.57	-78.77	2021-07-06	36	3	0.307	0	0.017	0	0.29
Cameron	CL3	44.55	-78.78	2021-07-06	39	<3	0.286	0	0.036	0	0.25

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Cameron	CL4	44.534	-78.75	2021-07-06	<3	<3	0.22	0	0	0.04	0.18
Cameron	CL5	44.539	-78.74	2021-07-06	3	<3	0.274	0	0.014	0	0.26
Cameron	CL13	44.582	-78.75	2021-07-06	8	<3	0.239	0	0.009	0	0.23
Cameron	CL10	44.577	-78.75	2021-07-13	3	<3	0.19	0	0	0	0.19
Cameron	CL1	44.547	-78.78	2021-08-03	3	<3	0.255	0	0.015	0	0.24
Cameron	CL2	44.57	-78.77	2021-08-03	3	3	0.21	0	0	0	0.21
Cameron	CL3	44.55	-78.78	2021-08-03	<3	<3	0.25	0	0.01	0	0.24
Cameron	CL4	44.534	-78.75	2021-08-03	5	3	0.262	0	0.012	0	0.25
Cameron	CL5	44.539	-78.74	2021-08-03	8	8	0.265	0	0.015	0	0.25
Cameron	CL6	44.557	-78.74	2021-08-03	33	5	0.254	0	0.014	0	0.24
Cameron	CL13	44.582	-78.75	2021-08-03	28	28	0.24	0	0	0	0.24
Cameron	CL1	44.547	-78.78	2021-08-31	<3	<3	0.21	0	0	0	0.21
Cameron	CL3	44.55	-78.78	2021-08-31	n/a	n/a	0.23	0	0	0	0.23
Cameron	CL4	44.534	-78.75	2021-08-31	8	3	0.21	0	0	0	0.21
Cameron	CL10	44.577	-78.75	2021-08-31	13	<3	0.16	0	0	0	0.16
Cameron	CL5	44.539	-78.74	2021-08-31	22	<3	0.209	0	0.009	0	0.2
Cameron	CL6	44.557	-78.74	2021-08-31	19	3	0.21	0	0	0	0.21
Cameron	CL13	44.582	-78.75	2021-08-31	102	11	0.21	0	0	0	0.21
Pigeon	PL1	44.516	-78.49	2019-06-06	0	0	0.55	0.005	0.235	0.06	0.25
Pigeon	PL2	44.356	-78.53	2019-06-06	11	3	0.929	0.006	0.133	0.19	0.6
Pigeon	PL3	44.361	-78.51	2019-06-06	5	3	0.462	0	0.012	0	0.45

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Pigeon	PL4	44.53	-78.53	2019-06-06	3	3	0.463	0	0.073	0	0.39
Pigeon	PL5	44.561	-78.45	2019-06-06	5	0	0.445	0	0.125	0	0.32
Pigeon	PL6	44.536	-78.55	2019-06-06	3	3	0.553	0.004	0.209	0	0.34
Pigeon	PL1	44.516	-78.49	2019-07-04	0	0	0.432	0.005	0.057	0	0.37
Pigeon	PL2	44.356	-78.53	2019-07-04	5	5	0.715	0.005	0.01	0.08	0.62
Pigeon	PL3	44.361	-78.51	2019-07-04	43	3	0.56	0	0	0.04	0.52
Pigeon	PL4	44.53	-78.53	2019-07-04	11	11	0.26	0	0	0	0.26
Pigeon	PL5	44.561	-78.45	2019-07-04	0	0	0.387	0.006	0.061	0	0.32
Pigeon	PL6	44.536	-78.55	2019-07-04	3	3	0.419	0.004	0.035	0	0.38
Pigeon	PL1	44.516	-78.49	2019-08-08	n/a	n/a	0.27	0	0	0.04	0.23
Pigeon	PL7	44.369	-78.51	2019-08-08	11	11	0.32	0	0	0	0.32
Pigeon	PL2	44.356	-78.53	2019-08-08	55	8	0.649	0.004	0.015	0	0.63
Pigeon	PL3	44.361	-78.51	2019-08-08	69	0	0.61	0	0	0	0.61
Pigeon	PL4	44.53	-78.53	2019-08-08	8	8	0.406	0	0.006	0	0.4
Pigeon	PL5	44.561	-78.45	2019-08-08	0	0	0.34	0	0	0	0.34
Pigeon	PL6	44.536	-78.55	2019-08-08	43	33	0.34	0	0	0	0.34
Pigeon	PL8	44.564	-78.52	2019-08-08	3	0	0.26	0	0	0.04	0.22
Pigeon	PL1	44.516	-78.49	2019-09-05	3	3	0.24	0	0	0.04	0.2
Pigeon	PL7	44.369	-78.51	2019-09-05	39	39	n/a	n/a	n/a	n/a	n/a
Pigeon	PL2	44.356	-78.53	2019-09-05	0	0	0.606	0	0.006	0	0.6
Pigeon	PL3	44.361	-78.51	2019-09-05	0	0	0.5	0	0	0	0.5

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Pigeon	PL4	44.53	-78.53	2019-09-05	0	0	0.394	0.004	0	0	0.39
Pigeon	PL5	44.561	-78.45	2019-09-05	0	0	0.29	0	0	0	0.29
Pigeon	PL6	44.536	-78.55	2019-09-05	0	0	4.24	0	0	1.6	2.64
Pigeon	PL8	44.564	-78.52	2019-09-05	0	0	0.31	0	0	0	0.31
Pigeon	PL1	44.516	-78.49	2021-06-03	3	<3	0.561	0	0.241	0	0.32
Pigeon	PL7	44.369	-78.51	2021-06-03	13	3	0.612	0	0.012	0	0.6
Pigeon	PL3	44.361	-78.51	2021-06-03	22	11	0.57	0	0	0	0.57
Pigeon	PL5	44.561	-78.45	2021-06-03	8	<3	0.655	0.003	0.262	0	0.39
Pigeon	PL6	44.536	-78.55	2021-06-03	16	<3	0.616	0.004	0.232	0	0.38
Pigeon	PL8	44.564	-78.52	2021-06-03	5	3	0.576	0	0.246	0	0.33
Pigeon	PL1	44.516	-78.49	2021-07-08	3	3	0.347	0.005	0.072	0.07	0.2
Pigeon	PL7	44.369	-78.51	2021-07-08	3	<3	0.46	0	0	0	0.46
Pigeon	PL3	44.361	-78.51	2021-07-08	30	8	0.42	0	0	0.04	0.38
Pigeon	PL5	44.561	-78.45	2021-07-08	<3	<3	n/a	0.004	0.074	0.04	n/a
Pigeon	PL6	44.536	-78.55	2021-07-08	25	13	0.423	0.004	0.139	0.05	0.23
Pigeon	PL8	44.564	-78.52	2021-07-08	3	<3	0.354	0.004	0.08	0	0.27
Pigeon	PL1	44.516	-78.49	2021-08-05	<3	<3	0.25	0	0	0	0.25
Pigeon	PL7	44.369	-78.51	2021-08-05	25	16	0.54	0	0	0	0.54
Pigeon	PL3	44.361	-78.51	2021-08-05	<3	<3	0.58	0	0	0	0.58
Pigeon	PL6	44.536	-78.55	2021-08-05	43	3	0.24	0	0	0	0.24
Pigeon	PL8	44.564	-78.52	2021-08-05	3	<3	0.26	0	0	0	0.26

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Pigeon	PL1	44.516	-78.49	2021-09-02	16	<3	0.61	0	0	0	0.61
Pigeon	PL5	44.561	-78.45	2021-09-02	13	<3	0.279	0	0.009	0	0.27
Pigeon	PL6	44.536	-78.55	2021-09-02	<3	<3	0.29	0	0	0.09	0.2
Pigeon	PL8	44.564	-78.52	2021-09-02	33	3	0.21	0	0	0	0.21
Sturgeon	SL1	44.445	-78.74	2019-06-06	136	0	0.269	0	0.069	0	0.2
Sturgeon	SL2	44.437	-78.75	2019-06-06	0	0	0.386	0	0.136	0.06	0.19
Sturgeon	SL3	44.448	-78.74	2019-06-06	5	0	0.268	0	0.068	0.05	0.15
Sturgeon	SL4	44.445	-78.74	2019-06-06	8	0	0.55	0.005	0.135	0.1	0.31
Sturgeon	SL5	44.474	-78.73	2019-06-06	0	0	0.5	0	0.2	0	0.3
Sturgeon	SL6	44.477	-78.73	2019-06-06	3	3	0.299	0	0.089	0.05	0.16
Sturgeon	SL7	44.527	-78.73	2019-06-06	3	3	0.491	0.003	0.218	0	0.27
Sturgeon	SL8	44.528	-78.73	2019-06-06	8	8	0.568	0	0.218	0	0.35
Sturgeon	SL9	44.512	-78.71	2019-06-06	3	3	0.25	0	0.09	0.06	0.1
Sturgeon	SL10	44.485	-78.67	2019-06-06	16	3	0.624	0	0.224	0.05	0.35
Sturgeon	SL11	44.484	-78.67	2019-06-06	11	11	0.562	0.004	0.208	0.04	0.31
Sturgeon	SL12	44.513	-78.64	2019-06-06	11	3	0.499	0.003	0.206	0	0.29
Sturgeon	SL13	44.516	-78.63	2019-06-06	0	0	0.495	0.005	0.2	0	0.29
Sturgeon	SL14	44.527	-78.6	2019-06-06	0	0	0.439	0.006	0.153	0	0.28
Sturgeon	SL15	44.525	-78.6	2019-06-06	3	3	0.722	0.013	0.259	0.04	0.41
Sturgeon	SL1	44.445	-78.74	2019-07-04	46	36	0.68	0	0	0.1	0.58
Sturgeon	SL2	44.437	-78.75	2019-07-04	8	3	0.273	0.006	0.057	0.05	0.16

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Sturgeon	SL3	44.448	-78.74	2019-07-04	8	0	0.181	0	0.021	0	0.16
Sturgeon	SL4	44.445	-78.74	2019-07-04	13	13	0.219	0	0.019	0.04	0.16
Sturgeon	SL5	44.474	-78.73	2019-07-04	3	0	0.463	0.007	0.086	0.08	0.29
Sturgeon	SL6	44.477	-78.73	2019-07-04	3	0	0.388	0.006	0.052	0.07	0.26
Sturgeon	SL7	44.527	-78.73	2019-07-04	0	0	0.378	0.006	0.072	0.07	0.23
Sturgeon	SL8	44.528	-78.73	2019-07-04	5	5	0.148	0	0.008	0	0.14
Sturgeon	SL9	44.512	-78.71	2019-07-04	3	0	0.321	0.006	0.035	0	0.28
Sturgeon	SL16	44.511	-78.6	2019-07-04	11	0	0.481	0.007	0.094	0	0.38
Sturgeon	SL11	44.484	-78.67	2019-07-04	5	5	0.486	0	0.106	0	0.38
Sturgeon	SL12	44.513	-78.64	2019-07-04	39	13	0.367	0	0.027	0	0.34
Sturgeon	SL13	44.516	-78.63	2019-07-04	0	0	0.39	0.004	0.056	0	0.33
Sturgeon	SL14	44.527	-78.6	2019-07-04	3	0	0.412	0.007	0.065	0	0.34
Sturgeon	SL15	44.525	-78.6	2019-07-04	5	3	0.613	0.003	0	0.07	0.54
Sturgeon	SL17	44.405	-78.74	2019-07-04	8	8	0.84	0	0	0.09	0.75
Sturgeon	SL1	44.445	-78.74	2019-08-08	19	8	0.54	0	0	0.08	0.46
Sturgeon	SL2	44.437	-78.75	2019-08-08	3	0	0.31	0	0	0	0.31
Sturgeon	SL3	44.448	-78.74	2019-08-08	11	11	0.25	0	0	0.04	0.21
Sturgeon	SL4	44.445	-78.74	2019-08-08	3	3	0.23	0	0	0	0.23
Sturgeon	SL5	44.474	-78.73	2019-08-08	0	0	0.31	0	0	0	0.31
Sturgeon	SL6	44.477	-78.73	2019-08-08	3	0	0.28	0	0	0	0.28
Sturgeon	SL7	44.527	-78.73	2019-08-08	0	0	0.26	0	0	0	0.26

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Sturgeon	SL8	44.528	-78.73	2019-08-08	0	0	0.34	0	0	0	0.34
Sturgeon	SL9	44.512	-78.71	2019-08-08	11	3	0.36	0	0	0	0.36
Sturgeon	SL10	44.485	-78.67	2019-08-08	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sturgeon	SL16	44.511	-78.6	2019-08-08	3	0	0.34	0	0	0	0.34
Sturgeon	SL11	44.484	-78.67	2019-08-08	39	0	0.34	0	0	0	0.34
Sturgeon	SL12	44.513	-78.64	2019-08-08	110	49	0.479	0.004	0.025	0	0.45
Sturgeon	SL13	44.516	-78.63	2019-08-08	0	0	0.25	0	0	0.06	0.19
Sturgeon	SL14	44.527	-78.6	2019-08-08	0	0	0.297	0	0.007	0	0.29
Sturgeon	SL15	44.525	-78.6	2019-08-08	30	30	0.67	0	0	0	0.67
Sturgeon	SL17	44.405	-78.74	2019-08-08	52	52	0.79	0	0	0	0.79
Sturgeon	SL1	44.445	-78.74	2019-09-05	13	13	0.44	0	0	0	0.44
Sturgeon	SL2	44.437	-78.75	2019-09-05	5	3	0.28	0	0	0.05	0.23
Sturgeon	SL3	44.448	-78.74	2019-09-05	33	19	0.292	0	0.012	0	0.28
Sturgeon	SL4	44.445	-78.74	2019-09-05	11	11	0.18	0	0	0	0.18
Sturgeon	SL5	44.474	-78.73	2019-09-05	0	0	0.32	0	0	0.04	0.28
Sturgeon	SL6	44.477	-78.73	2019-09-05	0	0	0.248	0	0.008	0	0.24
Sturgeon	SL7	44.527	-78.73	2019-09-05	13	0	0.31	0	0	0	0.31
Sturgeon	SL8	44.528	-78.73	2019-09-05	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sturgeon	SL9	44.512	-78.71	2019-09-05	11	0	0.298	0	0.008	0.04	0.25
Sturgeon	SL10	44.485	-78.67	2019-09-05	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sturgeon	SL16	44.511	-78.6	2019-09-05	0	0	0.42	0	0	0	0.42

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Sturgeon	SL11	44.484	-78.67	2019-09-05	3	0	0.216	0	0.006	0	0.21
Sturgeon	SL12	44.513	-78.64	2019-09-05	13	3	0.36	0	0.01	0	0.35
Sturgeon	SL13	44.516	-78.63	2019-09-05	3	0	0.22	0	0	0	0.22
Sturgeon	SL14	44.527	-78.6	2019-09-05	0	0	n/a	n/a	n/a	n/a	n/a
Sturgeon	SL15	44.525	-78.6	2019-09-05	0	0	0.54	0	0	0	0.54
Sturgeon	SL17	44.405	-78.74	2019-09-05	11	3	0.83	0	0	0.06	0.77
Sturgeon	SL1	44.458	-78.7	2021-06-03	8	3	0.547	0.005	0.232	0.04	0.27
Sturgeon	SL2	44.474	-78.73	2021-06-03	<3	<3	0.543	0.004	0.279	0.07	0.19
Sturgeon	SL3	44.525	-78.73	2021-06-03	65	8	0.451	0.009	0.082	0.09	0.27
Sturgeon	SL4	44.535	-78.74	2021-06-03	166	36	0.336	0	0.076	0	0.26
Sturgeon	SL5	44.483	-78.67	2021-06-03	11	<3	0.613	0.003	0.33	0	0.28
Sturgeon	SL6	44.484	-78.67	2021-06-03	19	13	0.54	0	0.28	0	0.26
Sturgeon	SL7	44.513	-78.64	2021-06-03	3	3	0.583	0.003	0.3	0	0.28
Sturgeon	SL16	44.511	-78.6	2021-06-03	25	5	0.62	0.003	0.317	0	0.3
Sturgeon	SL11	44.507	-78.61	2021-06-03	5	<3	0.587	0.003	0.314	0	0.27
Sturgeon	SL12	44.505	-78.61	2021-06-03	19	3	0.63	0.004	0.316	0	0.31
Sturgeon	SL13	44.484	-78.65	2021-06-03	5	3	0.616	0.003	0.343	0	0.27
Sturgeon	SL14	44.453	-78.71	2021-06-03	3	<3	0.596	0.003	0.303	0	0.29
Sturgeon	SL15	44.421	-78.73	2021-06-03	16	13	0.74	0	0	0	0.74
Sturgeon	SL17	44.471	-78.7	2021-06-03	5	<3	0.609	0	0.339	0.04	0.23
Sturgeon	SL32	44.481	-78.71	2021-06-03	5	<3	0.567	0.003	0.294	0	0.27

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Sturgeon	SL33	44.491	-78.73	2021-06-03	28	22	0.502	0.003	0.219	0.04	0.24
Sturgeon	SL12	44.505	-78.61	2021-07-07	83	5	0.492	0.006	0.086	0	0.4
Sturgeon	SL33	44.491	-78.73	2021-07-07	59	13	0.279	0	0.009	0	0.27
Sturgeon	SL1	44.458	-78.7	2021-07-08	3	3	0.373	0.003	0.06	0	0.31
Sturgeon	SL2	44.474	-78.73	2021-07-08	8	5	0.307	0	0.047	0	0.26
Sturgeon	SL3	44.525	-78.73	2021-07-08	8	3	0.178	0	0.008	0.06	0.11
Sturgeon	SL5	44.483	-78.67	2021-07-08	<3	<3	0.392	0.004	0.108	0.04	0.24
Sturgeon	SL6	44.484	-78.67	2021-07-08	3	3	0.372	0.003	0.109	0.06	0.2
Sturgeon	SL7	44.513	-78.64	2021-07-08	8	5	0.409	0.004	0.095	0	0.31
Sturgeon	SL16	44.511	-78.6	2021-07-08	8	3	0.43	0.004	0.126	0	0.3
Sturgeon	SL11	44.507	-78.61	2021-07-08	3	<3	0.257	0	0.057	0	0.2
Sturgeon	SL13	44.484	-78.65	2021-07-08	3	<3	0.43	0.004	0.106	0	0.32
Sturgeon	SL15	44.421	-78.73	2021-07-08	<3	<3	0.56	0	0	0.04	0.52
Sturgeon	SL17	44.471	-78.7	2021-07-08	11	<3	0.431	0.003	0.098	0.04	0.29
Sturgeon	SL32	44.481	-78.71	2021-07-08	5	<3	0.34	0	0.06	0	0.28
Sturgeon	SL34	44.411	-78.76	2021-07-08	141	30	0.69	0	0	0	0.69
Sturgeon	SL1	44.458	-78.7	2021-08-05	<3	<3	0.514	0	0.024	0.05	0.44
Sturgeon	SL2	44.474	-78.73	2021-08-05	<3	<3	0.374	0	0.014	0	0.36
Sturgeon	SL3	44.525	-78.73	2021-08-05	36	5	0.379	0	0.009	0	0.37
Sturgeon	SL5	44.483	-78.67	2021-08-05	<3	<3	0.335	0	0.025	0	0.31
Sturgeon	SL6	44.484	-78.67	2021-08-05	<3	<3	0.286	0	0.026	0	0.26

Lake	ID	Latitude	Longitude	Sample date	MPN/ 100mL Coli	MPN/ 100mL *E.coli*	mg/L TN	mg/L Nitrite	mg/L Nitrate	mg/L Ammonia	mg/L TON
Sturgeon	SL7	44.513	-78.64	2021-08-05	<3	<3	0.24	0	0	0	0.24
Sturgeon	SL16	44.511	-78.6	2021-08-05	3	<3	0.251	0	0.011	0	0.24
Sturgeon	SL11	44.507	-78.61	2021-08-05	<3	<3	0.25	0	0	0	0.25
Sturgeon	SL12	44.505	-78.61	2021-08-05	<3	<3	0.287	0	0.007	0	0.28
Sturgeon	SL13	44.484	-78.65	2021-08-05	3	<3	0.284	0	0.024	0	0.26
Sturgeon	SL14	44.453	-78.71	2021-08-05	39	<3	0.354	0.004	0.04	0.04	0.27
Sturgeon	SL15	44.421	-78.73	2021-08-05	<3	<3	0.78	0	0	0	0.78
Sturgeon	SL17	44.471	-78.7	2021-08-05	5	3	0.382	0.003	0.039	0	0.34
Sturgeon	SL32	44.481	-78.71	2021-08-05	<3	<3	0.24	0	0.01	0	0.23
Sturgeon	SL33	44.491	-78.73	2021-08-05	8	3	0.29	0	0	0	0.29
Sturgeon	SL34	44.411	-78.76	2021-08-05	36	11	0.72	0	0	0	0.72
Sturgeon	SL2	44.474	-78.73	2021-09-02	8	3	0.269	0	0.009	0	0.26
Sturgeon	SL3	44.525	-78.73	2021-09-02	11	3	0.178	0	0.008	0.04	0.13
Sturgeon	SL4	44.535	-78.74	2021-09-02	39	8	0.254	0	0.014	0	0.24
Sturgeon	SL5	44.483	-78.67	2021-09-02	5	5	0.284	0	0.014	0	0.27
Sturgeon	SL6	44.484	-78.67	2021-09-02	<3	<3	0.267	0	0.007	0	0.26
Sturgeon	SL7	44.513	-78.64	2021-09-02	22	<3	0.39	0	0	0	0.39
Sturgeon	SL16	44.511	-78.6	2021-09-02	11	8	0.37	0	0.01	0.04	0.32
Sturgeon	SL12	44.505	-78.61	2021-09-02	30	19	0.3	0	0	0	0.3
Sturgeon	SL15	44.421	-78.73	2021-09-02	171	8	0.78	0	0	0.08	0.7
Sturgeon	SL32	44.481	-78.71	2021-09-02	3	<3	0.244	0	0.014	0.04	0.19

Sturgeon	SL33	44.491	-78.73	2021-09-02	28	<3	0.27	0	0	0	0.27