Environment Report 2025

Township of The Archipelago

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Prepared For
Township of The Archipelago

Foreword from the Township of The Archipelago

The water quality monitoring program represents a successful partnership between the Township of The Archipelago, ratepayer associations, and numerous volunteers in areas along the coast and inland lakes since its inception in 1999. The volunteer-based program provides an important avenue for relaying information about the environment to ratepayers and for providing valuable information to the Township.

The Township wishes to thank all of its ratepayers, and in particular the volunteer monitors, for their keen interest and drive to ensure our high-quality environment is maintained. The Township is committed to addressing environmental issues and ensuring the maintenance of the environment we all enjoy. This philosophy is integrated into the day-to-day functioning of the municipality, from public works operations to detailed planning analysis.

Report compiled by Georgian Bay Mnidoo Gamii Biosphere and Westwind Forest Stewardship Inc.

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2025 Report Updates

Each year the Township of The Archipelago (TOA) Environment Report summarizes the most current information on water quality, fish communities, and forest health for the region. The main objective of this annual report is to gather environmental information for the township in one place, making it easier for ratepayers to track trends over time. A new ArcGIS StoryMap version of the report is also available.

The table below identifies the sections of the 2025 Environment Report with updated content.

Summary of 2025 Environment Report Updates

Lake Partner Program	Benthic Monitoring	Forest Health
• Bayfield Nares Islanders' Association • Blackstone Lake Cottagers' Association • Healey Lake Property Owner's Association • Kapikog Lake Cottagers' Association • Pointe au Baril Islanders' Association • Sans Souci & Copperhead Association • South Channel Association	• Blackstone Lake Cottagers' Association • Crane Lake Association • Healey Lake Property Owners' Association • Kapikog Lake Cottagers' Association	• Beech bark disease • Beech leaf disease • Emerald ash borer • Forest tent caterpillar • Hemlock wooly adelgid • Introduced pine sawfly • Oak wilt • Spruce budworm • French-Severn harvest areas 2026-2027

Most LPP volunteers resumed regular sampling in 2022 following limited sampling and analysis in 2020 and 2021 due to the Covid-19 pandemic. The table below presents a summary of LPP activity in the TOA.

Association / Waterbody	Monitoring Status	Total Phosphorus		Trophic Status	Recommendation
		Average (3-5 yrs)	Trend (>5 yrs)		
Bayfield Nares Islanders' Association	Active (LPP)	5.4 µg/L; 4.1 µg/L	n/a	Oligotrophic	Continue current monitoring
Blackstone Lake Cottagers' Association	Active (LPP & benthic monitoring)	6.8 µg/L	n/a	Oligotrophic	Continue current monitoring
Cranberry Lake	Inactive (history of LPP monitoring)	n/a	n/a	Mesotrophic	Reinitiate monitoring
Crane Lake Association	Recently active (LPP); active (benthic monitoring)	n/a	Increasing	Oligotrophic	Reinitiate LPP monitoring, continue benthic monitoring
Healey Lake Property Owners' Association	Active (LPP & benthic monitoring)	7.5 µg/L; 8.8 µg/L	n/a	Oligotrophic	Continue current monitoring
Iron City Fishing Club	Inactive (history of LPP monitoring)	n/a	n/a	Mesotrophic	Reinitiate monitoring
Kapikog Lake Cottagers' Association	Active (LPP & benthic monitoring)	n/a	Increasing	Oligotrophic	Continue current monitoring
Manitou Association	Inactive (no history of LPP monitoring)	n/a	n/a	n/a	Begin standard LPP monitoring
Naiscoot Lake Association	Inactive (no history of LPP monitoring)	n/a	n/a	n/a	Begin standard LPP monitoring
Pointe au Baril Islanders' Association	Active (LPP)	Most sites mesotrophic with a decreasing trend. See detailed results for more information.			Continue current monitoring
Rock Island Lake	Inactive (no history of LPP monitoring)	n/a	n/a	n/a	Begin standard LPP monitoring
Sans Souci & Copperhead Association	Active (LPP)	See detailed results for more information		Oligotrophic	Continue current monitoring
Skerryvore Ratepayers' Association	Inactive (no history of LPP monitoring)	n/a	n/a	n/a	Begin standard LPP monitoring
South Channel Association	Active (LPP)	See detailed results for more information		Oligotrophic	Continue current monitoring
Three Legged Lake Association	Recently active (LPP)	n/a	Increasing	Oligotrophic	Reinitiate standard LPP monitoring
Woods Bay Community Association	Recently active (LPP)	See detailed results for more information		Oligotrophic	Reinitiate standard LPP monitoring

Benthic monitoring continued in 2025 on four lakes: Blackstone, Crane, Healey, and Kapikog. The objective of benthic monitoring in TOA lakes is to characterize the benthic community of each lake and compare it to lakes in the Parry Sound-Muskoka District in order to determine whether the benthic community is considered typical of what would be expected for a lake in this region. Based on the analysis of eight years of data, the benthic community in each of the four lakes is considered ‘typical’ for the region.

Benthic monitoring should continue annually to note any changes in the benthic community that could signify changes in water quality. Lakes in the region are experiencing increasing pressures, such as climate change, invasive species, and development. It is important to continue monitoring water quality even in lakes considered to be healthy so that if/when changes start to occur, those changes are noted and appropriate actions can be taken swiftly (e.g., stewardship actions, enhanced monitoring or studies). Without long-term, continuous monitoring, changes in the benthic community and water quality more broadly may go unnoticed until there is a significant problem.

Fish community data gathered by the Ministry of Natural Resources is included in this report. As new data become available, these summaries are updated. No new information was available for 2025.

The featured forest pests in this year’s report are: beech bark disease, beech leaf disease, emerald ash borer, forest tent caterpillar, hemlock wooly adelgid, introduced pine sawfly, oak wilt, spongy moth, and spruce budworm.

Introduction

Each year the Township of The Archipelago's (TOA) Environment Report presents results from the Water Quality Monitoring Program, fish community data gathered by the Ministry of Natural Resources (MNR), and an overview of featured forest pests and diseases either present in the Parry Sound-Muskoka District or that have the potential to reach the area in the future. The main objective of this annual report is to gather environmental information for the township in one place, making it easier for TOA Council, staff, and ratepayers to track trends over time.

The remainder of this report provides a brief overview of the methods used to collect water quality data and details the results, by ratepayer association, from the most recently available data gathered. This includes an overview of sampling locations, water clarity, total phosphorus, calcium, chloride, and sulphate concentrations, and benthic macroinvertebrates. Fish community summaries are detailed where data exist. The final section presents an update on forest pests and diseases in or near the region.

All past Environment Reports can be viewed on the TOA's Environment webpage under "Annual Environment Reports" and a new ArcGIS StoryMap version of the report is also available.

Water Quality Overview

In the spring of 2016, the TOA recommended changes to its water quality (WQ) monitoring program. These changes came about as a result of a partnership with the Georgian Bay Mnidoo Gamii Biosphere (GBB). Over three years, as part of their *Coordinated Nutrient Monitoring Program*, GBB worked with partners to review existing nutrient monitoring efforts along eastern Georgian Bay. Based on this review, a new set of guidelines and recommendations were developed to improve the effectiveness and efficiency of the collective efforts of volunteers, associations, agencies, and other organizations. The main recommendation that came out of the review was a shift from bacteria to phosphorus monitoring. For more details on the rationale for this shift, read the 2022 Environment Report.

Monitoring phosphorus is very important, as is it is the nutrient that controls plant growth (including algae) in lakes. Measuring total phosphorus (TP) year after year is necessary to detect long-term changes in water quality that may be due to impacts of shoreline development, climate change, and other stressors. The objectives associated with monitoring TP in eastern Georgian Bay are as follows:

1. Mitigating localised water quality issues;
2. Regional characterisation of water quality;
3. Spatial and temporal trend detection; and
4. Identifying the effects of regional drivers and multiple stressors to protect ecosystem function.

Lake Partner Program

The Lake Partner Program (LPP) is an Ontario-wide, publicly funded, free program that uses volunteers to collect data about phosphorus, water clarity, calcium, chloride, and sulphate. The simple tests for TP and water clarity provide a strong basis for assessing the health of the ecosystem, and whether TP is too high or too low. GBB encourages ratepayer associations and volunteers to join the LPP if there is no active sampling happening in their area. Sampling locations can be viewed here.

LPP water quality monitoring data collected in the TOA also helps inform the bigger picture story around TP trends in eastern Georgian Bay. Along with data collected by provincial agencies, federal agencies, and other organizations, volunteer-collected data (e.g., TOA monitoring data) is used to report on water quality in the *State of the Bay* reports (available here). By bringing all of these sources of data together, a more spatially and temporally complete picture of water quality in eastern Georgian Bay can be achieved.

Enclosed bays that are connected to Georgian Bay, and have limited exchange of water due to convoluted connections or constricted openings, will have water chemistry characteristics that are mostly subject to influences from the upstream watershed. This will be especially true if there are major inflows or shoreline development within the bay. Even in cases where the bay is considered to be 'natural', there are multiple stressors associated with all ecosystems that occur as a result of climate change, long-range transport of pollutants, and the influx of invading species. Monitoring in these areas will help to understand the impacts of these stressors and support federal and provincial monitoring in similar nearshore areas.

Inland lakes require TP data to help assess background concentrations relative to present day concentrations. Inland lakes should be sampled in all cases where there is no previous data collected. As a general rule, only one representative sampling location is required for each lake, even in large convoluted lakes with multiple arms (e.g., Healey Lake). If there are compelling reasons to believe that water quality in different areas of the lake would be influenced differently by rivers or development for example, or there are local observed differences or perceived problems, more sites may be recommended. Generally speaking, if the watershed influences are similar across a lake, the water quality will be similar as well.

Methods

Spring sampling (following LPP protocols) is sufficient for most locations in the TOA, as there are few areas that experience fall algal blooms. However, in some locations enhanced monitoring (beyond LPP) may be required. Generally, the trigger to consider additional monitoring relates to high TP and/or algal blooms. In these scenarios, further water quality parameters can be obtained with only a few additional pieces of equipment, most notably oxygen meters and specialized bottles to collect samples at distinct depths.

Regular monitoring sites

LPP volunteers collect one TP sample in May (during the spring-turnover period) at a deep spot. Additionally, volunteers take Secchi disc water clarity measurements at least once every two weeks throughout the summer. The black-and-white Secchi disc is lowered into the water until it is at the absolute limit of being visible. This depth is the Secchi depth of visibility, which is directly related to water clarity and can be used as a simple and effective monitoring tool for determining the effects of human activities on water clarity and, indirectly, on the nutrient content in the water.

The materials needed to take the water samples and conduct water clarity measurements are sent to volunteers by the province. Instructions and training videos are available online and additional training can be provided by GBB. Samples are returned (postage paid) to the Dorset Environmental Science Centre (DESC) for analysis and Secchi observation sheets are mailed to DESC in November. All data are made available online.

Enhanced monitoring sites

The collection of additional water quality data should be determined on a case-by-case basis following a review of existing data. GBB's *Enclosed Bays and Inland Lakes Phosphorus Monitoring Guideline* includes a decision tree to outline how further monitoring could occur under several different scenarios. It also outlines potential equipment needs and general water chemistry parameters for enhanced monitoring programs. The guideline ensures that information is collected in a standardized way that allows comparison between sites and over time.

Interpreting Results

Water clarity

In general, water clarity, as measured by Secchi depth, tends to be higher in open areas of Georgian Bay and in bays with good water circulation. Water clarity tends to diminish (smaller Secchi depth values) in enclosed bays, near wetlands or sources of organic material, and in lakes or areas that have higher nutrient levels either from natural or anthropogenic sources.

When examining the data, it is typical to see a small decline in Secchi depth throughout the year, with lowest depths reading near the end of the summer and into September. However, a major decline in the readings should be evaluated more carefully. A multi-year comparison of data is valuable to assess the water clarity trends for a particular area.

Where more than one year of water clarity data exists for a sampling location, average Secchi depth is given.

Calcium

Calcium is a nutrient that is required by all living organisms. Some organisms, including those that are a primary food for many fish, use calcium in the water to form their calcium-rich body coverings. These organisms, like Daphnia, mollusks, clams, amphipods, and crayfish, are very sensitive to declining calcium levels.

Calcium concentrations have been shown to be decreasing in Canadian Shield lakes in response to depleted watershed stores of calcium caused by logging and decades of acid loading associated with acid rain. Combined with lower food availability and warmer temperatures predicted as part of a changing climate, this decrease represents an important stressor for many aquatic species.

Calcium concentrations should be considered over the long term to identify trends.

Chloride

Chloride is a naturally occurring ion found dissolved in water. It can come from natural sources (e.g., weathering of rocks and soils) as well as human sources (e.g., road salt, agricultural inputs). Chloride is often measured as an indication of salinity, although other ions also affect salinity, including calcium, magnesium, and sodium.

Lakes and rivers naturally contain low concentrations of chloride (generally <100 mg/L). Too much chloride can be toxic to freshwater plants and animals. The Canadian Council of Ministers of the Environment set the Canadian Water Quality Guidelines (CWQG) for the protection of aquatic life against effects of chronic exposure to chloride at a concentration of 120 mg/L.

A study by Sorichetti et al. (2022) found clear evidence of anthropogenic impact on chloride concentrations in Ontario inland lakes and that the primary source is runoff from de-icers and road salts. The authors state, "relatively higher and increasing historical chloride concentrations are measured in lakes that have winter-maintained roads or urban land use within their watersheds" (Sorichetti et al., 2022, p. 521). Most lakes examined in the study (79%) had chloride concentrations below 5 mg/L, 19.5% were between 5 and 40 mg/L, and 0.5% were above 40 mg/L (Sorichetti et al., 2022). These concentrations are well below the CWQG for the protection of aquatic life from exposure to chloride (120 mg/L), however, recent studies have shown that the CWQGs may not be protective of all taxa, "namely cladoceran zooplankton, particularly in low nutrient and soft-water lakes such as those on the Canadian Shield" (Sorichetti et al., 2022, p. 524).

Similar to calcium, chloride concentrations should be considered over the long term to identify trends. Where more than one year of data exists for a sampling location, chloride concentration in mg/L is graphed.

Total phosphorus

As phosphorus is the nutrient that controls the growth of plants (e.g., algae) in the aquatic environment, TP concentrations are used to interpret nutrient status. The nutrient status of an aquatic environment is typically described in terms of three broad categories – oligotrophic, mesotrophic, and eutrophic (Figure 1). TP concentrations below 10 µg/L indicate an oligotrophic or unproductive environment. Aquatic environments with TP concentrations ranging between 10 and 20 µg/L are termed mesotrophic and are moderately enriched. Finally, TP concentrations over 20 µg/L indicate a eutrophic aquatic environment in which persistent, nuisance algal blooms are possible.

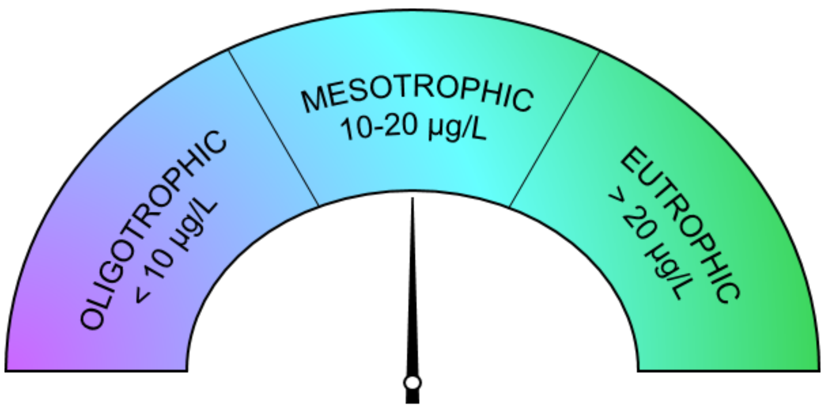

Figure 1. A lake's trophic status is determined by its total phosphorus concentration: oligotrophic lakes have TP levels less than 10 µg/L; mesotrophic lakes have TP concentrations ranging between 10 and 20 µg/L; and eutrophic lakes have TP concentration.

The Interim Provincial Water Quality Objective (PWQO) for TP in lakes is 20 µg/L. This measure is intended to serve as a warning for, and to prevent, conditions that could result in the nuisance growth of algae. Results in this report are used to characterize trophic condition and assess any TP trends (increasing or decreasing). When interpreting data, the Ministry of Environment, Conservation and Parks (MECP) cautions that although only three years of data are required to establish a reliable, long-term average to measure current nutrient status, a longer data set is required to examine trends. Some aquatic environments exhibit relatively large differences in TP between years, highlighting the need for long-term data collection to distinguish between natural variation and true anomalies.

Where more than one year of consecutive TP data exists for a sampling location, TP in µg/L (micrograms/litre) is graphed. Average TP is calculated for sampling locations with between three and five years of data, as well as locations with five or more years of data for which there is no apparent trend. For sampling locations with five or more years of TP data and for which there is an apparent trend, a trend line is shown on the TP graph and average is not calculated. While every effort is made to calculate a trend for lakes with five or more years of data, a trend may not be included on a case-by-case basis if large gaps exist between sampling years. Visible outliers are removed for the purpose of determining whether a trend exists.

Complete data for all historical and active sampling locations, including over one thousand sampling locations across Ontario, are available through the Lake Partner Program open data website. Readers may find the database useful in understanding how TOA sampling location TP concentrations compare to other waterbodies across the province.

Only data collected after the MECP took over coordination of the LPP (2002 to present) are shown in graphs and labelled on figures. Since 2002, LPP phosphorus samples have been analysed on a low-level phosphorus analyser that has increased the precision of results from +/- 6 μg of phosphorus per litre to +/- 0.7 μg/L. This low-level analysis is especially important for Georgian Bay TP samples that may have low levels of TP (e.g., 2 μg/L).

Sulphate

Sulphate is a naturally occurring ion that occurs in sedimentary rocks and in the upper aerobic layers of soil (where sulphide is converted into sulphate). Sulphur is a major nutrient for plants, which means that the decomposition of plants and animals also contributes sulphate to the environment.

Sulphate present in the atmosphere is significantly increased by coal combustion, metal smelting, and other industrial activities. These industrial activities release sulphur dioxide into the atmosphere, which is then dissolved by precipitation and returned to the earth as dilute acids. This acidic precipitation impacts vegetation and aquatic life and causes corrosion of human-made structures. Sulphates or sulphuric acid are also used in many production processes, including mining, paper production, and leather processing.

Current elevated sulphate levels in lakes are largely due to historical industrial activities, such as mining and smelting. At present, there are no standards or guidelines for sulphate levels in Ontario; however, analysis of data since 2015 has shown that 0.6% (5 of 782 lakes) of lakes have concentrations above British Columbia's guideline for very soft water lakes of 128 mg/L sulphate. In Ontario, sulphate deposition declined between 1976 and 2000, largely due to reductions in sulphur dioxide emissions (Keller et al., 2001; Dillon et al., 2003). However, corresponding declines in sulphate concentrations in lakes depends on large-scale climate factors.

Monitoring sulphate helps track trends and inform lake health management decisions. Where more than one year of data exists for a sampling location, sulphate concentration in mg/L is graphed.

Benthic Monitoring

Starting in 2018, the TOA began benthic monitoring on several inland lakes – Kapikog, Healey, Blackstone, and Crane.

Different types of water quality monitoring provide water managers with complementary information. Most people are familiar with the idea of looking at water quality from a "stressor-based approach". This includes monitoring water chemistry parameters like pH, dissolved oxygen, total phosphorus, and others. Stressor-based monitoring approaches provide important information about an ecosystem's exposure to stress, but they leave unanswered questions about the significance (or effect) of that stress.

Biological monitoring (e.g., benthic monitoring) uses an "effect-based approach" to provide information about how ecosystems have responded to a stress, for example by looking at fish communities or benthic macroinvertebrates. However, effect-based approaches used in isolation leaves unanswered questions about what stresses are being responded to. Therefore, these approaches (chemical and biological monitoring) are complementary and best used together to provide a complete picture of aquatic ecosystem health (i.e., the lake's exposure to stress and associated ecological response).

For example, volunteers on Crane Lake monitor phosphorus levels, which provides a measure of exposure to stress (e.g., impacts from humans, climate change, invasive species). These measures could be phosphorus levels going up, going down, or staying the same. But what is the impact from these trends on the ecosystem? By adding benthic monitoring, we can start to see if and how the ecosystem is reacting to a stressor.

Over the last three decades, the use of biological monitoring in Ontario has increased dramatically. Researchers, water managers, and the larger scientific community are recognizing the ability of biological monitoring to reflect the impacts of stressors on aquatic ecosystems, including the effects of non-point-source and episodic pollution, habitat changes, and the cumulative effects of multiple stressors. Accordingly, the use of biotic changes to evaluate ecosystem condition and water management performance has grown in relevance and legitimacy – to the point that legal and regulatory frameworks in many countries now require information on biological condition. Ontario's Water Resources Act (R.S.O 1990, C. 040) and Environmental Protection Act (R.S.O. 1990, C. E19), for example, define impairment and adverse impact in clearly biological terms.

Benthic macroinvertebrates (or benthos) are small aquatic organisms (including insects, crustaceans, worms, and mollusks). The term benthic macroinvertebrate can be broken down to better understand the nature of these organisms. Benthic macroinvertebrates spend all or part of their life cycle living at the bottom of the lake (benthic), they are quite small but can generally still be seen with the naked eye (macro), and they lack a backbone (invertebrate).

These animals are well suited as indicators of water and sediment quality, as they spend most or all of their lives (one to three years) in constant contact with the benthic environment in a specific area. Furthermore, they are relatively easy and inexpensive to sample and have varying tolerances to disturbances and pollution (Figure 2). A healthy lake will support high richness (the number of species) and abundance (the number of individuals). If a lake has low species richness and mainly pollution-tolerant species, this indicates that the lake could be impaired. Changes in the benthic community of a lake (e.g., types of organisms, abundance) can indicate changes in the lake ecosystem (e.g., improvements in water quality, habitat alteration, introduction of invasive species).

Finally, benthic macroinvertebrates are a critical part of the food web of a lake. Certain benthic macroinvertebrates are important food sources for a variety of fish species, while others play a key role in decomposing organic matter.

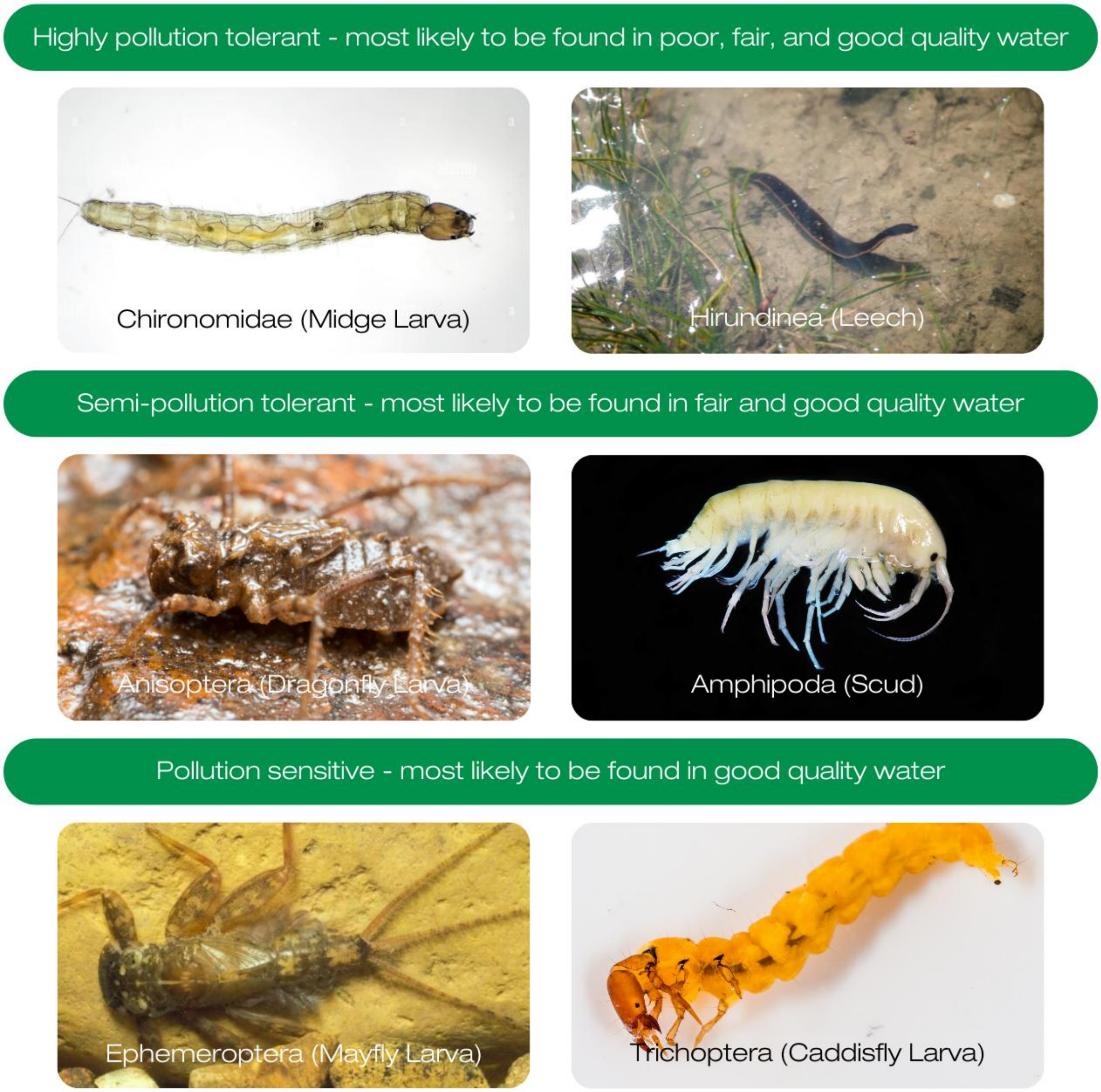

Figure 2. Benthic macroinvertebrates found in the Township of The Archipelago lakes and their pollution sensitivities.

Methods

Certified GBB staff oversee benthic macroinvertebrate sampling on behalf of the TOA, using the standardized Ontario Benthos Biomonitoring Network (OBBN) protocol for lakes. For each lake, three shallow, nearshore areas representative of the lake are selected as test sites (referred to as "lake segments" in the protocol) and sampled each year using the travelling-kick-and-sweep method. The individual doing the sampling disturbs the bottom of the lake in transects from 1m depth to the water's edge for approximately 10 minutes. Using a net, the dislodged material is collected and placed in a bucket. These samples are then processed to count and identify the different types of benthos in the sample (video available here). There are 27 different groups of benthos ranging in sensitivity to pollution and disturbance.

Interpreting Results

Four TOA lakes (Blackstone, Crane, Healey, Kapikog) have had benthic macroinvertebrate sampling conducted each year since 2018 (for raw data, please contact Katrina Krievins at kkrievins@georgianbaybiosphere.com). The objective of the benthic monitoring is to characterize the benthic community of each lake and compare it to lakes in the Parry Sound-Muskoka District to determine whether the benthic community is considered typical of what would be expected for a lake in this region.

The District Municipality of Muskoka has been working with lake associations to conduct benthic monitoring throughout the district since 2004. This rich Muskoka dataset, combined with additional benthic data for lakes in south-central Ontario from the Dorset Environmental Science Centre and from Jones et al. (2007), provides the basis needed for regional comparisons among lakes.

As detailed in the 2018 Muskoka Watershed Report Card Background Report, the Muskoka Watershed Council (MWC) reports on lake benthic communities in terms of the percentage of pollution-sensitive taxa found. Specifically, the pollution-sensitive taxa include larval mayflies (*Ephemeroptera*), dragonflies and damselflies (*Odonata*), and caddisflies (*Trichoptera*), collectively referred to as EOT. These taxa are very sensitive to pollution and habitat alterations, meaning that their numbers will be highest in healthy lakes and lowest in unhealthy or disturbed lakes. The average %EOT for a lake is compared to the normal range for %EOT in lakes in the region. In other words, this monitoring seeks to answer the question: does the %EOT for the lake of interest fall within the normal range of what would be expected for a lake in the region?

The normal range for %EOT in lakes in the region was determined by MWC for the Muskoka Watershed Report Card by "randomly selecting one data point from each lake sampled between 2012 and 2017 and characterizing the distribution of values observed among these lakes" (MWC, 2018, p. 46). The resulting range of %EOT values is shown in Figure 3 and is used for analysis in this report.

Following the methodology used by MWC (2018), the average %EOT was calculated for each of the four lakes sampled in the TOA using data collected between 2018 and 2023. The average %EOT for each lake was then compared to the normal range (Figure 3) to determine whether the lake is considered typical, atypical, or extremely atypical. These categories are defined by MWC (2018) as follows:

- Typical: %EOT is between the 10th and 90th percentile. These lakes resemble the majority of lakes in the region, and therefore are comprised of typical percentages of EOT species.
- Atypical: %EOT is between either the 5th and 10th percentile or the 90th and 95th percentile. These lakes are outside of the normal range of the majority of lakes in the region. The percentages of EOT species may be slightly higher or lower compared to the majority of lakes in the region.
- Extremely Atypical: %EOT is less than the 5th percentile or greater than the 95th percentile. These lakes do not represent the majority of lakes in the region in terms of the percentages of EOT species. These lakes may have very high or very low percentages of EOT species compared to the majority of lakes in the region.

If a lake is considered atypical or extremely atypical, additional monitoring may be necessary to try to understand potential causes and/or contributing factors.

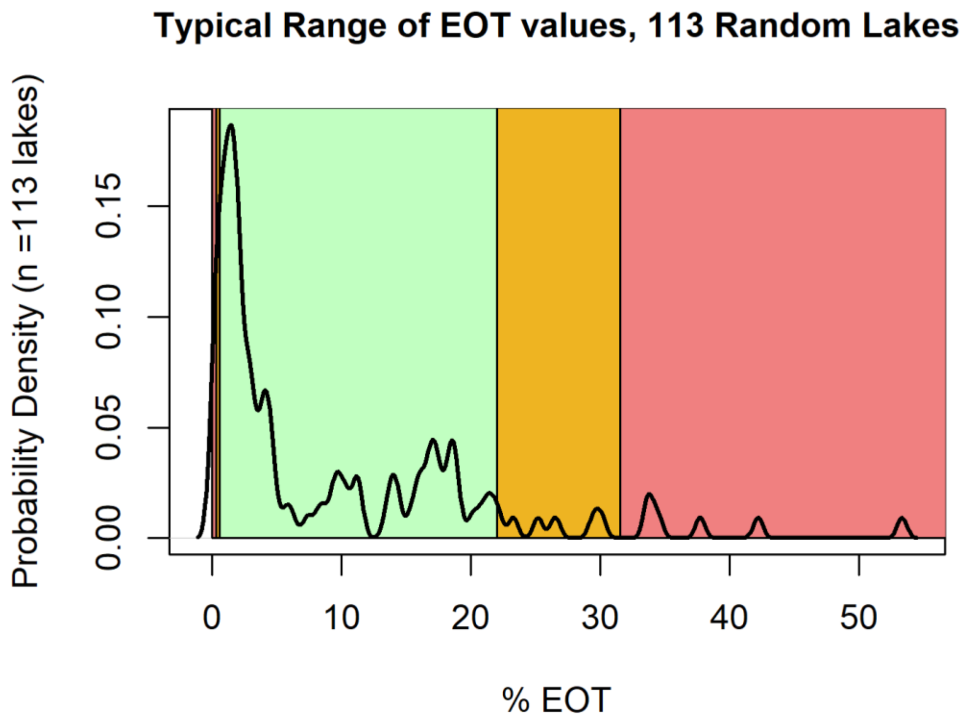

Figure 3. Range of %EOT values of sampled lakes in the region from 2012 to 2017. Typical is shown in green which is between the 10th and 90th percentile (%EOT between 0.55 and 20.99). Atypical is shown in orange which is between the 5th and 10th percentile (%EOT 0.3 and 0.54) and 90th and 95th percentile (%EOT between 22.1 and 28.01). Extremely atypical is shown in red which is less than the 5th percentile (%EOT less than 0.29) or greater than the 95th percentile (%EOT greater than 31.5).

Fish Communities Overview

The Ministry of Natural Resources (MNR) is responsible for gathering data on fish communities in Georgian Bay and inland lakes. In 2008, the MNR began implementing the Ecological Framework for Fisheries Management (EFFM) to improve the management of recreational fisheries in Ontario. To support the EFFM, the ministry developed a Broad-scale Monitoring (BsM) Program.

The BsM runs on a five-year monitoring cycle and involves the long-term monitoring of fish populations, aquatic habitats, and recreational fishing. During each five-year cycle, data is collected from a selection of lakes. Lakes are selected for monitoring based on fishery management zones (FMZs), of which the MNR has established 20 in Ontario. Once every five years, the MNR randomly selects and collects data from a representative number of lakes in each FMZ. The goal is to survey a sufficient number of lakes in order to obtain representative data on the fisheries in each zone. Not all lakes are sampled on a regular basis, nor is the same data collected from every lake. Data collected may include fish abundance and characteristics (e.g., length, weight, age), contaminants, lake characteristics (e.g., depth, temperatures, chemistry, oxygen levels, water clarity), and/or the presence of invasive species.

In each FMZ, the selected lakes are identified as either trend lakes or state lakes. Trend lakes, which contain brook trout, lake trout, or walleye, are sampled once during each five-year cycle. State lakes, which are lakes greater than 50 hectares regardless of fish species, are sampled once in the five-year cycle, but may or may not be sampled again in future cycles. In total, these surveys cover approximately 700 lakes every 5 years. This is a small percentage of the total number of lakes in Ontario, meaning that most inland lakes in Ontario do not get sampled.

The fish community information presented in this report represents the most up to date information available from the MNR for TOA lakes. For information on fish communities in Georgian Bay, readers are directed to the 2023 State of the Bay report.

Monitoring Results

Water quality and fish community monitoring results are presented in this section, by ratepayer association. Click on the name of your ratepayer association below to navigate to results for your region. Results for enhanced monitoring are discussed last.

Please note, gaps in data may be present for the years 2020 and 2021. Due to the Covid-19 pandemic, the LPP received and analysed a greatly reduced number of water samples in those years.

Bayfield Nares Islanders' Association

Blackstone Lake Cottagers' Association

Cranberry Lake

Crane Lake Association

Healey Lake Property Owners' Association

Iron City Fishing Club

Kapikog Lake Cottagers' Association

Manitou Association

Naiscoot Lake Association

Pointe au Baril Islanders' Association

Rock Island Lake

Sans Souci & Copperhead Association

Skerryvore Ratepayers' Association

South Channel Association

Three Legged Lake Association

Woods Bay Community Association

Bayfield Nares Islanders' Association

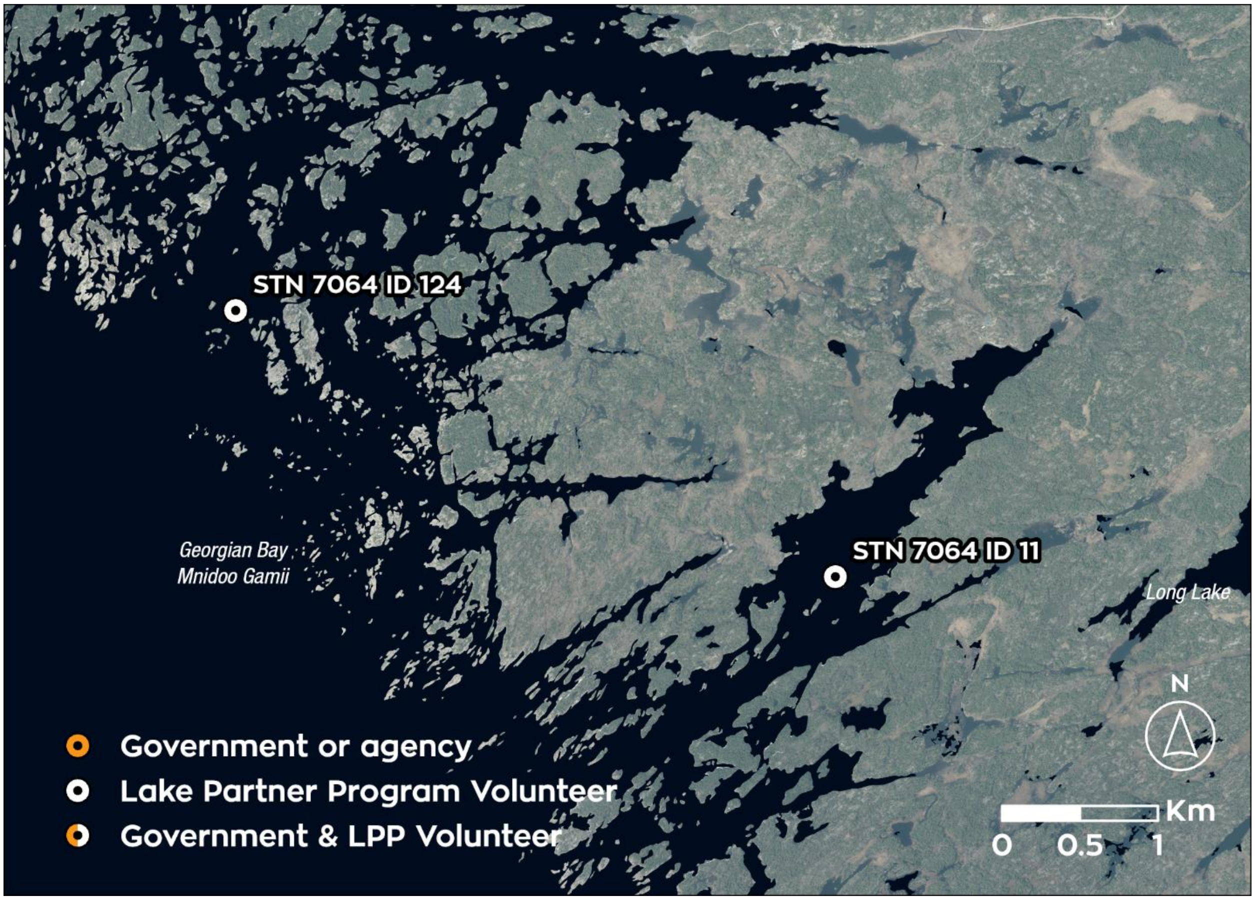

Figure 4. Recently active LPP sampling locations in Nares Inlet.

Recommendation: continue with standard LPP monitoring at Site ID 11 and 124 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Nares Inlet	
• Station: 7064	• Average TP: 5.4 µg/L
• Site ID: 11	• Average Secchi depth: 5.1 m
• Description: Nares Inlet, deep spot	• Average calcium: 20.4 mg/L
• Data collector: LPP volunteer	• Average chloride: 6.3 mg/L
• Trophic status: oligotrophic	• Average sulphate: 12.1 mg/L

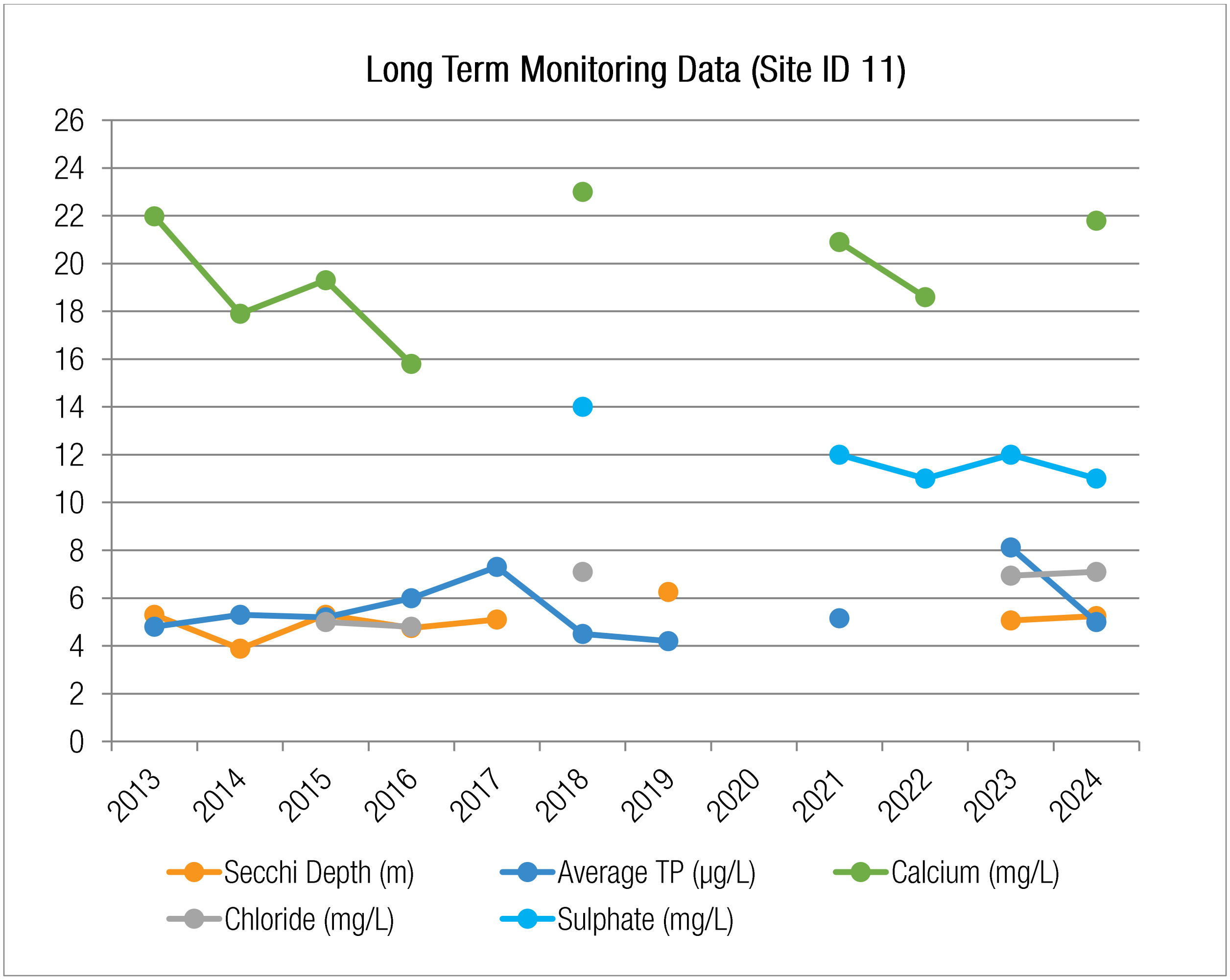

Figure 5. Long term monitoring for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 11 in Nares Inlet.

Bayfield Inlet	
• Station: 7064	• Average TP: 4.1 µg/L
• Site ID: 124	• Average Secchi depth: 6.0 m
• Description: Bayfield Inlet, GLNA#311	• Average calcium: 20.3 mg/L
• Data collector: LPP volunteer	• Average chloride: 6.6 mg/L
• Trophic status: oligotrophic	• Average sulphate: 11.5 mg/L

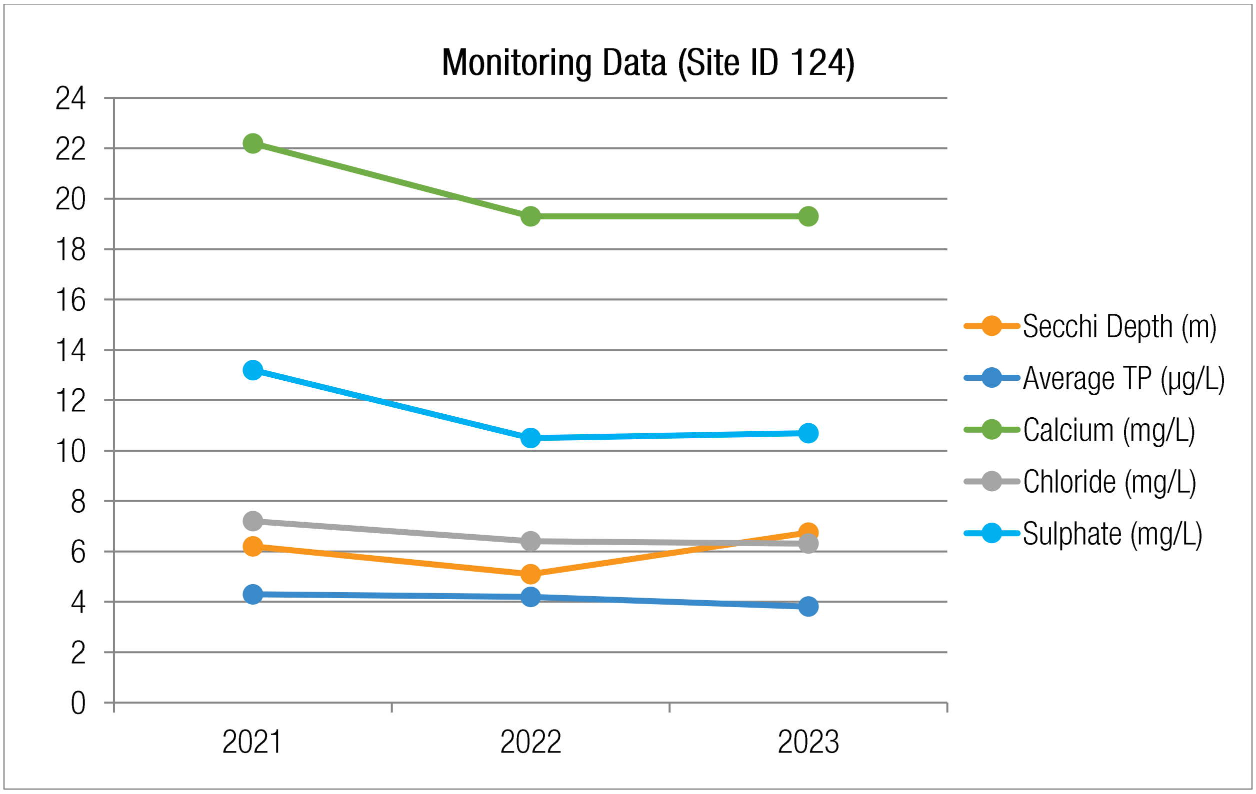

Figure 6. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 124 in Bayfield Inlet.

Blackstone Lake Cottagers' Association

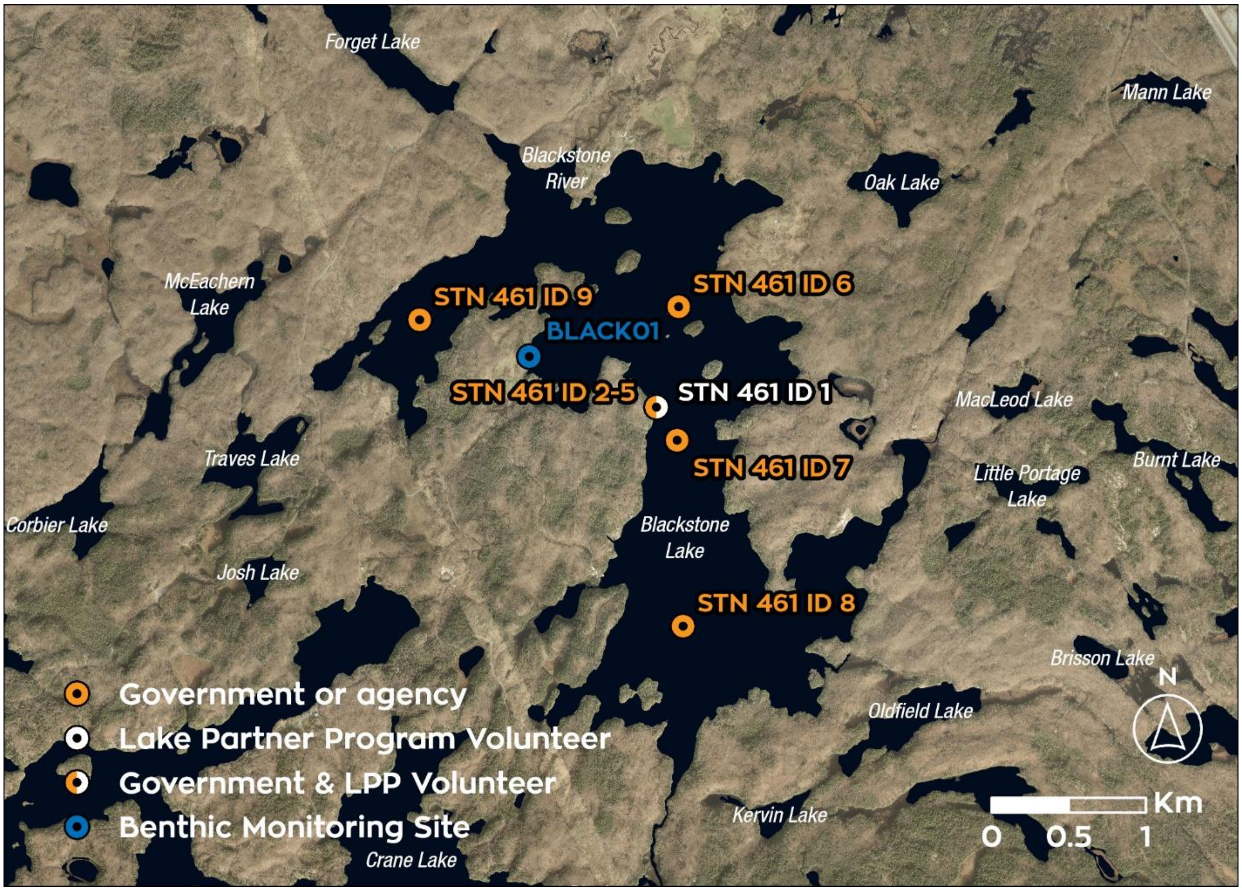

Figure 7. Recently active LPP and benthic sampling locations on Blackstone Lake.

Recommendation: continue with standard LPP monitoring at Site ID 1 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Blackstone Lake	
• Station: 461	• Average TP: 6.8 µg/L
• Site ID: 1	• Average Secchi depth: 4.6 m
• Description: Mid lake, deep spot	• Average calcium: 3.8 mg/L
• Data collector: LPP volunteer	• Average chloride: 22.1 mg/L
• Trophic status: oligotrophic	• Average sulphate: 3.4 mg/L

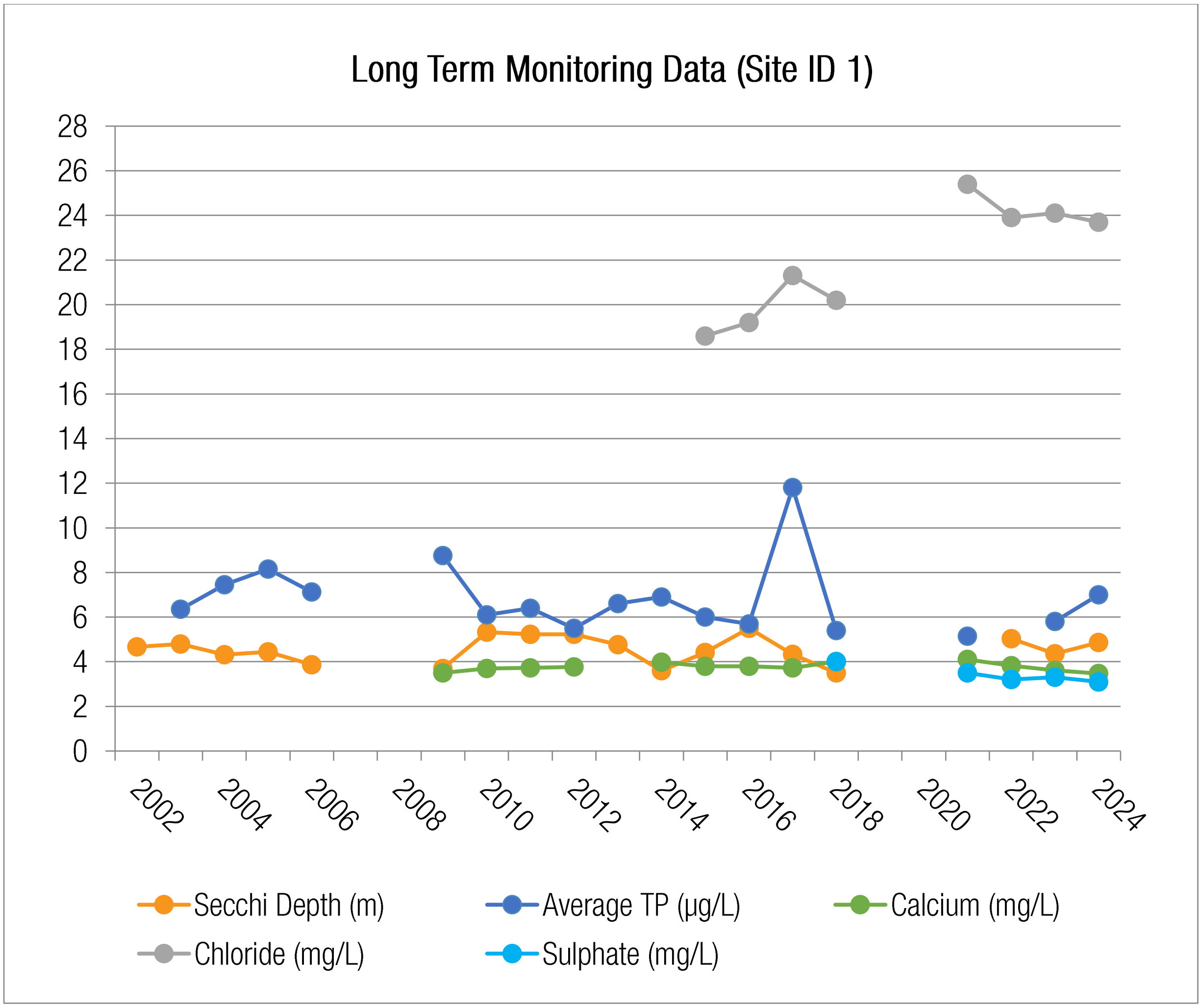

Figure 8. Long term monitoring for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 1 on Blackstone Lake.

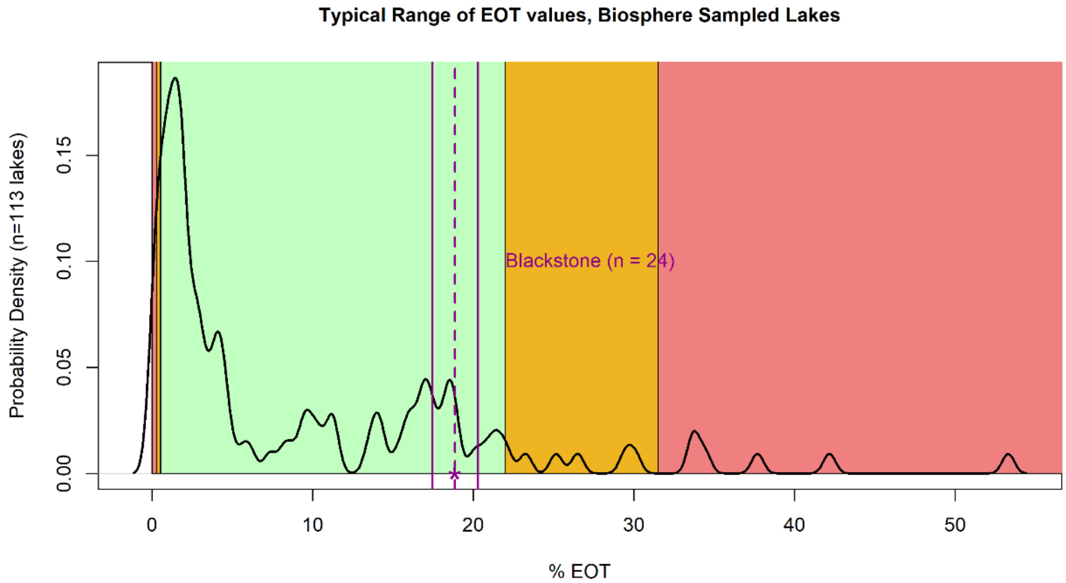

Figure 9. Blackstone Lake average %EOT (dashed purple line) and standard deviation (solid purple line) sampled from 3 lake segments over 8 years (n = 24) fall within the "typical" category (green area) on the typical %EOT range plot (based on 113 sampled lakes). This indicates that the Blackstone Lake benthic community is typical of what would be expected for a lake in this region.

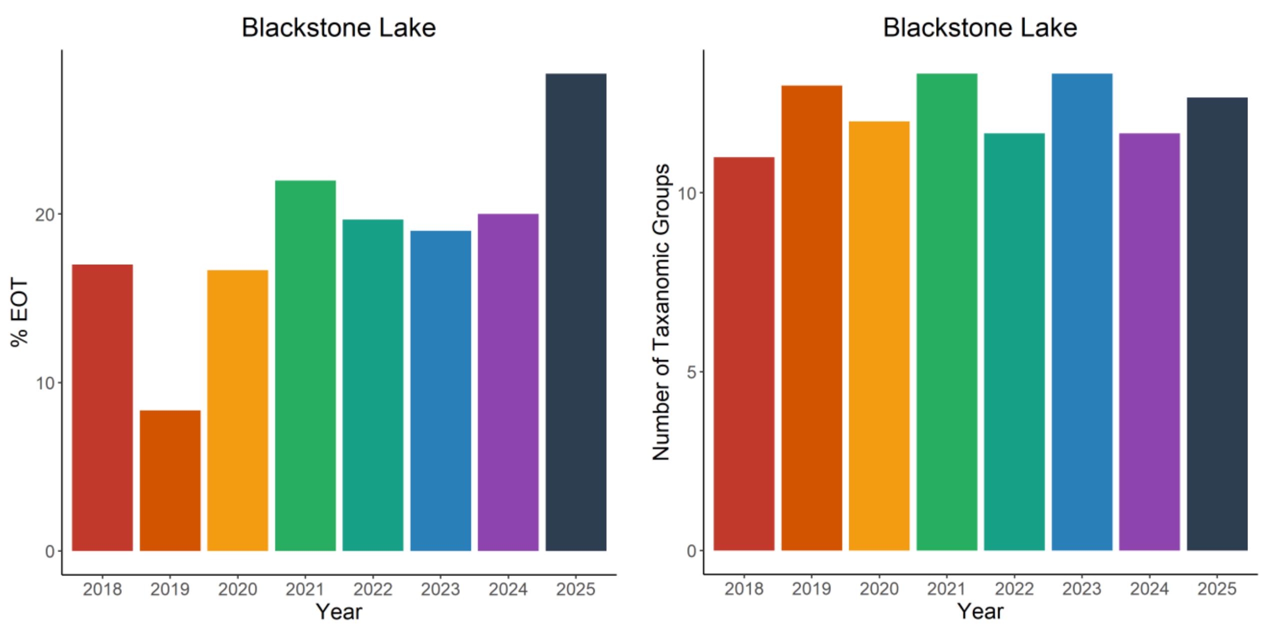

Figure 10. %EOT and the number of taxonomic groups in Blackstone Lake from 2018 to 2025.

Table 1. Summary of fish communities and their management in Blackstone Lake (see link)

Major fish species	Lake trout (stocked), largemouth bass, muskellunge, black crappie, smallmouth bass, walleye, northern pike, yellow perch
Other fish species	Cisco, white sucker, emerald shiner, bluntnose minnow, Johnny darter, logperch, rainbow smelt, golden shiner, brown bullhead, pumpkinseed, burbot, rock bass, mottled sculpin, common shiner
Lake trout management	Designated; put-grow-take. Season open all year (excluding sanctuary).
Current stocking	Lake trout; put-grow-take. No natural reproduction expected, stocked every second year with yearlings.
Historic stocking	Walleye (2006)
Contaminants (species tested)	No testing done

Relative to most other inland lakes in the TOA, the fish community in Blackstone Lake has been fairly well studied in recent decades. Based on a 2005 Spring Littoral Index Netting (SLIN) survey which captured 23 lake trout (catch per unit effort 0.77 ± 0.52; $p<0.05$), Blackstone Lake was considered to have an average or moderate abundance of lake trout, indicating good survival of stocked lake trout. This catch per unit effort was similar to that observed in the Parry Sound reference dataset (0.83) and the Provincial reference dataset (1.20). All but one of the 23 lake trout captured were from the 1999 and 2001 stocking events.

No natural lake trout reproduction occurs in Blackstone Lake despite having a large amount of deep-water juvenile habitat (limited water clarity may limit its use to some degree). A visual reconnaissance of nearshore areas was done in 2011 to identify potential lake trout spawning habitat. While not abundant, some suitable habitat is present, suggesting that other factors are limiting lake trout recruitment. The genetic strain of lake trout being stocked has changed from the Killala Lake strain, identified as seldom reproducing successfully in other lakes in the region, to the Lake Manitou strain, which has been shown to reproduce in some lakes. Following the spawning shoal reconnaissance, it was suggested that enhancement of spawning habitat may be warranted in the future if signs of reproduction are detected. Yearling lake trout are stocked in Blackstone Lake in the order of 2,000-3,000 every two years, most recently in 2023.

The walleye population in Blackstone Lake was studied in 1993 (synoptic trapnet survey), 1996 (Index Walleye Spawners Survey), and again in 2005 (synoptic trapnet survey and Index Walleye Spawners Survey). The synoptic trapnet surveys were primarily aimed at ascertaining the status of the walleye population with a secondary purpose of assessing the overall status of the nearshore fish community and the individual fish species that comprise it. In 2005, overall fish productivity for all species combined was approximately average for Parry Sound area lakes. Catch was dominated by muskellunge (50.5%), smallmouth bass (24%), and walleye (16.2%). All other remaining species (northern pike, white sucker, rock bass, pumpkinseed, and black crappie) comprised only 9.3% of the total catch weight. Although walleye catch per unit effort was much lower in 2005 (0.9 ±0.7; $p<0.05$) than 1993 (4.6 ± 2.6; $p<0.05$), the two were not statistically different ($p<0.05$). Biosampling and catch data from this and other surveys on Blackstone Lake indicate chronically poor levels of walleye spawning and recruitment success. Smallmouth bass abundance as measured by catch per unit effort was essentially unchanged between surveys. More muskellunge and fewer pike were caught in 2005 relative to 1993, but the numbers were too small between surveys to formulate any conclusions about relative abundance. Rock bass were much more frequently caught in 2005. In addition, one black crappie was caught in 2005; a species that was not present in the lake in 1993.

The Index Walleye Spawners Surveys were intended to monitor the status of the spawning population and assess changes that have occurred between the 1996 and 2005 surveys. The walleye catch per unit effort for the 2005 survey was 7.0 ± 5.6 ($p<0.05$); down considerably from 17.3 ± 10.3 observed in 1996. However, walleye catch per unit effort is not a reliable indicator of spawning population. The most significant indicator of spawning population health was contained in the biosampling data. Mean length and size distribution of male and female walleye in the spawning population had shifted alarmingly to larger fish in 2005 relative to 1996. This shift was indicative of several years of poor or negligible recruitment to the spawning population. Another notable change was the highly unusual sex ratio in the 2005 walleye sample. Sex ratio of male to female walleye was 1:7.4. In 1996, it was almost 1:1. The potential impact of this sex ratio is unknown.

Records on walleye habitat rehabilitation in Blackstone Lake over the years include:

- 1974 - 60 cubic yards of rock rubble added to spawning beds below bridge
- 1975 - Spawning area of 240 ft^2 enhanced at Blackstone Creek (inlet from Third Lake)
- 1983 - Junior Rangers added rock rubble to Blackstone Creek
- 1989 - 121 tons of limestone rip-rap added to spawning beds
- 1991 - 45 cubic yards of rip-rap deposited in Rat Creek

Cranberry Lake

Figure 11. Recently active LPP sampling location on Cranberry Lake.

Recommendation: reinitiate standard LPP monitoring at Site ID 1 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Station	Site ID	Description	Data Collector	2017 Average TP (µg/L)	2019 Average TP (µg/L)
1013	1	Mid lake, deep spot	LPP volunteer	12.1	17.7

Table 2. Summary of fish communities and their management in Cranberry Lake (see link)

Major fish species	Northern pike, largemouth bass (introduced), black crappie (introduced)
Other fish species	Yellow perch, brown bullhead, pumpkinseed, rock bass, Iowa darter, bowfin, golden shiner
Lake trout management	Not designated
Current stocking	None
Historic stocking	Walleye (1940), largemouth bass (1979)
Contaminants (species tested)	No testing done

The first recorded MNR survey of Cranberry Lake was completed in 1978 and was focused on examining the bass fishery. Cranberry Lake was noted as having excellent largemouth bass habitat despite the fact that few bass were found. Field staff speculated that brown bullhead was in direct competition with bass.

Following this initial survey, coarse fish removal was undertaken with 1,500 brown bullhead being removed from the lake in 1978 and 3,197 brown bullhead and 45 bowfin being removed in 1979. Also in 1979, 238 adult and sub-adult largemouth bass were transferred to Cranberry Lake from Yarrow (91), Windfall (61), Nevelle (34), and Brennan (52) Lakes.

Four years later the lake was assessed for the presence of largemouth bass. None of the largemouth bass planted in 1979 were captured in 1983 but eight others were, representing some natural reproduction. Based on this assessment, it was concluded that the establishment of a self-sustaining largemouth bass fishery had failed.

In 1986, a trapnet survey revealed catches of brown bullhead (1,534), black crappie (410), pumpkinseed (292), northern pike (96), largemouth bass (84), bowfin (50), yellow perch (23), and golden shiner (2). No further assessments have been conducted.

Crane Lake Association

Figure 12. Recently active LPP and benthic sampling locations on Crane Lake.

Recommendation: reinitiate standard LPP monitoring at Site ID 1 and 2 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Crane Lake	
• Station: 1014	• TP trend: increasing
• Site ID: 1	• Average Secchi depth: 5.0 m
• Description: mid-bay, deep spot	• Average calcium: 3.5 mg/L
• Data collector: LPP volunteer	• Average chloride: 19.3 mg/L
• Trophic status: oligotrophic	• Average sulphate: 3.4 mg/L

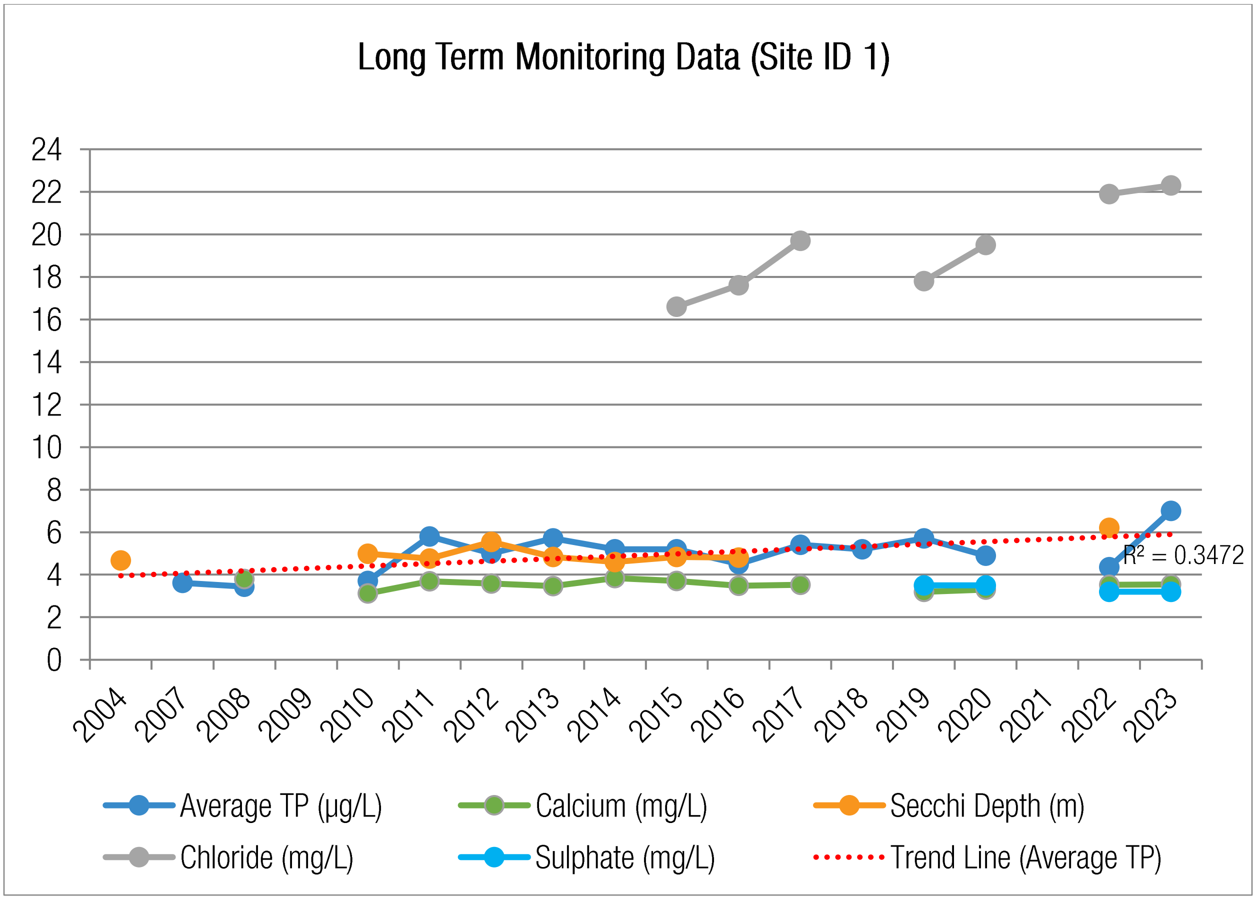

Figure 13. Long term monitoring for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 1 on Crane Lake.

Crane Lake	
• Station: 1014	• Average TP: 4.8 µg/L
• Site ID: 2	• Average Secchi depth: 4.6 m
• Description: N end, off Marsh Is.	• Average calcium: 3.3 mg/L
• Data collector: LPP volunteer	• Average chloride: 16.2 mg/L
• Trophic status: oligotrophic	• Average sulphate: 3.4 mg/L

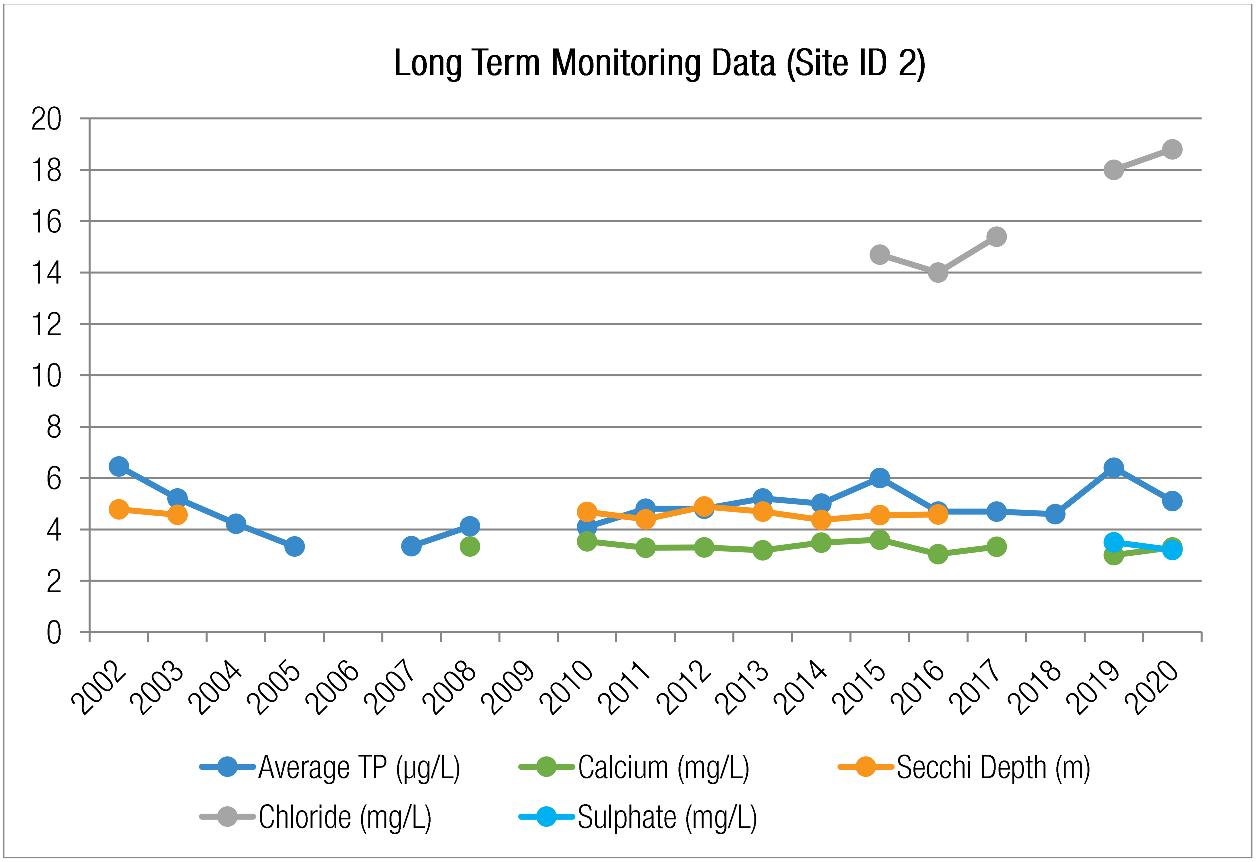

Figure 14. Long term monitoring for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 2 on Crane Lake.

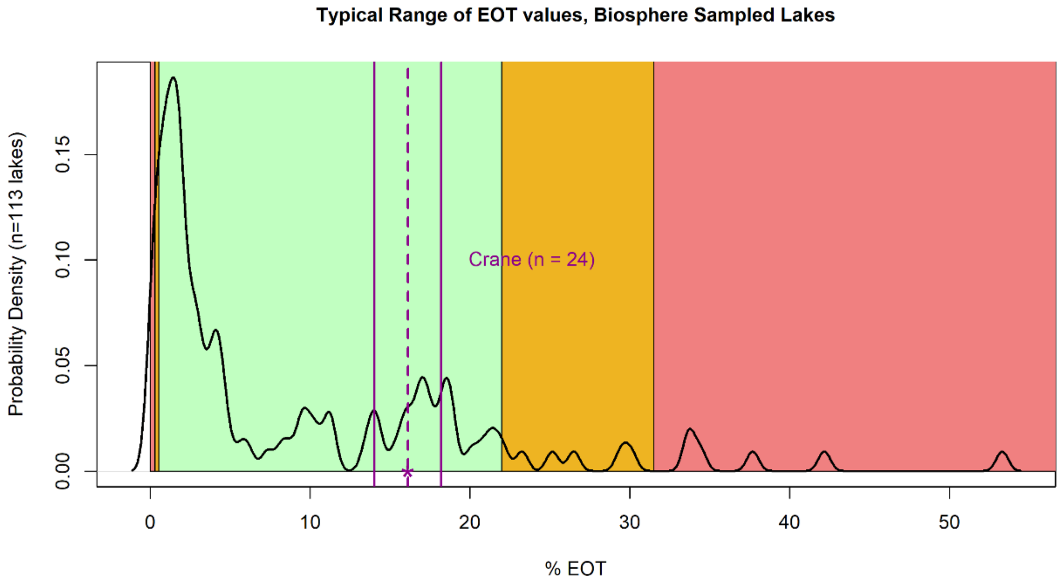

Figure 15. Crane Lake average %EOT (dashed purple line) and standard deviation (solid purple line) sampled from 3 lake segments over 8 years (n = 24) fall within the "typical" category (green area) on the typical %EOT range plot (based on 113 sampled lakes). This indicates that the Crane Lake benthic community is typical of what would be expected for a lake in this region.

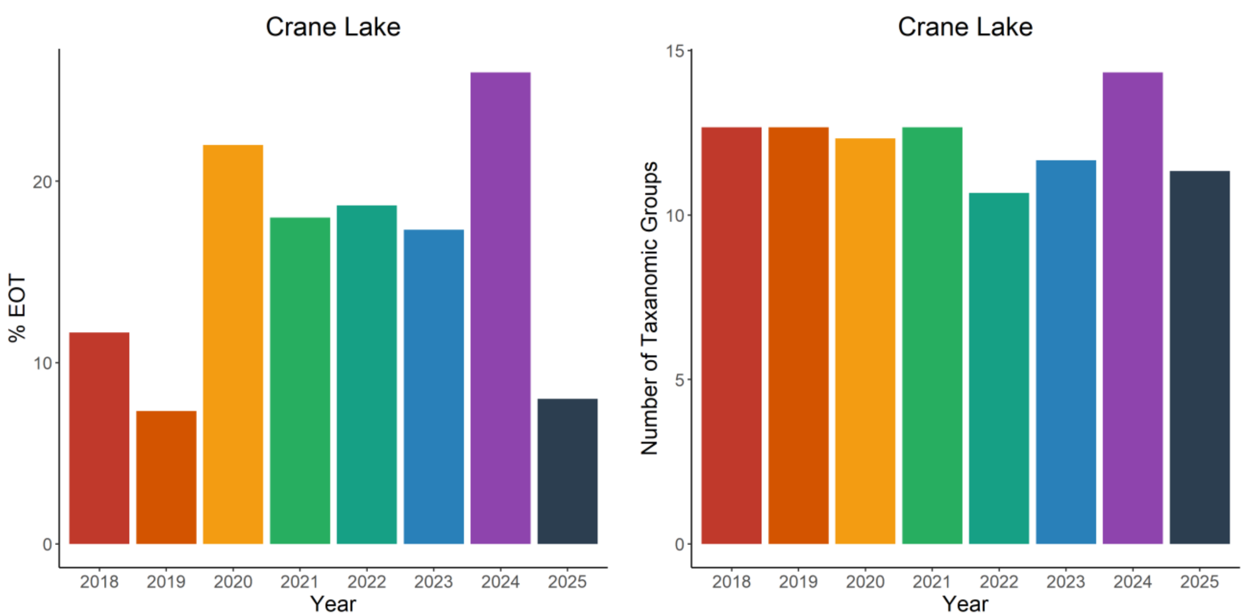

Figure 16. %EOT and the number of taxonomic groups in Crane Lake from 2018 to 2025.

Table 3. Summary of fish communities and their management in Crane Lake (see link)

Major fish species	Walleye, lake trout (stocked), muskellunge, smallmouth bass (introduced), largemouth bass (introduced 1977), black crappie (introduced), northern pike
Other fish species	Yellow perch, burbot, cisco, rainbow smelt (introduced), rock bass, mimic shiner, bluntnose minnow
Lake trout management	Designated; put-grow-take. Season open all year.
Current stocking	Lake trout; put-grow-take. No natural reproduction expected, stocked every second year with yearlings.
Historic stocking	Smallmouth bass (1939-1958), walleye (1939-1994), muskellunge (1954-1964)
Contaminants (species tested)	Walleye, smallmouth bass, largemouth bass, lake trout

Relative to most other inland lakes in the TOA, the fish community in Crane Lake has been fairly well studied in recent decades. Most recently, a mark-recapture study was completed in 2021 for the purpose of netting calibration for the provincial Broad-scale Monitoring (BsM) program. No netting results are publicly available for this calibration study. Prior to this, a stocking assessment was completed in 2015 which determined that lake trout abundance is relatively low and stocking is not achieving the desired goal of a put-grow-take fishery.

A trapnet survey was conducted in 2005 with the primary purpose being to ascertain the status of the walleye population. Similar surveys were conducted in 1993 and 1997. In 2005, overall fish productivity was described as “approximately average”, relative to other Parry Sound area lakes. Productivity in 2005 was very similar to observations in 1997 and 1993. The catch was dominated by smallmouth bass (68.7% of total catch weight) and walleye (27.9%). All other species combined (largemouth bass, rock bass, black crappie, and brown bullhead) accounted for less than 4% of the total catch weight. These are similar results to past surveys, with the exception of 2005 being the first documentation of a black crappie in Crane Lake (presumably an unauthorized introduction). The survey report summary states that there have been notable changes for walleye, smallmouth bass, and muskellunge in the catch between survey years. However, these changes are not discussed further in the summary.

Walleye biosampling data and indices of abundance in 2005 revealed a small population with several years of recent recruitment failure. Evidently, very restrictive catch and size regulations implemented in 1999 failed to rehabilitate the walleye population. The depressed state of the population is believed to be attributable to reproductive and recruitment failure, not excessive angler exploitation. Indices of abundance for smallmouth bass were extremely high and the population was considered to be in an exceptionally healthy state. Other fish species (largemouth bass, rock bass, black crappie, and brown bullhead) were very scarce in the catch, as was observed in previous surveys on the lake. No pike were captured in this survey.

A 2001 Fall Walleye Index Netting (FWIN) survey, and 1998 and 1993 synoptic trapnet surveys all resulted in similar findings. Walleye abundance was found to be low with poor natural recruitment, northern pike abundance was also low, smallmouth bass abundance was high, and muskellunge abundance was very good.

Anecdotal interviews with knowledgeable long-time residents indicate Crane Lake never had a native lake trout population and the current population is maintained wholly by stocked fish. In 1976, 16 overnight gill-net sets resulted in the capture of 13 lake trout. The following year no lake trout were captured during 15 overnight gill-net sets. Despite poor results in 1977, stocking continued in the following years. In 1990, 17 overnight gill-net sets yielded 7 lake trout, all of which were stocked fish (6 from 1987 stocking, 1 from 1974 stocking). Stocking continues to this day with 1,000-2,000 yearling lake trout stocked every two years, most recently in 2024.

Healey Lake Property Owners' Association

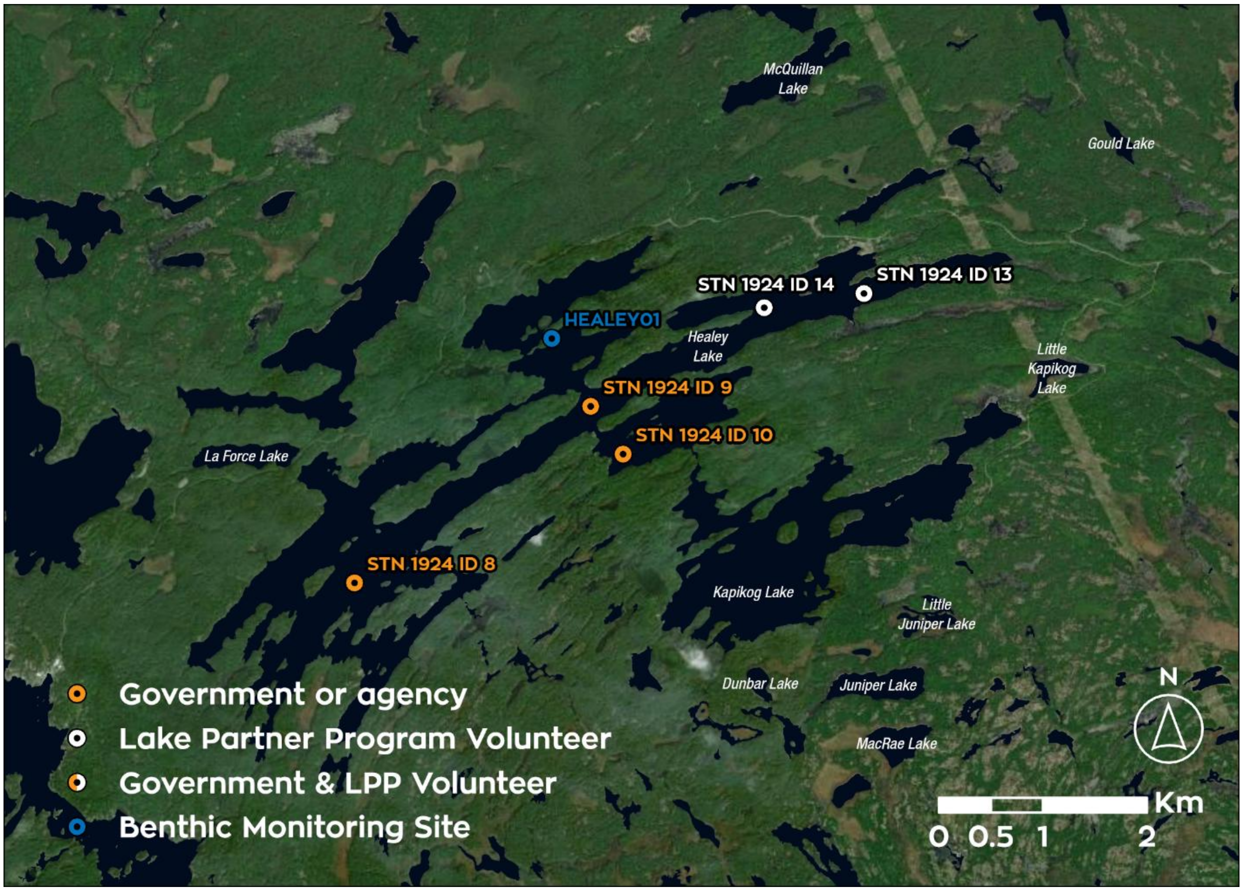

Figure 17. Active LPP and benthic sampling locations on Healey Lake.

Recommendation: continue standard LPP monitoring at Site ID 13 and 14 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Healey Lake	
• Station: 1924	• Average TP: 7.5 µg/L
• Site ID: 13	• Average Secchi depth: 2.7 m
• Description: Pinebay, deep spot	• Average calcium: 1.9 mg/L
• Data collector: LPP volunteer	• Average chloride: 5.7 mg/L
• Trophic status: oligotrophic	• Average sulphate: 1.7 mg/L

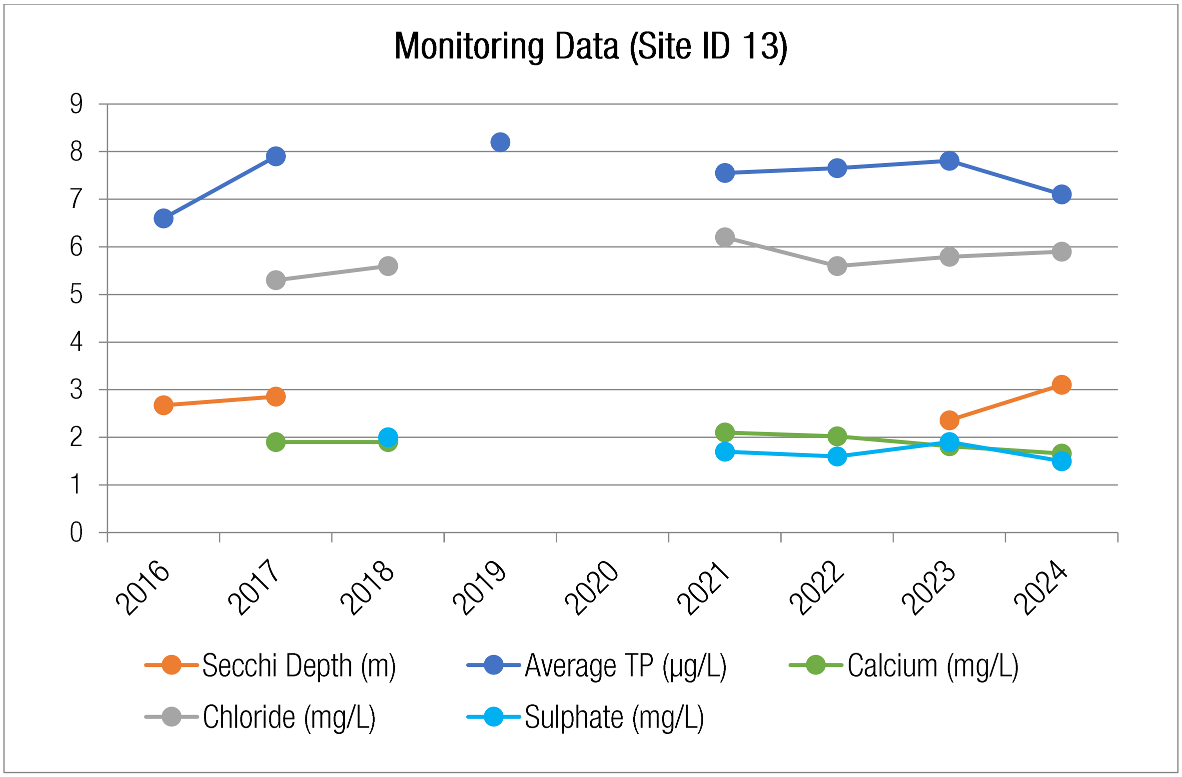

Figure 18. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 13 on Healey Lake.

Healey Lake	
• Station: 1924	• Average TP: 8.8 µg/L
• Site ID: 14	• Average Secchi depth: 2.4 m
• Description: Mid lake, deep spot	• Average calcium: 2.8 mg/L
• Data collector: LPP volunteer	• Average chloride: 5.9 mg/L
• Trophic status: oligotrophic	• Average sulphate: 1.7 mg/L

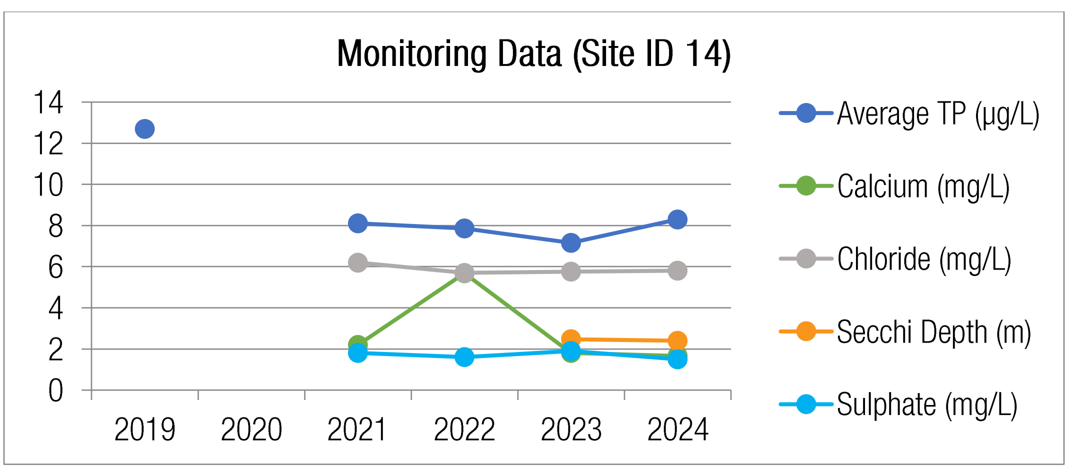

Figure 19. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 14 on Healey Lake.

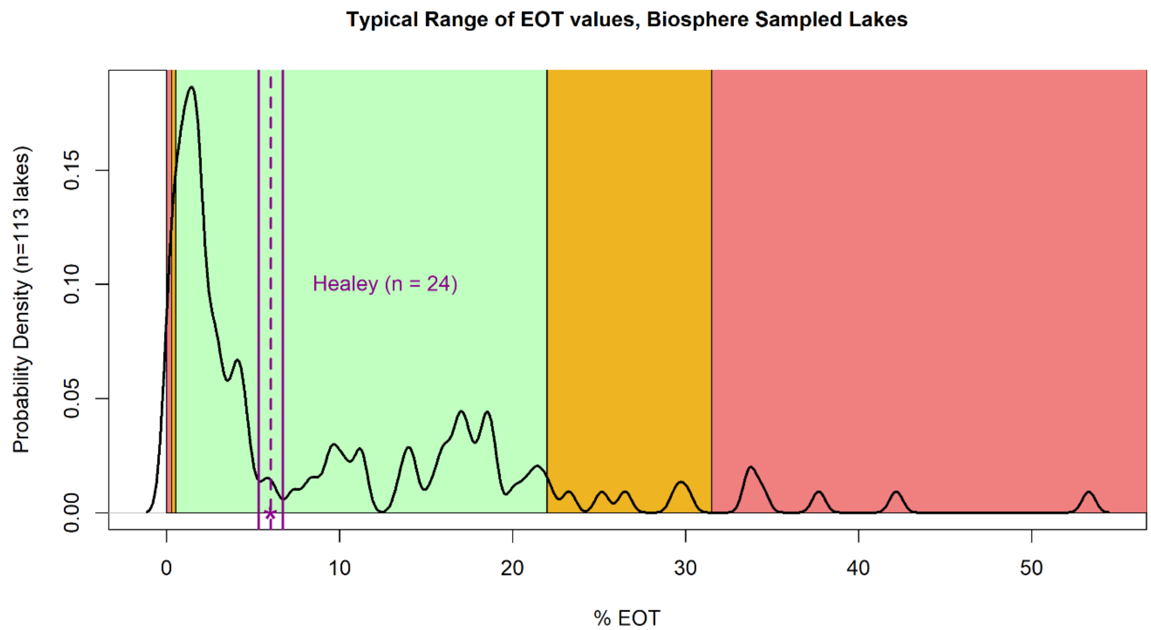

Figure 20. Healey Lake average %EOT (dashed purple line) and standard deviation (solid purple line) sampled from 3 lake segments over 8 years (n = 24) fall within the "typical" category (green area) on the typical %EOT range plot (based on 113 sampled lakes). This indicates that the Healey Lake benthic community is typical of what would be expected for a lake in this region. Note: data from sampling in 2012 were included in addition to the 2018-2022 data.

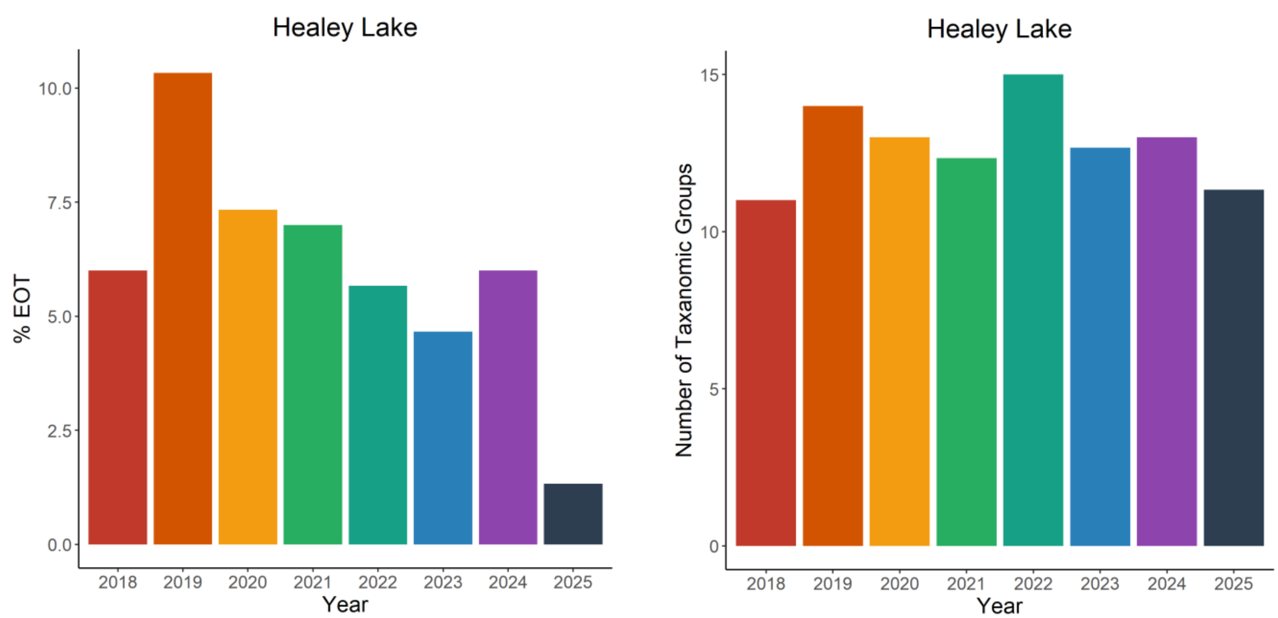

Figure 21. %EOT and the number of taxonomic groups in Healey Lake from 2018 to 2025.

Table 4. Summary of fish communities and their management in Healey Lake (see link)

Major fish species	Largemouth bass, smallmouth bass, northern pike, black crappie (introduced 1997)
Other fish species	Johnny darter, yellow perch, white sucker, rock bass, cisco, brown bullhead, bluntnose minnow
Lake trout management	Not designated
Current stocking	None
Historic stocking	Walleye (1956-1959)
Contaminants (species tested)	Largemouth bass, yellow perch, rock bass, black crappie, pumpkinseed, brown bullhead

A 1973 report of the interpretation of limnological data collected on Healey Lake states that the lake can support both a warm and cold water fishery, but oxygen levels may limit cold water species. The report concluded that the lake cannot produce many pounds of fish annually and that fishing effort should be limited if a high-quality fishery is desired. Winter and summer creel surveys in the same year found that 67.5 winter rod hours yielded 4 northern pike while 6.5 summer rod hours yielded no fish. A summer creel survey in 1974 found that 17.5 rod hours yielded 3 smallmouth bass and 1 northern pike, and 4 rod hours in 1977 yielded 1 rock bass.

In 1983, an intensive trap and gill netting program was performed on Healey Lake. This program was an attempt to gather information concerning fish species composition, age-class structure of the sport fish, relative abundance of the various fish species, and coarse fish removal. Coarse fish (rock bass, pumpkinseed) were most abundant. Northern pike and yellow perch were virtually absent from trap and gill net catches. The largemouth bass population appeared to be healthy although this population was localized in Dollar Bay which could lead to overexploitation. The 2+ and 4+ age-classes were the highest represented among the largemouth and smallmouth bass. Insufficient sample size did not permit any evaluation of the age-class structure of yellow perch, northern pike, cisco and white sucker.

Over a series of years starting in 1984, coarse fish (e.g., pumpkinseed, rock bass) removal was undertaken. In 1984, 556 fish were removed through trapnetting and 1,540 lbs of rock bass and pumpkinseed were removed during a fish derby. Another fish derby in 1985 removed 1,126 lbs of rock bass and pumpkinseed. The following year 200 suckers were removed via netting. A fish derby was held again in 1996 during which 79 lbs of fish was removed (70% rock bass, remainder pumpkinseed and one brown bullhead).

Iron City Fishing Club

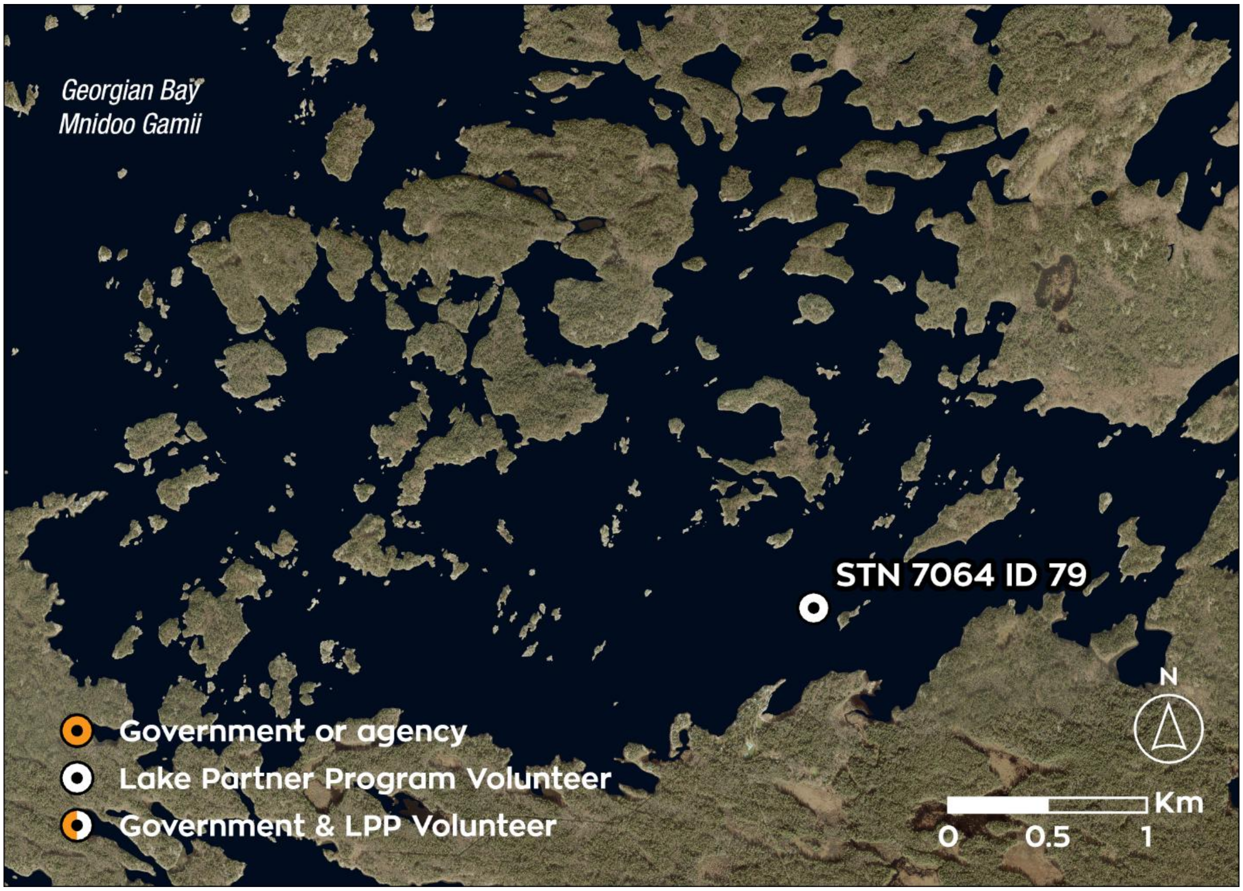

Figure 22. Recently active LPP sampling location in Iron City Bay.

Recommendation: reinitiate standard LPP monitoring at Site ID 79 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Station	Site ID	Description	Data Collector	2016 Average TP (µg/L)	2019 Average TP (µg/L)
7064	79	Iron City Bay, deep spot	LPP volunteer	10.3	10.2

Kapikog Lake Cottagers' Association

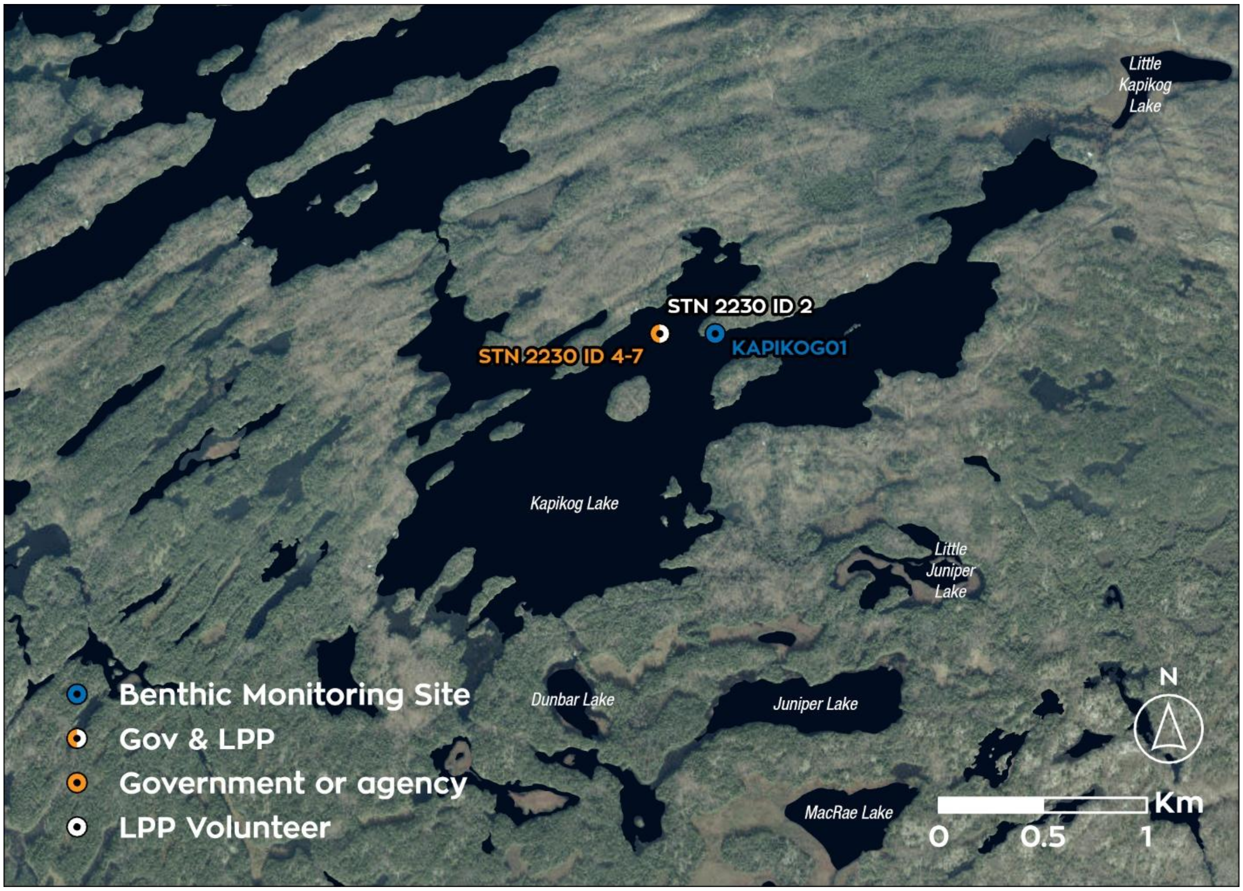

Figure 23. Recently active LPP and benthic sampling locations.

Recommendation: continue with standard LPP monitoring at Site ID 2 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Kapikog Lake	
• Station: 2230	• TP trend: increasing
• Site ID: 2	• Average Secchi depth: 4.1 m
• Description: Stn 2, mid-lake	• Average calcium: 2.7 mg/L
• Data collector: LPP volunteer	• Average chloride: 1.0 mg/L
• Trophic status: oligotrophic	• Average sulphate: 1.7 mg/L

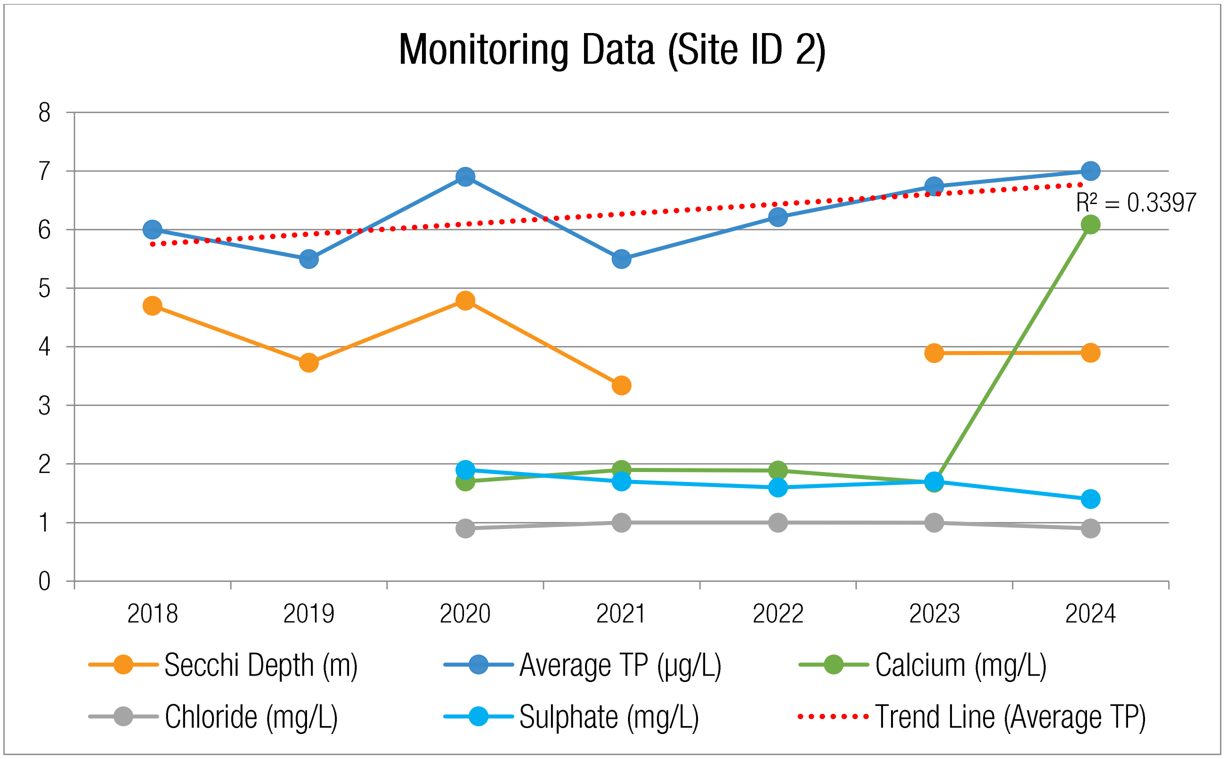

Figure 24. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 2 on Kapikog Lake.

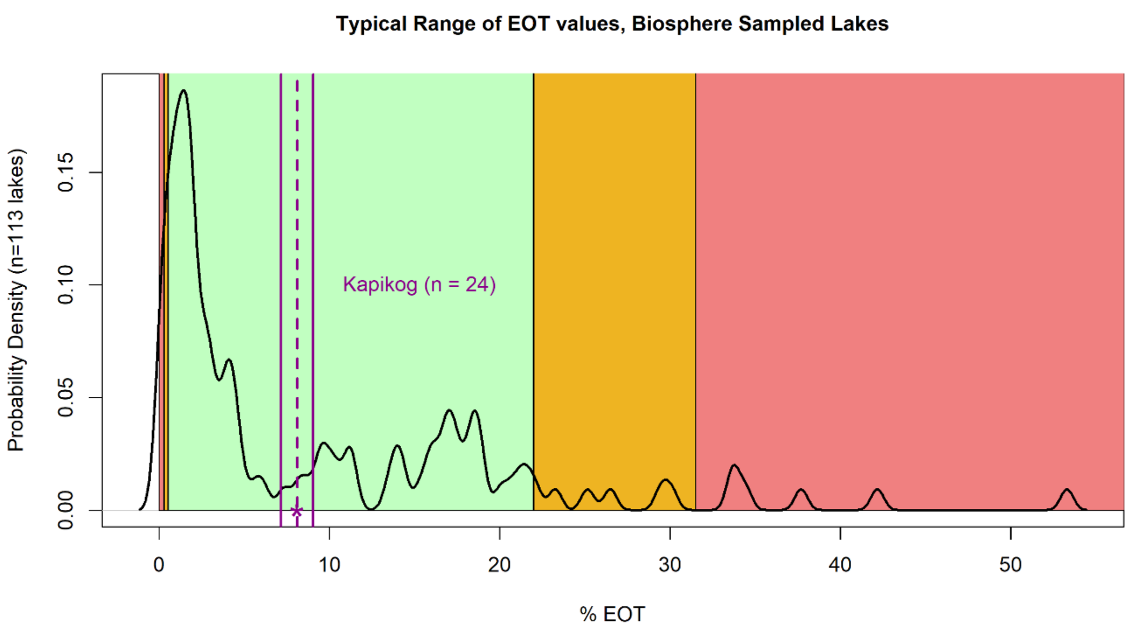

Figure 25. Kapikog Lake average %EOT (dashed purple line) and standard deviation (solid purple line) sampled from 3 lake segments over 8 years (n = 24) fall within the "typical" category (green area) on the typical %EOT range plot. This indicates that the Kapikog Lake benthic community is typical of what would be expected for a lake in this region. Note: data from sampling in 2012 were included in addition to the 2018-2022 data.

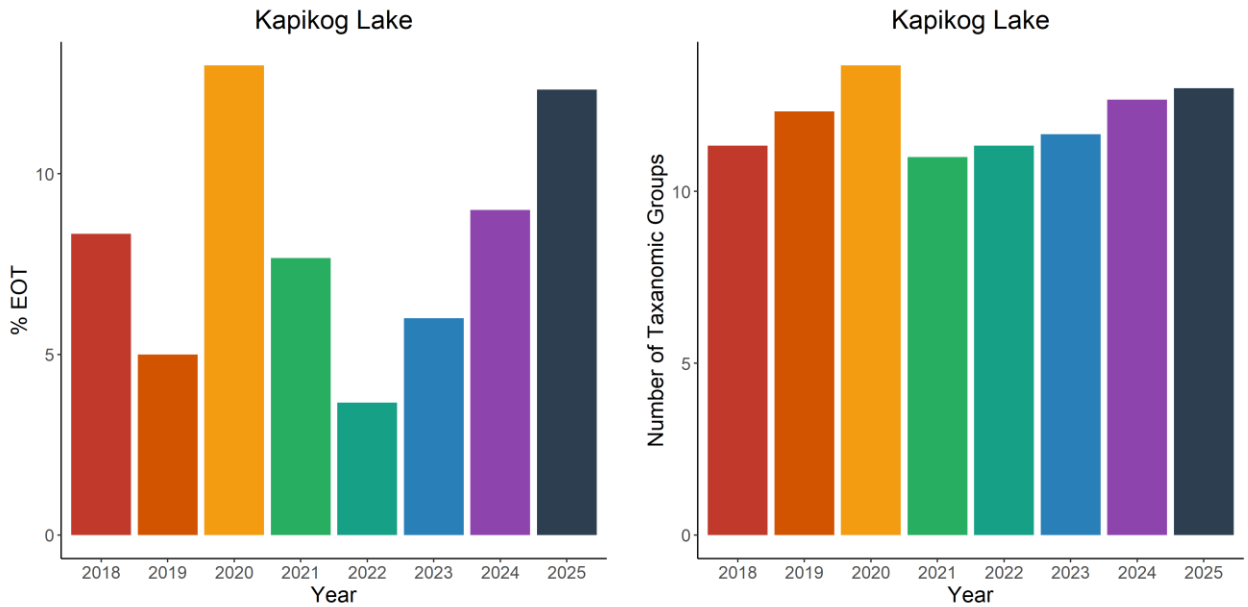

Figure 26. %EOT and the number of taxonomic groups in Kapikog Lake from 2018 to 2025.

Table 5. Summary of fish communities and their management in Kapikog Lake (see link)

Major fish species	Smallmouth bass, largemouth bass, black crappie (introduced), northern pike
Other fish species	Cisco, golden shiner, yellow perch, rock bass, brown bullhead, pumpkinseed
Lake trout management	Not designated
Current stocking	None
Historic stocking	Rainbow trout (2005)
Contaminants (species tested)	Largemouth bass, pumpkinseed, brown bullhead, northern pike (2015)

The first available record for Kapikog Lake is a pre-stocking assessment from 1981. The report concludes that Kapikog Lake has a small population of largemouth bass and is not suitable as a donor lake for the bass transfer program. Two years later a trapnet survey was conducted. The summary report indicates that catch per unit effort was lower in 1983 than during similar surveys conducted in 1981 and 1982 (no reports available from these surveys). Largemouth bass were found to grow rapidly while growth rates for smallmouth bass and yellow perch were slow and very slow, respectively. Small and largemouth bass populations were considered heavily exploited by anglers.

Manitou Association

LPP monitoring has not previously been carried out in this area.

Recommendation: refer to the *Enclosed Bays and Inland Lakes Phosphorus Monitoring Guideline* for information on selecting an LPP sampling location and begin standard LPP monitoring (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Naiscoot Lake Association

LPP monitoring has not previously been carried out on Naiscoot Lake.

Recommendation: refer to the *Enclosed Bays and Inland Lakes Phosphorus Monitoring Guideline* for information on selecting an LPP sampling location and begin standard LPP monitoring (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Table 6. Summary of fish communities and their management in Naiscoot Lake (see link)

Major fish species	Lake whitefish, muskellunge, northern pike, smallmouth bass, largemouth bass, walleye, bluegill
Other fish species	Bluntnose minnow, brown bullhead, cisco, fathead minnow, trout-perch, yellow perch, golden shiner, Johnny darter, white sucker, pumpkinseed, bowfin, rock bass
Lake trout management	Not designated
Current stocking	None
Historic stocking	Walleye (1939-1953), smallmouth bass (1942-1974), muskellunge (1953-1973), rainbow trout (1999)
Contaminants (species tested)	No testing done

Naiscoot Lake was surveyed originally in 1976 and found to support a diverse fish community. In 2006, a fall trapnet survey was done. The catch of smallmouth bass was high while that of walleye was moderate. Bowfin were caught, which had not been documented in the 1976 survey. More recently, an angler reported catching bluegill in 2016. The presence of an established population has not yet been verified.

Pointe au Baril Islanders' Association

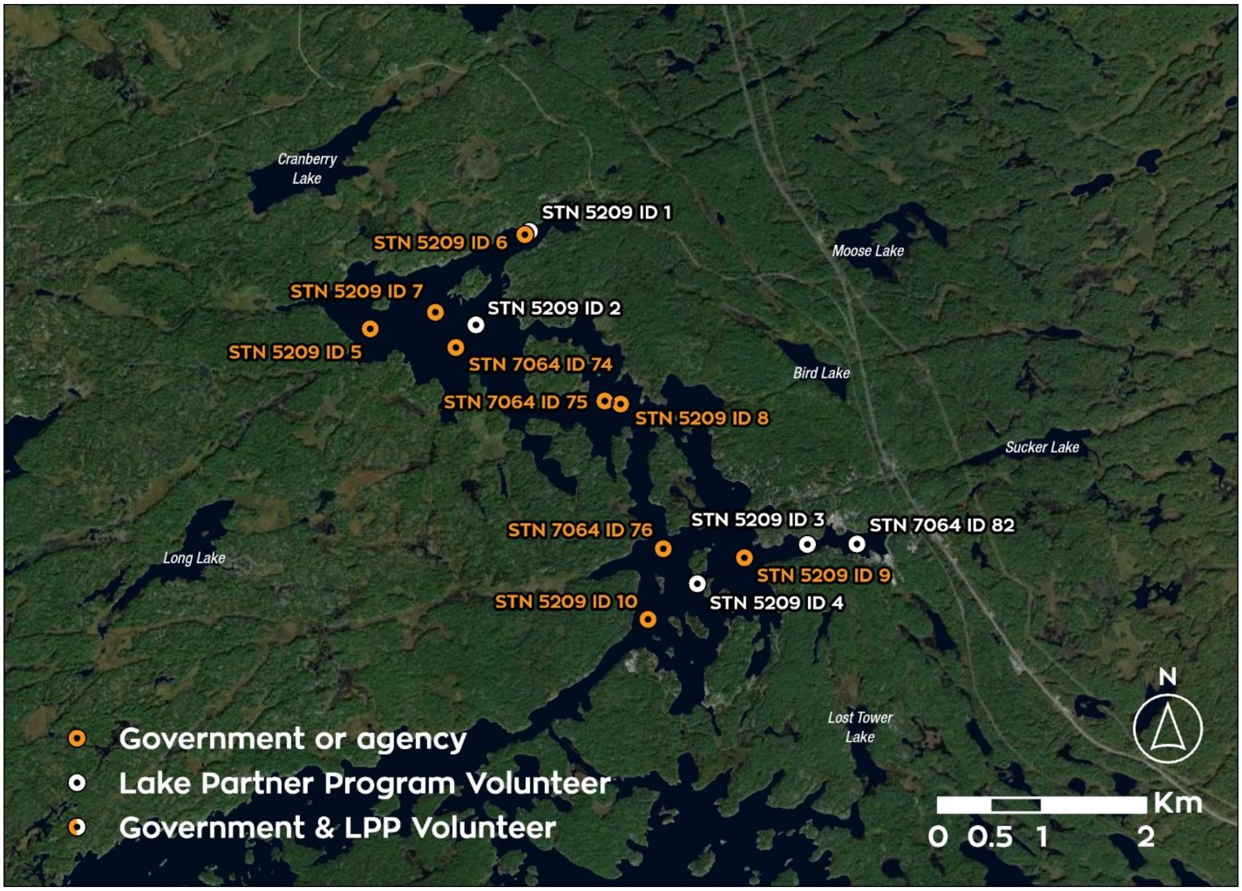

Figure 27. Past and recently active LPP sampling locations on Sturgeon Bay.

Recommendation: continue with standard LPP monitoring at Site ID 1, 2, 3, 4, 82, 110, and 111 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer). If volunteer time is limited, prioritise sites with long term data and those that cover a broad geographic area.

Sturgeon Bay	
• Station: 5209	• TP trend: decreasing
• Site ID: 1	• Average Secchi depth: 1.5 m
• Description: W Sturgeon Bay Prov. Pk	• Average calcium: 7.7 mg/L
• Data collector: LPP volunteer	• Average chloride: 7.2 mg/L
• Trophic status: mesotrophic	• Average sulphate: 4.5 mg/L

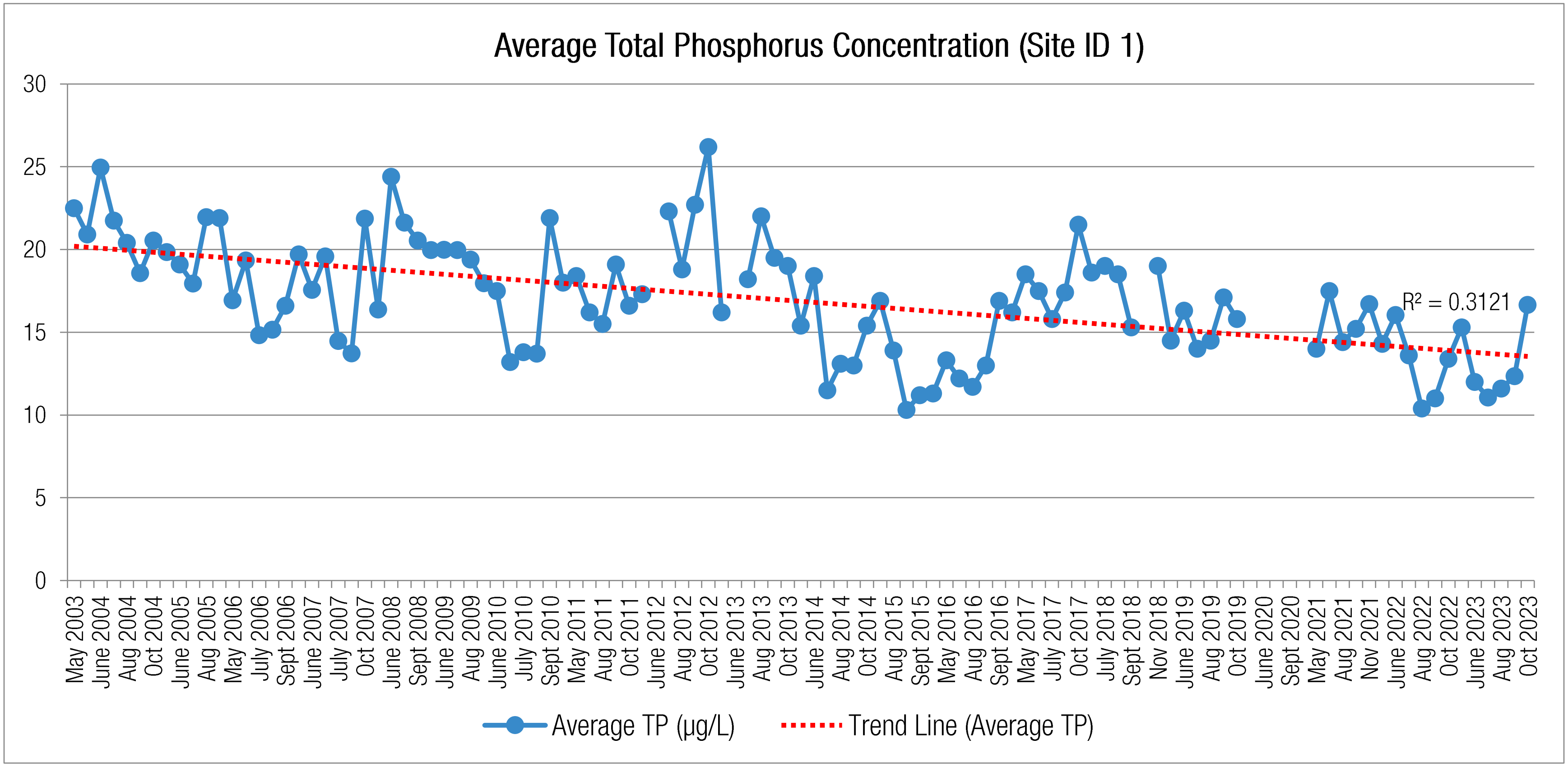

Figure 28. Average total phosphorus (TP) concentration at Site 1 in Sturgeon Bay.

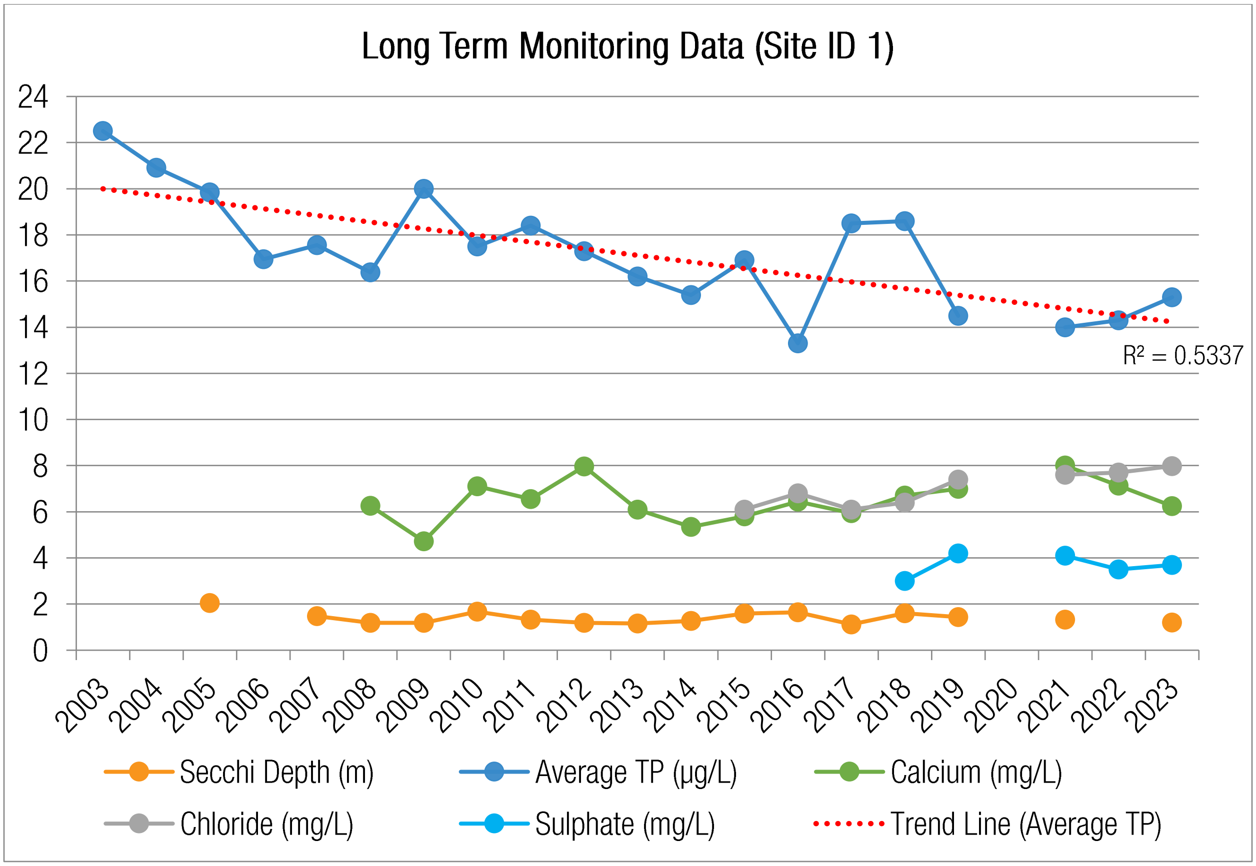

Figure 29. Long term monitoring for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 1 in Sturgeon Bay. Annual results are presented using data from the first sample of each year, the sample taken closest to ice out (as per LPP protocol).

Sturgeon Bay	
• Station: 5209	• TP trend: decreasing
• Site ID: 2	• Average Secchi depth: 1.6 m
• Description: Kenilworth & Skunk I	• Average calcium: 8.0 mg/L
• Data collector: LPP volunteer	• Average chloride: 6.9 mg/L
• Trophic status: mesotrophic	• Average sulphate: 4.6 mg/L

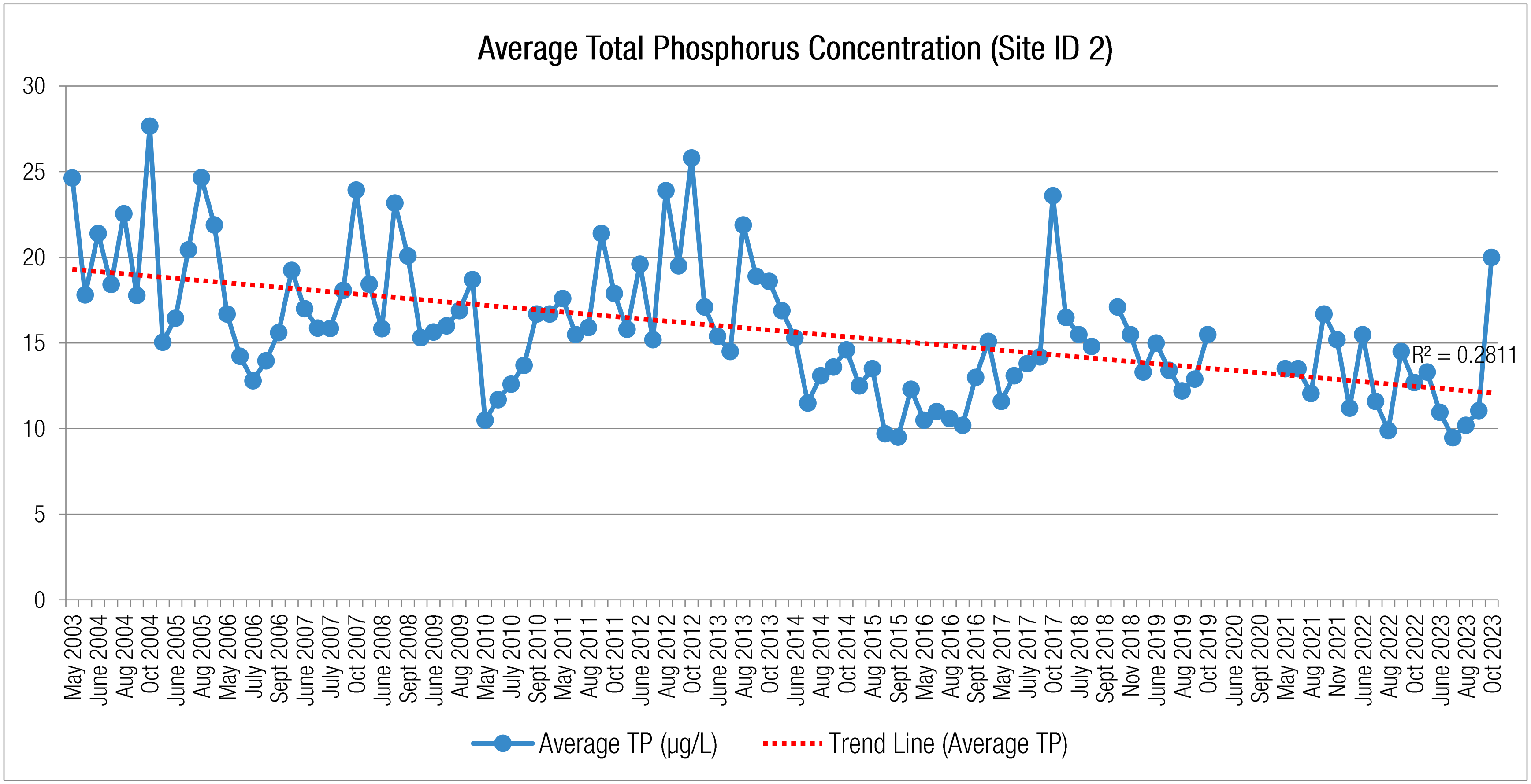

Figure 30. Average total phosphorus (TP) concentration at Site 2 in Sturgeon Bay.

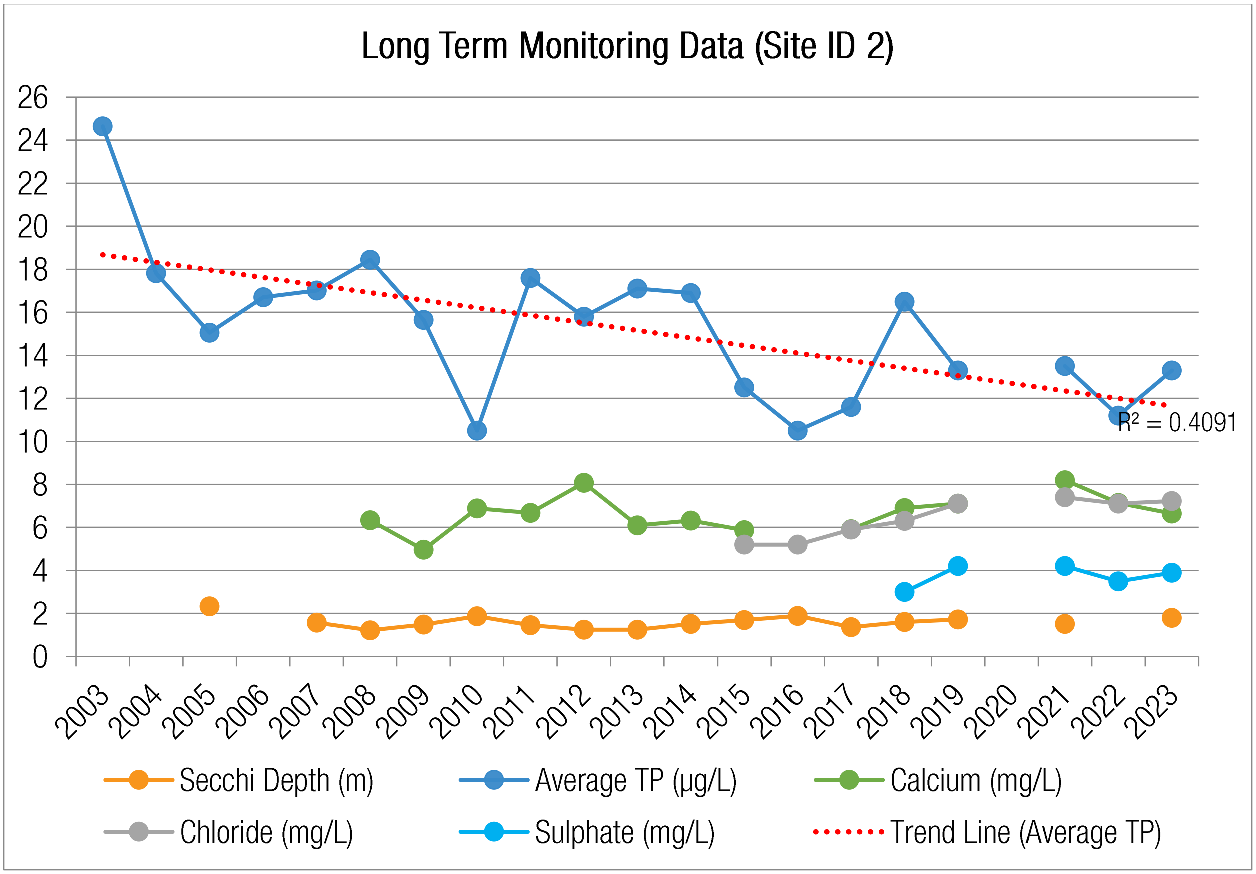

Figure 31. Long term monitoring for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 2 in Sturgeon Bay. Annual results are presented using data from the first sample of each year, the sample taken closest to ice out (as per LPP protocol).

Sturgeon Bay	
• Station: 5209	• TP trend: decreasing
• Site ID: 3	• Average Secchi depth: 1.8 m
• Description: Pointe au Baril chan	• Average calcium: 10.6 mg/L
• Data collector: LPP volunteer	• Average chloride: 6.9 mg/L
• Trophic status: mesotrophic	• Average sulphate: 6.5 mg/L

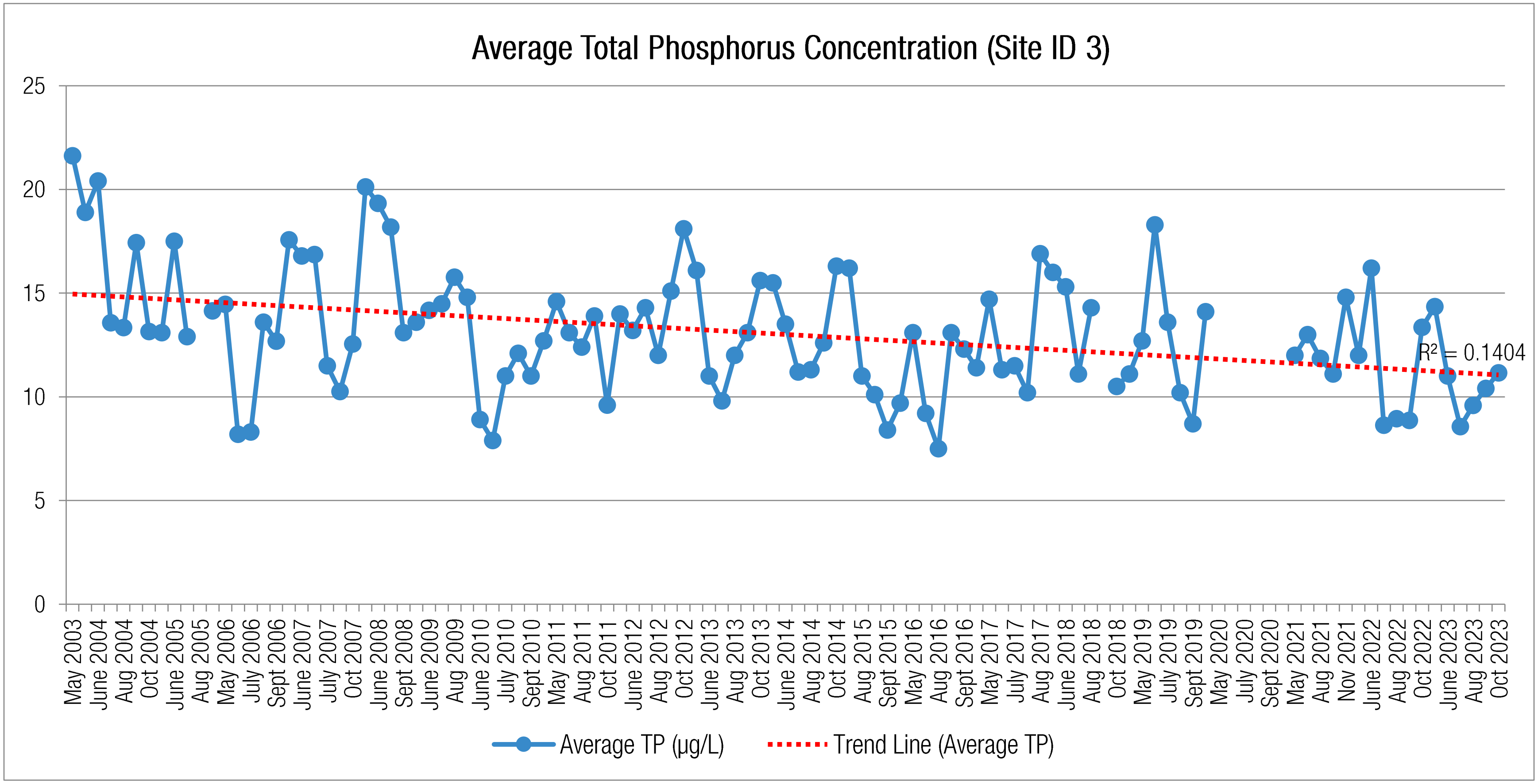

Figure 32. Average total phosphorus (TP) concentration at Site 3 in Sturgeon Bay.

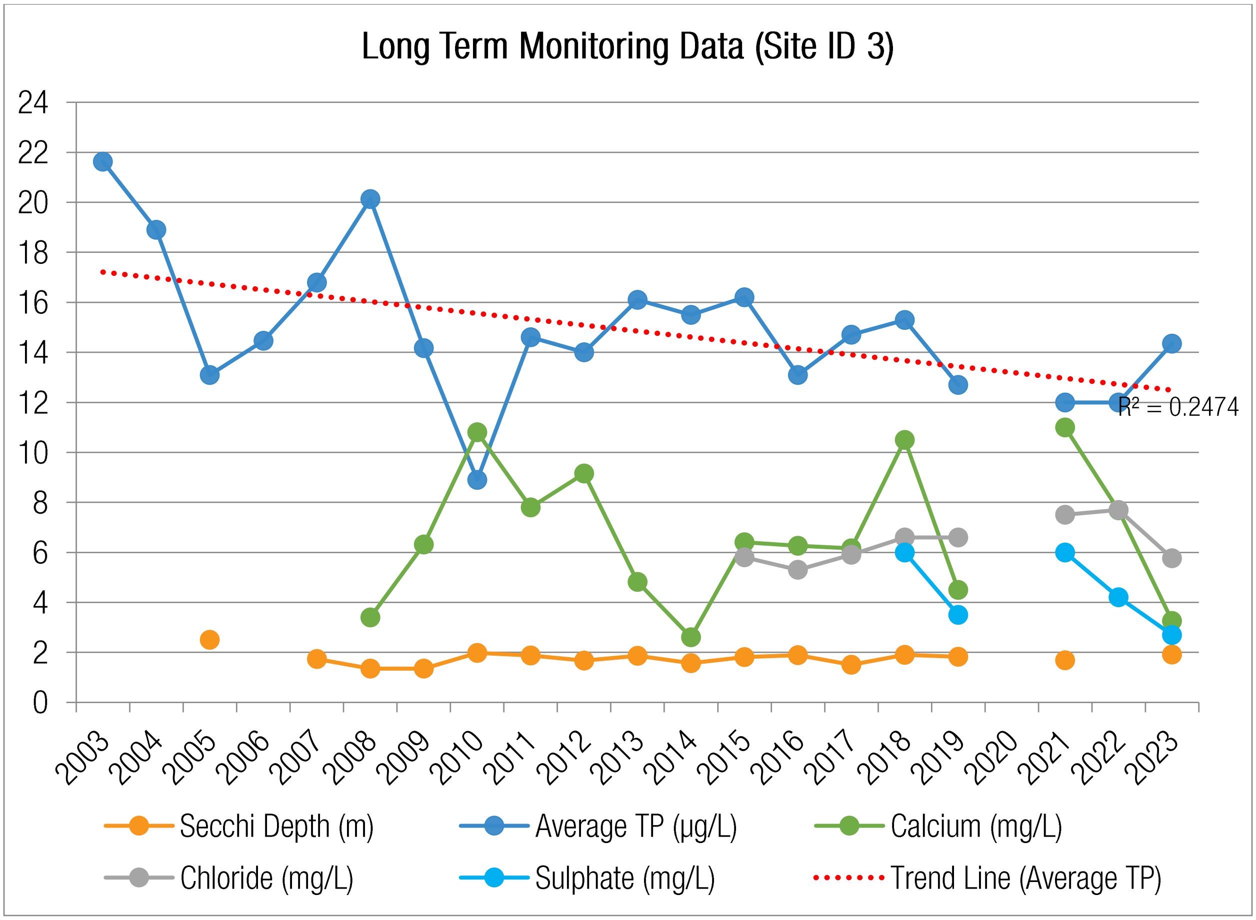

Figure 33. Long term monitoring for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 3 in Sturgeon Bay. Annual results are presented using data from the first sample of each year, the sample taken closest to ice out (as per LPP protocol).

Sturgeon Bay	
• Station: 5209	• TP trend: decreasing
• Site ID: 4	• Average Secchi depth: 2.0 m
• Description: W of School House Is.	• Average calcium: 11.8 mg/L
• Data collector: LPP volunteer	• Average chloride: 6.8 mg/L
• Trophic status: mesotrophic	• Average sulphate: 6.9 mg/L

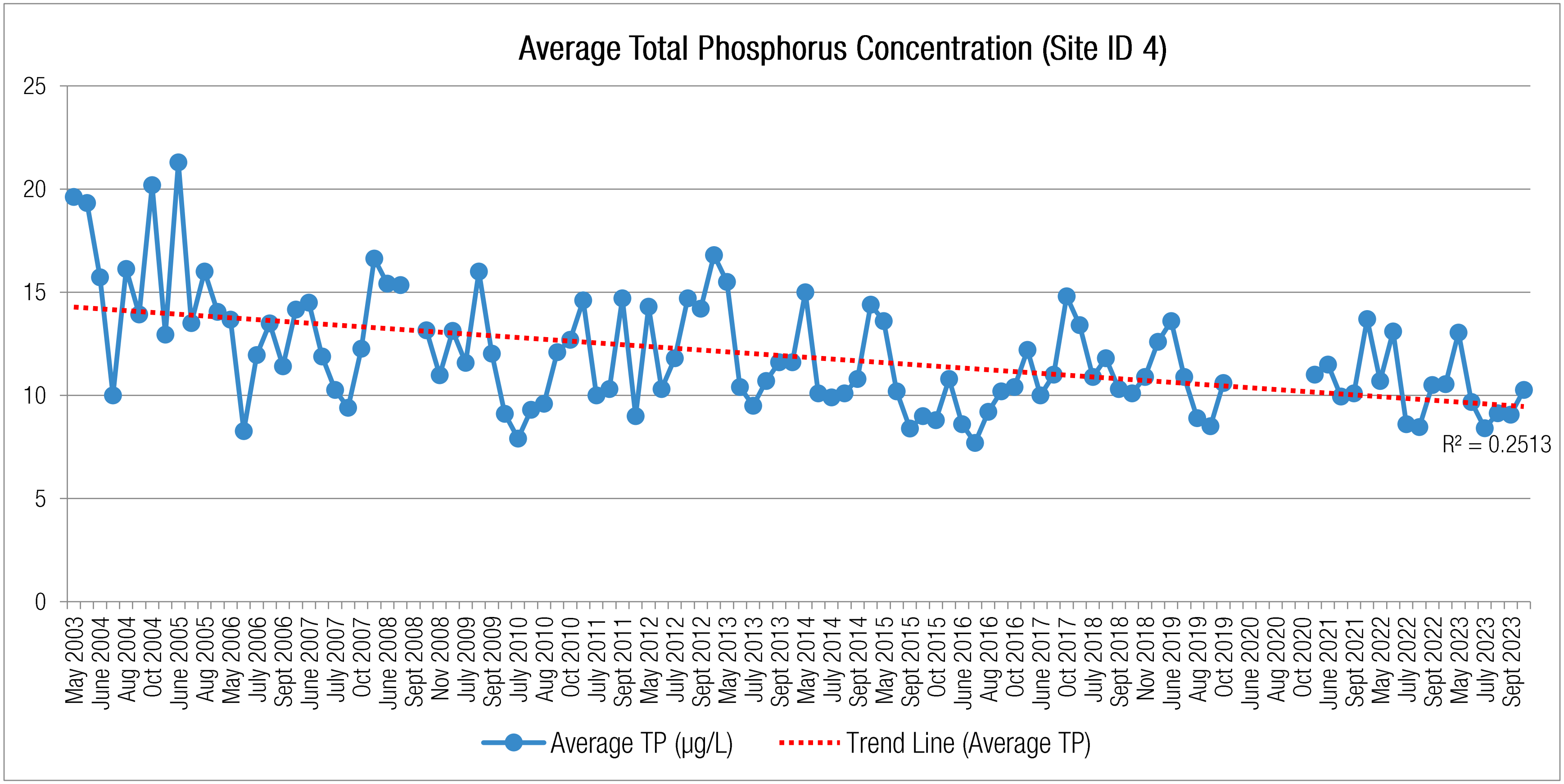

Figure 34. Average total phosphorus (TP) concentration at Site 4 in Sturgeon Bay.

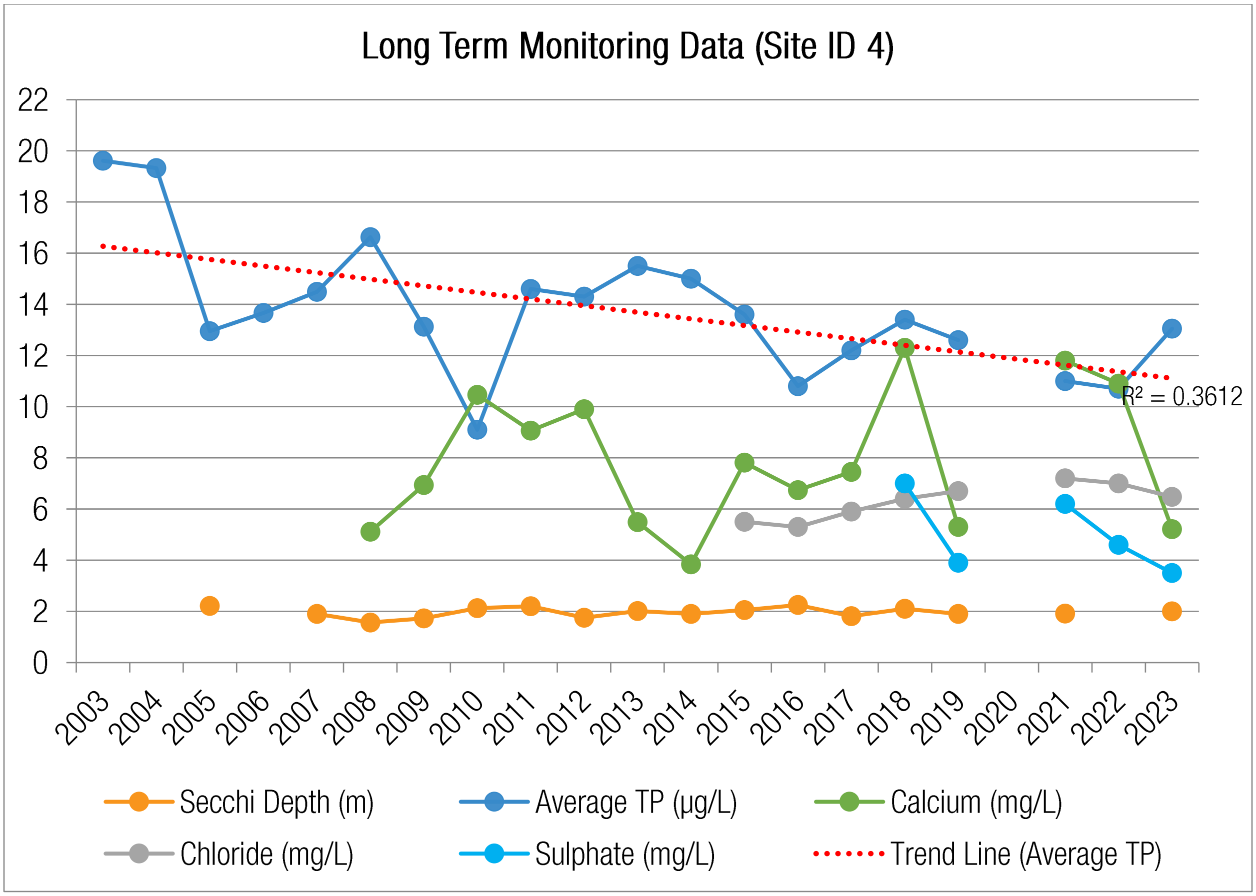

Figure 35. Long term monitoring for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 4 in Sturgeon Bay. Annual results are presented using data from the first sample of each year, the sample taken closest to ice out (as per LPP protocol).

Sturgeon Bay	
• Station: 7064	• Average TP: 15.1 µg/L
• Site ID: 82	• Average Secchi depth: 2.4 m
• Description: Pointe au Baril	• Average calcium: 6.6 mg/L
• Data collector: LPP volunteer	• Average chloride: 7.1 mg/L
• Trophic status: mesotrophic	• Average sulphate: 4.1 mg/L

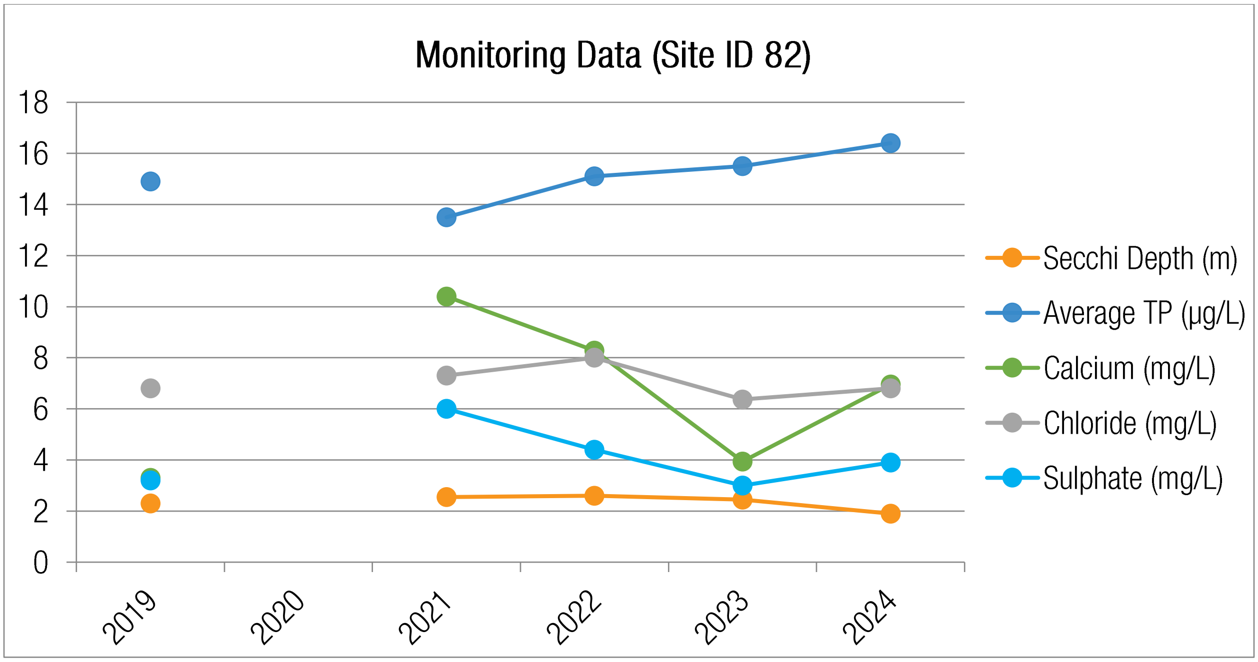

Figure 36. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 82 in Pointe au Baril.

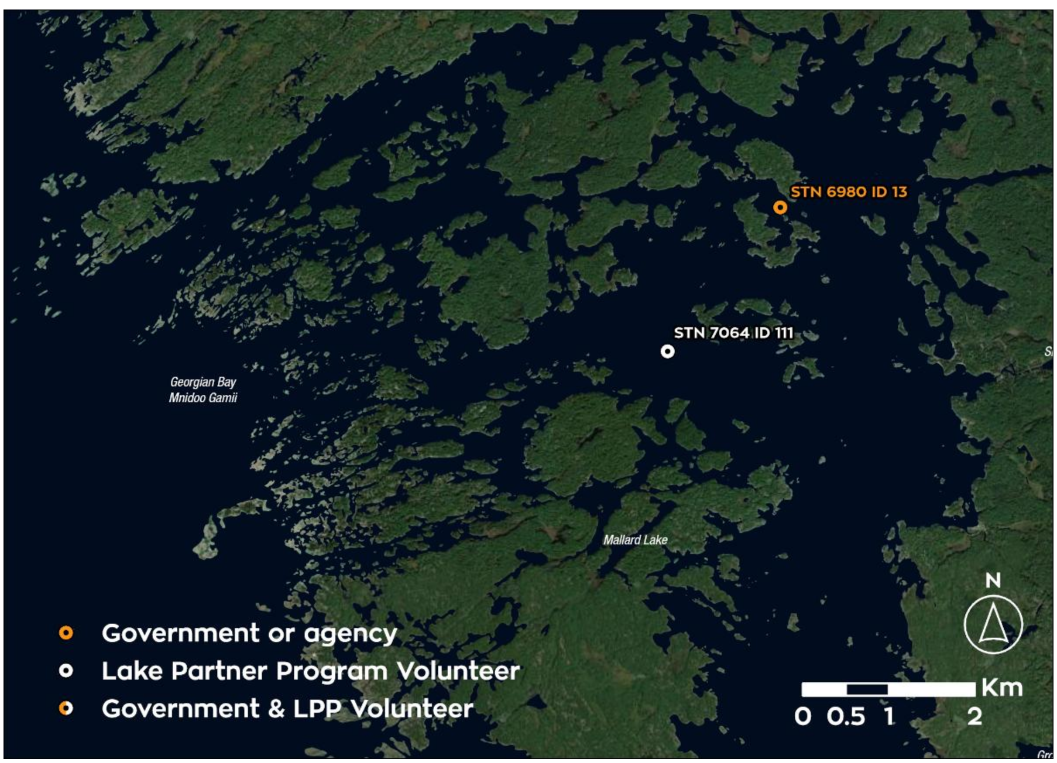

Figure 37. Recently active LPP sampling locations near Pointe au Baril.

Pointe au Baril	
• Station: 7064	• Average TP: 3.8 µg/L
• Site ID: 110	• Average Secchi depth: 6.3 m
• Description: Open water S of Doran Rock	• Average calcium: 20.7 mg/L
• Data collector: LPP volunteer	• Average chloride: 6.8 mg/L
• Trophic status: oligotrophic	• Average sulphate: 11.5 mg/L

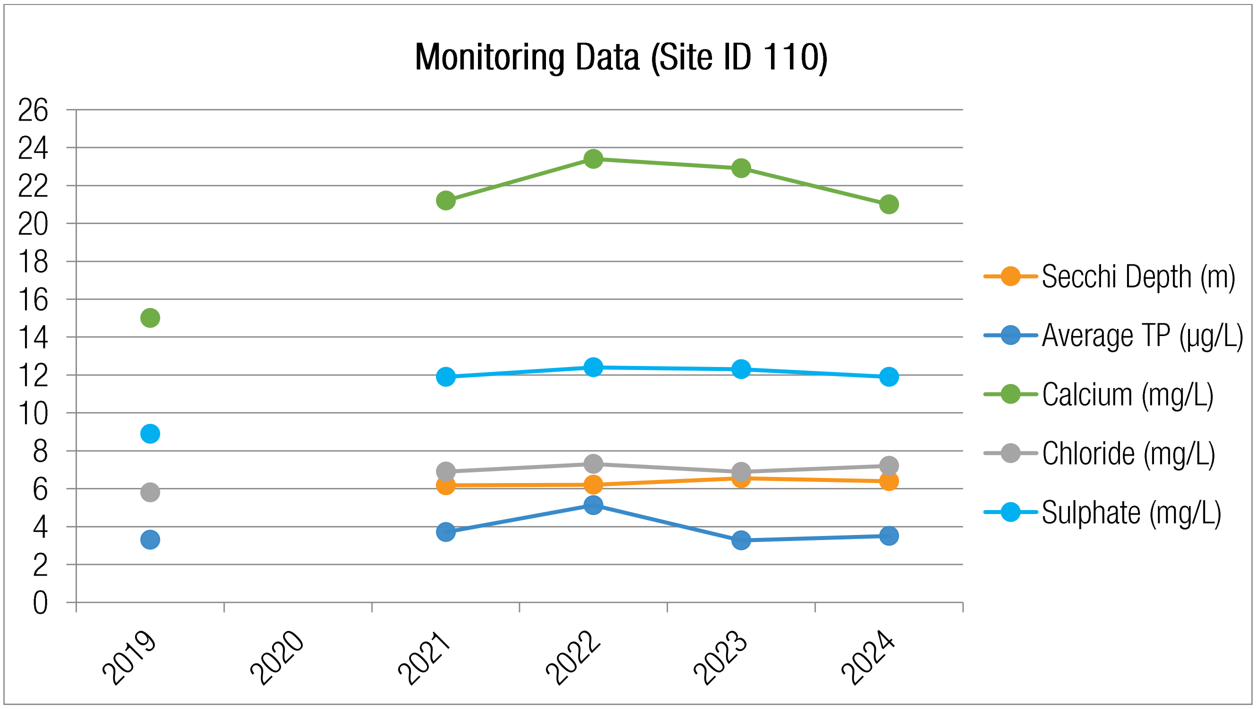

Figure 38. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 110 in the open waters of Georgian Bay, near Pointe au Baril.

Pointe au Baril	
• Station: 7064	• Average TP: 4.8 µg/L
• Site ID: 111	• Average Secchi depth: 4.5 m
• Description: Off Pym Rock & Polland Is.	• Average calcium: 18.5 mg/L
• Data collector: LPP volunteer	• Average chloride: 6.4 mg/L
• Trophic status: oligotrophic	• Average sulphate: 10.5 mg/L

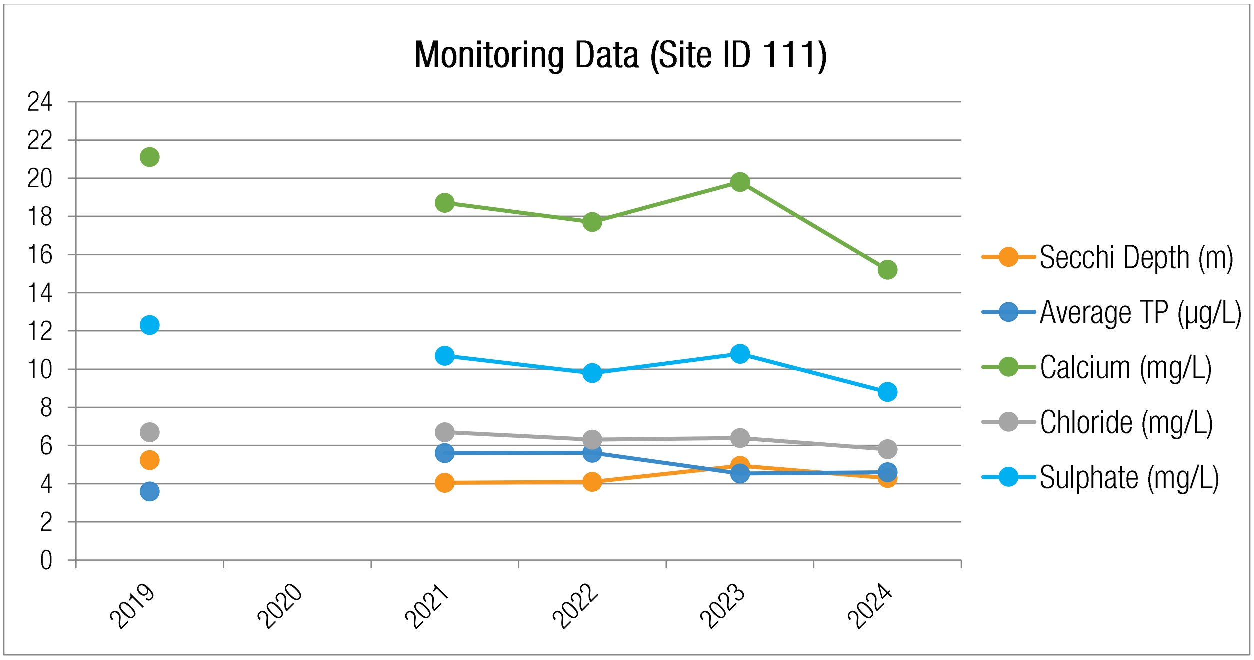

Figure 39. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 111 in Georgian Bay near Pointe au Baril.

Rock Island Lake

LPP monitoring has not previously been carried out on Rock Island Lake.

Recommendation: refer to the *Enclosed Bays and Inland Lakes Phosphorus Monitoring Guideline* for information on selecting an LPP sampling location and begin standard LPP monitoring (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Table 7. Summary of fish communities and their management in Rock Island Lake (see link)

Major fish species	Northern pike, smallmouth bass, largemouth bass (introduced 2003), walleye
Other fish species	Bluntnose minnow, brown bullhead, cisco, Iowa darter, Johnny darter, mimic shiner, pumpkinseed, rock bass, white sucker
Lake trout management	Not designated
Current stocking	None
Historic stocking	Smallmouth bass (1950-1964), walleye (1949-1953)
Contaminants (species tested)	Cisco, northern pike, walleye

Rock Island Lake was first surveyed in 1964, followed by an inventory done in 1975. In 2001, a Fall Walleye Index Netting (FWIN) survey was completed with 12 net sets revealing walleye (18) and smallmouth bass (17) as the dominant sport fish. Other species caught included cisco (96), white sucker (29), brown bullhead (11), rock bass (11), yellow perch (8), pumpkinseed (3), and northern pike (2). Two years later, a trap net survey was completed in which three largemouth bass were captured, this was the first documented occurrence of the species in the lake. At this time, the walleye population was graded as being relatively high compared to other lakes in the area.

Sans Souci & Copperhead Association

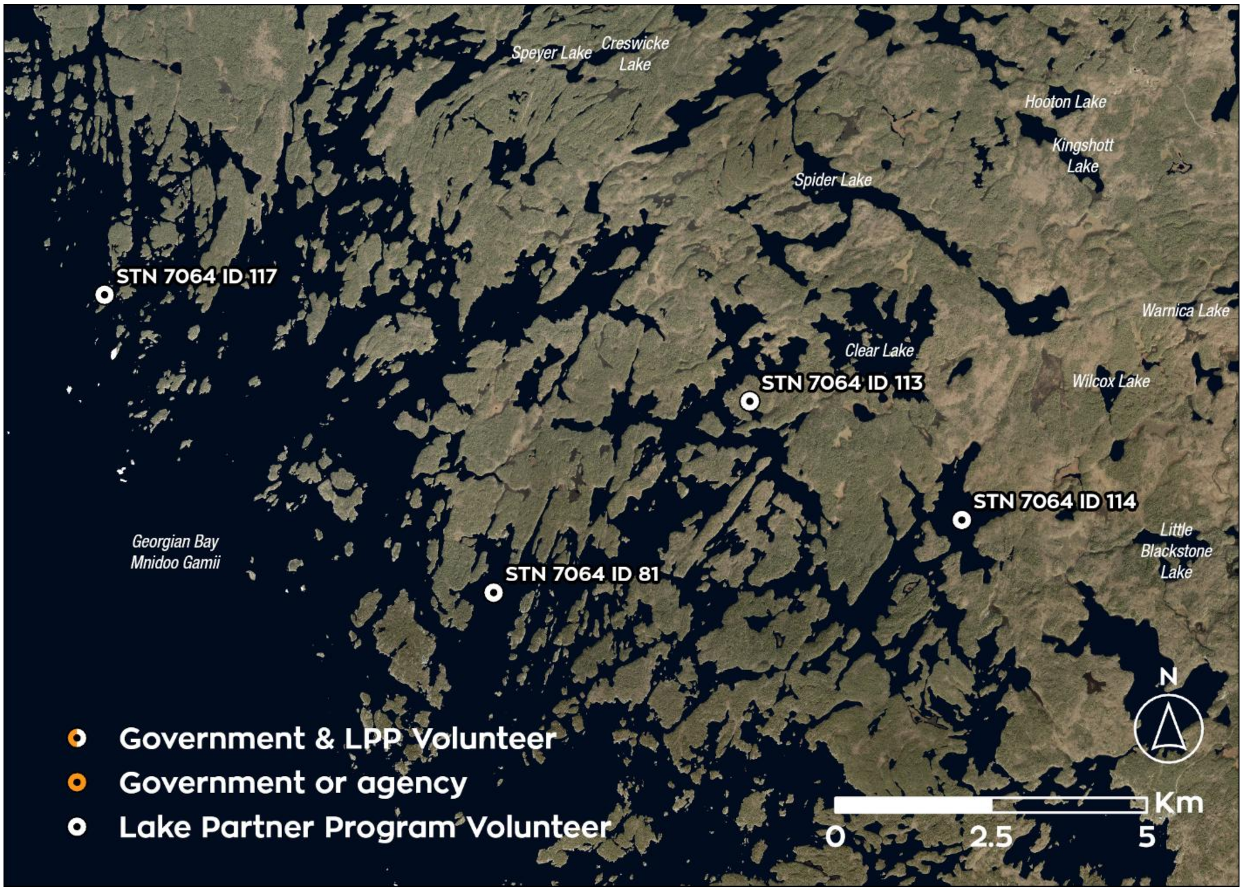

Figure 40. Recently active LPP sampling locations in Sans Souci, Clear Bay, and Rawson Bay.

Recommendation: continue with standard LPP monitoring at Site ID 113, 114, and 117 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer). Reinitiate regular sampling at Site ID 81.

Sans Souci & Copperhead	
• Station: 7064	• Average TP: 9.5 µg/L
• Site ID: 113	• Average Secchi depth: n/a
• Description: Ruddy Island in Clear Bay	• Average calcium: 3.8 mg/L
• Data collector: LPP volunteer	• Average chloride: 8.0 mg/L
• Trophic status: oligotrophic	• Average sulphate: 3.2 mg/L

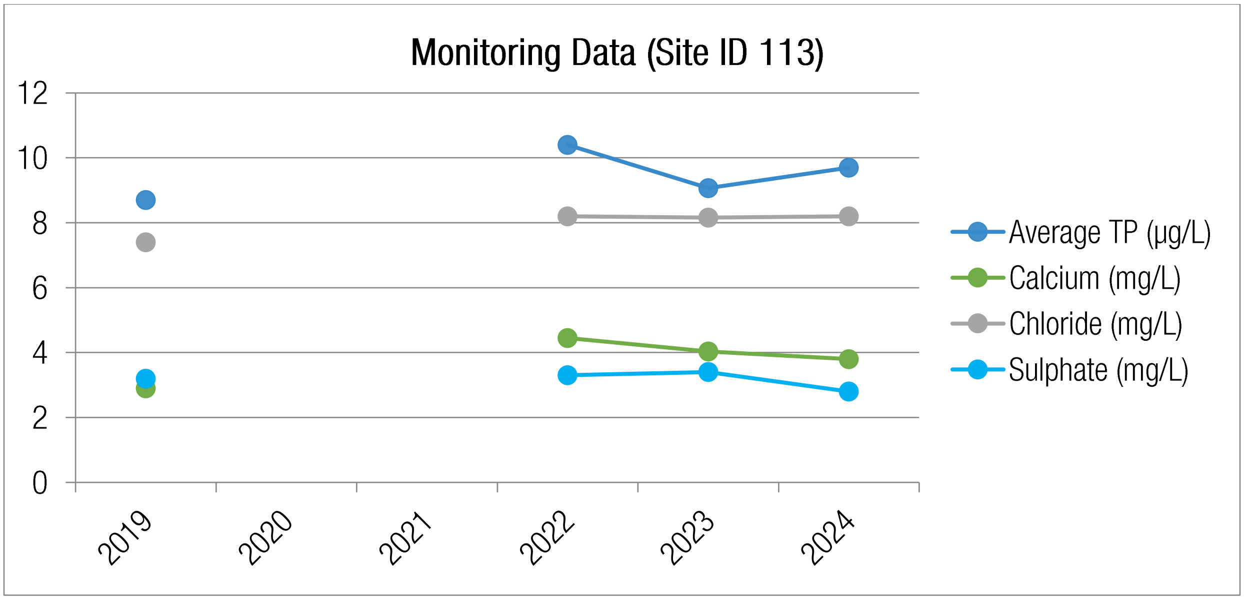

Figure 41. Monitoring data for average TP, calcium, chloride, and sulphate concentrations at Site 113 in the Sans Souci area.

Sans Souci & Copperhead	
• Station: 7064	• Average TP: 7.7 µg/L
• Site ID: 114	• Average Secchi depth: n/a
• Description: Rawson Bay	• Average calcium: 2.9 mg/L
• Data collector: LPP volunteer	• Average chloride: 8.0 mg/L
• Trophic status: oligotrophic	• Average sulphate: 3.0 mg/L

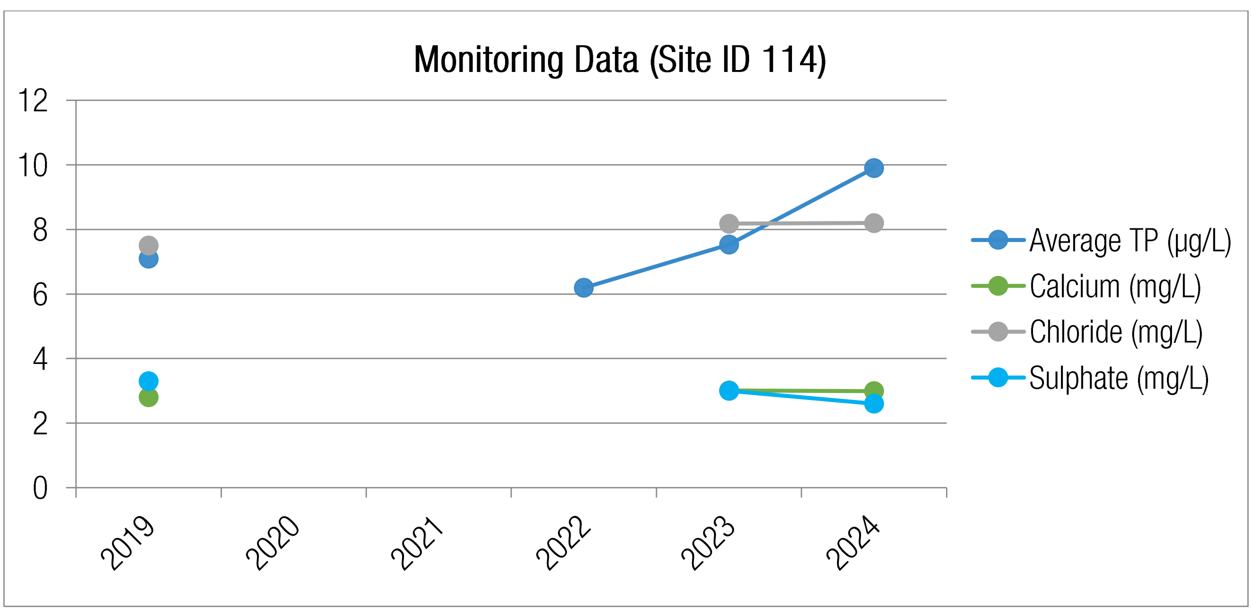

Figure 42. Monitoring data for average TP, calcium, chloride, and sulphate concentrations at Site 114 in the Sans Souci area.

Sans Souci & Copperhead	
• Station: 7064	• Average TP: 4.1 µg/L
• Site ID: 117	• Average Secchi depth: 11.6 m
• Description: Watt Island B-460	• Average calcium: 20.8 mg/L
• Data collector: LPP volunteer	• Average chloride: 7.9 mg/L
• Trophic status: oligotrophic	• Average sulphate: 11.4 mg/L

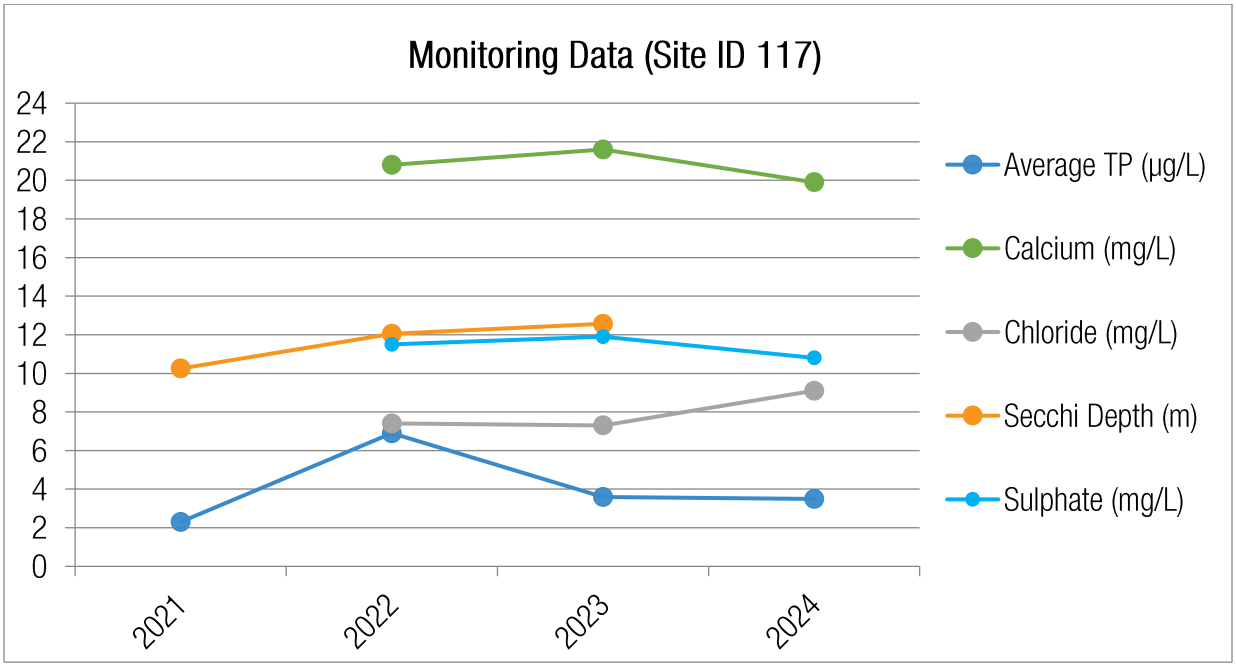

Figure 43. Monitoring data for average TP, calcium, chloride, and sulphate concentrations at Site 117 in the Sans Souci area.

Station	Site ID	Description	2018 Average TP (µg/L)	2019 Average TP (µg/L)	2023 Average TP (µg/L)
7064	81	Sans Souci, deep spot	4.4	3.9	n/a

Skerryvore Ratepayers' Association

Figure 44. Past LPP sampling location with data collected by the MOE Northern Region.

Recommendation: Initiate standard LPP monitoring at Site ID 13 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Table 8. Summary of fish communities and their management in Skerryvore Lake (see link)

Major fish species	Black crappie, northern pike, largemouth bass
Other fish species	Golden shiner, rock bass, brook silverside, yellow perch, brown bullhead, pumpkinseed
Lake trout management	Not designated
Current stocking	None
Historic stocking	None
Contaminants (species tested)	No testing done

Skerryvore Lake was partially surveyed in 1990. Largemouth bass, northern pike, and black crappie were the sport fish species caught. Given the proximity of the lake to Georgian Bay, it is likely that all species are native to the lake.

South Channel Association

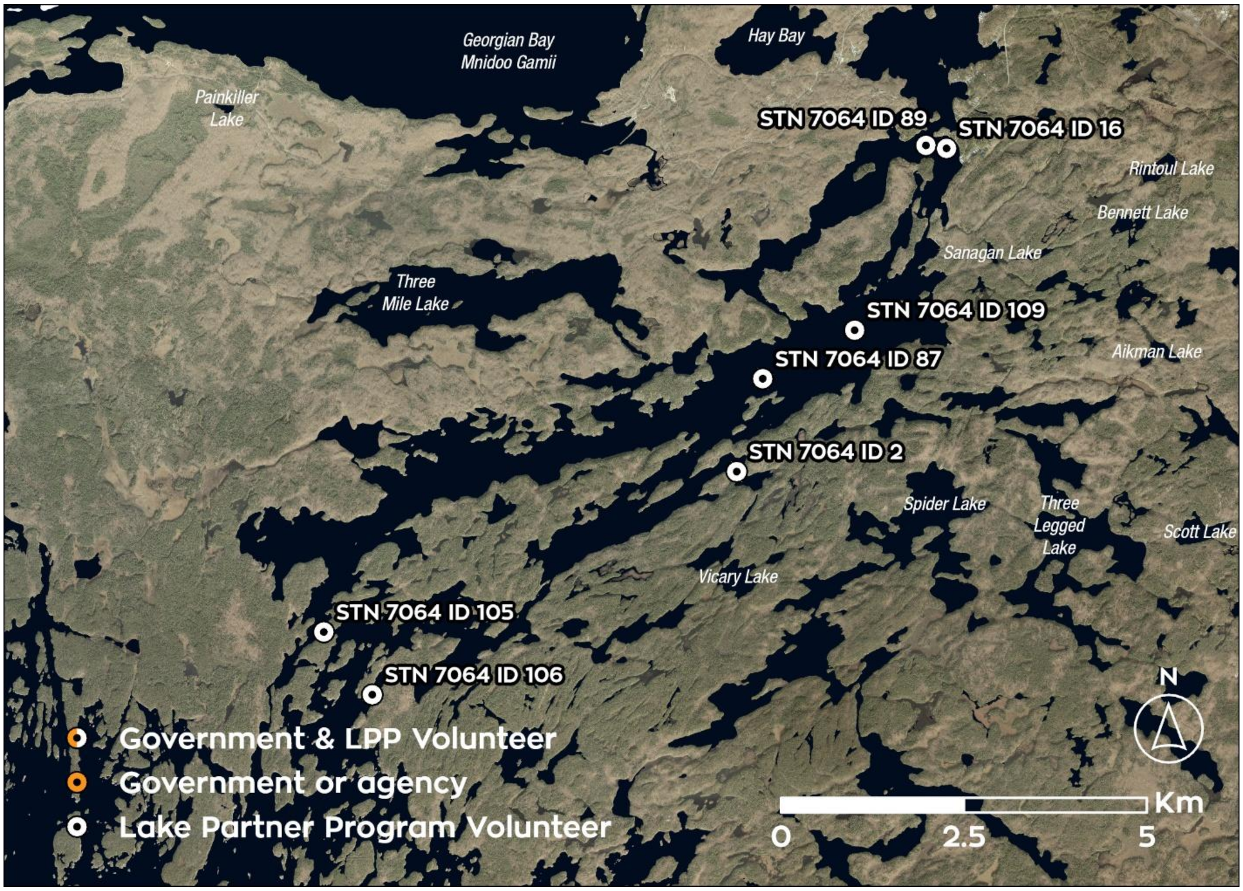

Figure 45. Recently active and past LPP sampling locations in South Channel.

Recommendation: continue with standard LPP monitoring at Site ID 89, 105, 106, and 109 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer). If volunteer time is limited, prioritise sites with the longest, most complete dataset and broad geographic coverage.

South Channel	
• Station: 7064	• Average TP: 7.4 µg/L
• Site ID: 89	• Average Secchi depth: 4.0 m
• Description: Channel N of Isabella Island	• Average calcium: 5.9 mg/L
• Data collector: LPP volunteer	• Average chloride: 11.9 mg/L
• Trophic status: oligotrophic	• Average sulphate: 3.7 mg/L

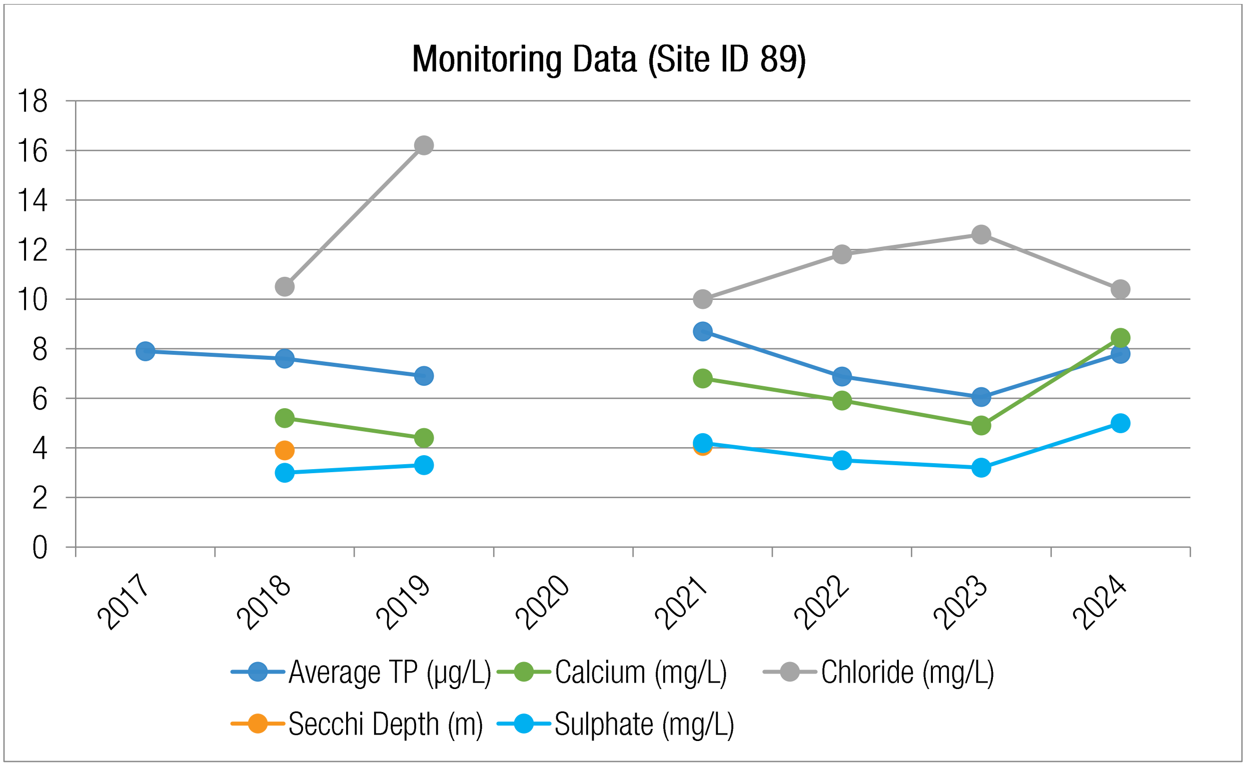

Figure 46. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 89 in the South Channel.

South Channel	
• Station: 7064	• Average TP: 6.4 µg/L
• Site ID: 105	• Average Secchi depth: n/a
• Description: Indian Dock Channel	• Average calcium: 7.7 mg/L
• Data collector: LPP volunteer	• Average chloride: 8.5 mg/L
• Trophic status: oligotrophic	• Average sulphate: 5.0 mg/L

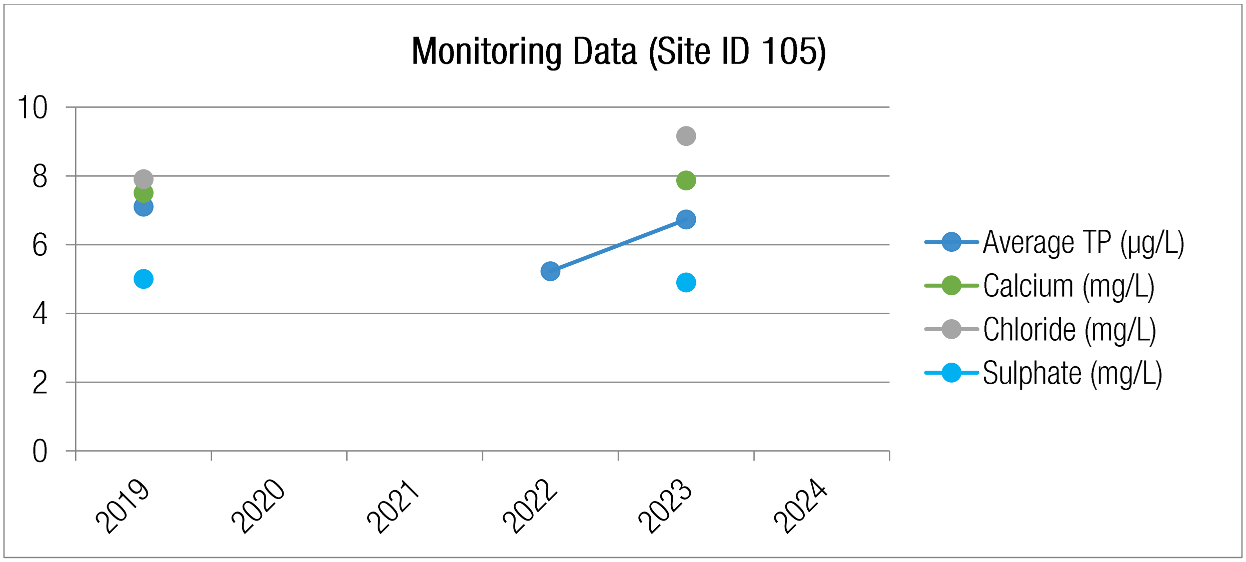

Figure 47. Monitoring data for average TP, calcium, chloride, and sulphate concentrations at Site 105 in the South Channel.

South Channel	
• Station: 7064	• Average TP: 4.4 µg/L
• Site ID: 106	• Average Secchi depth: m
• Description: Redner Bay	• Average calcium: 14.1 mg/L
• Data collector: LPP volunteer	• Average chloride: 8.2 mg/L
• Trophic status: oligotrophic	• Average sulphate: 8.2 mg/L

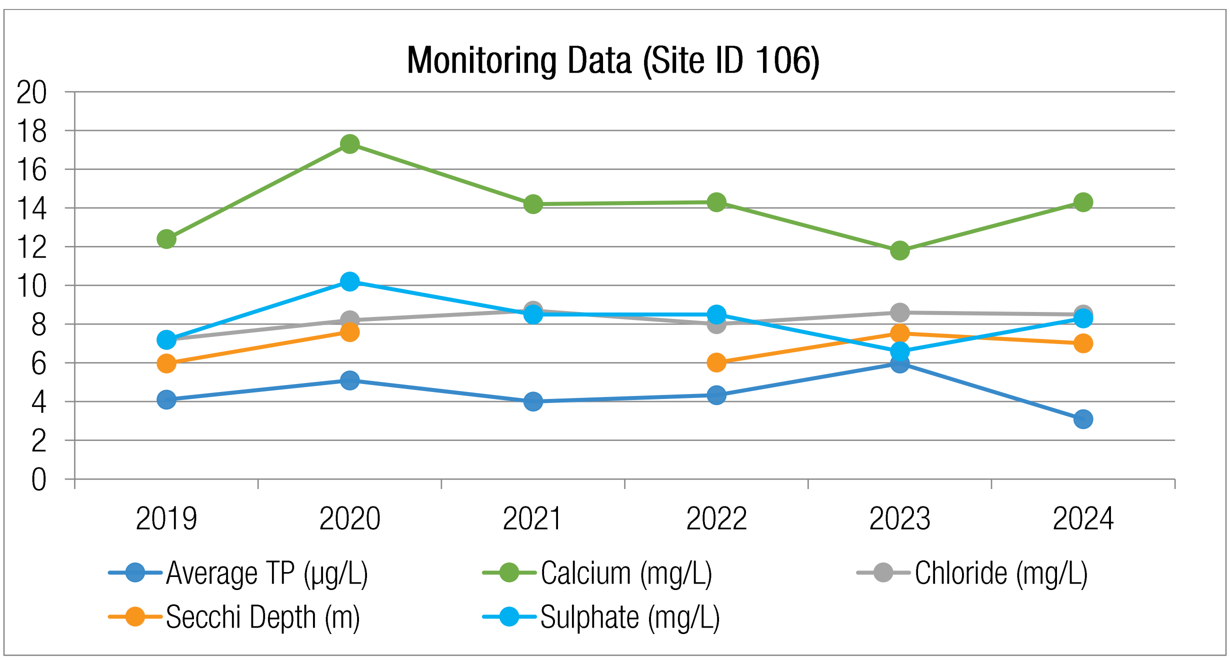

Figure 48. Monitoring data for average TP, calcium, chloride, and sulphate concentrations at Site 106 in the South Channel.

South Channel	
• Station: 7064	• Average TP: 5.5 µg/L
• Site ID: 109	• Average Secchi depth: 4.1 m
• Description: S channel basin	• Average calcium: 5.8 mg/L
• Data collector: LPP volunteer	• Average chloride: 10.9 mg/L
• Trophic status: oligotrophic	• Average sulphate: 3.9 mg/L

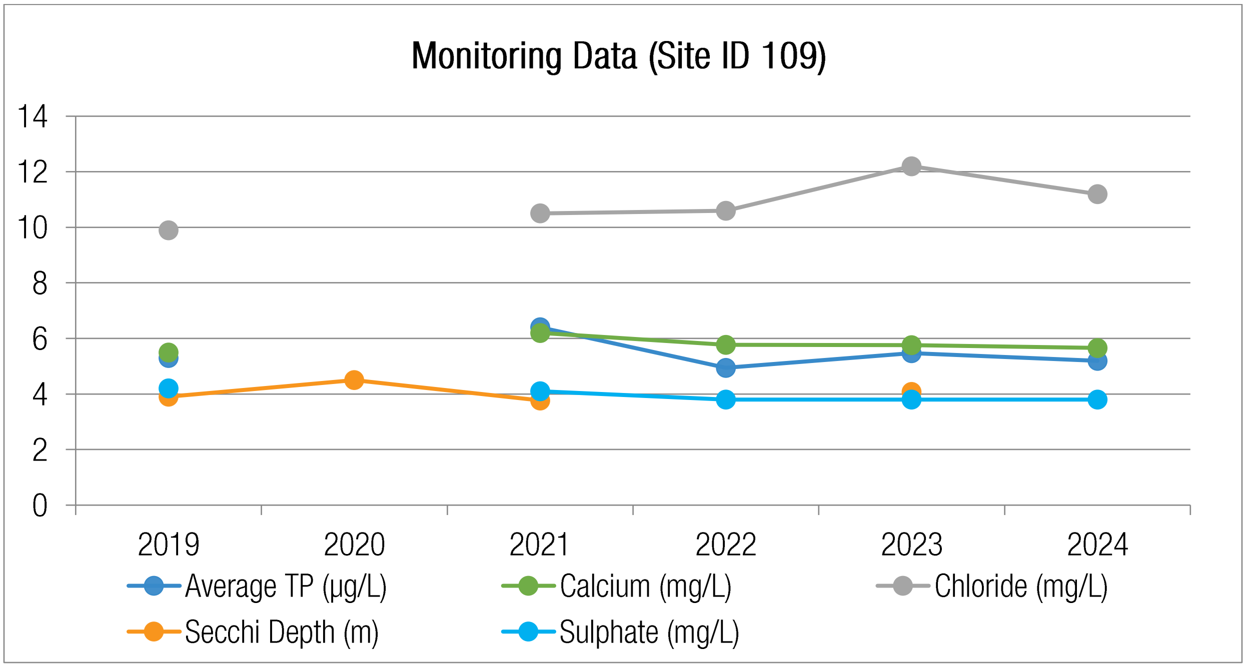

Figure 49. Monitoring data for average TP, calcium, chloride, and sulphate concentrations at Site 109 in the South Channel.

Station	Site ID	Description	2019 Average TP (µg/L)	2021 Average TP (µg/L)
7064	2	South Chan-Nutter Bay	6.4	n/a
7064	87	South Channel	4.9	5.7

Three Legged Lake Association

Figure 50. Recently active LPP sampling locations on Three Legged Lake.

Recommendation: reinitiate standard LPP monitoring at Site ID 1 and 2 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Three Legged Lake	
• Station: 5360	• TP trend: increasing
• Site ID: 1	• Average Secchi depth: 6.2 m
• Description: mid lake, deep spot	• Average calcium: 1.5 mg/L
• Data collector: LPP volunteer	• Average chloride: 0.9 mg/L
• Trophic status: oligotrophic	• Average sulphate: 2.5 mg/L

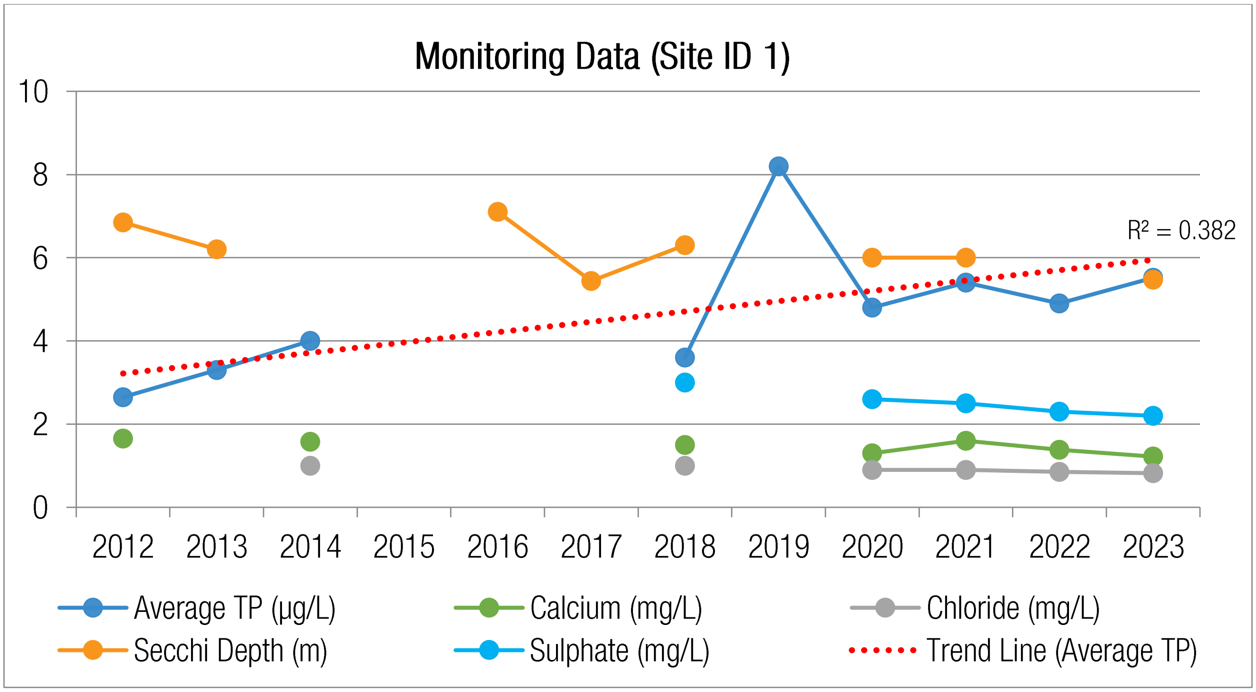

Figure 51. Long term monitoring for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 1 on Three Legged Lake.

Three Legged Lake	
• Station: 5360	• Average TP: 4.3 µg/L
• Site ID: 2	• Average Secchi depth: 4.4 m
• Description: mid lake, deep spot	• Average calcium: 1.4 mg/L
• Data collector: Seguin Township	• Average chloride: 0.9 mg/L
• Trophic status: oligotrophic	• Average sulphate: 2.5 mg/L

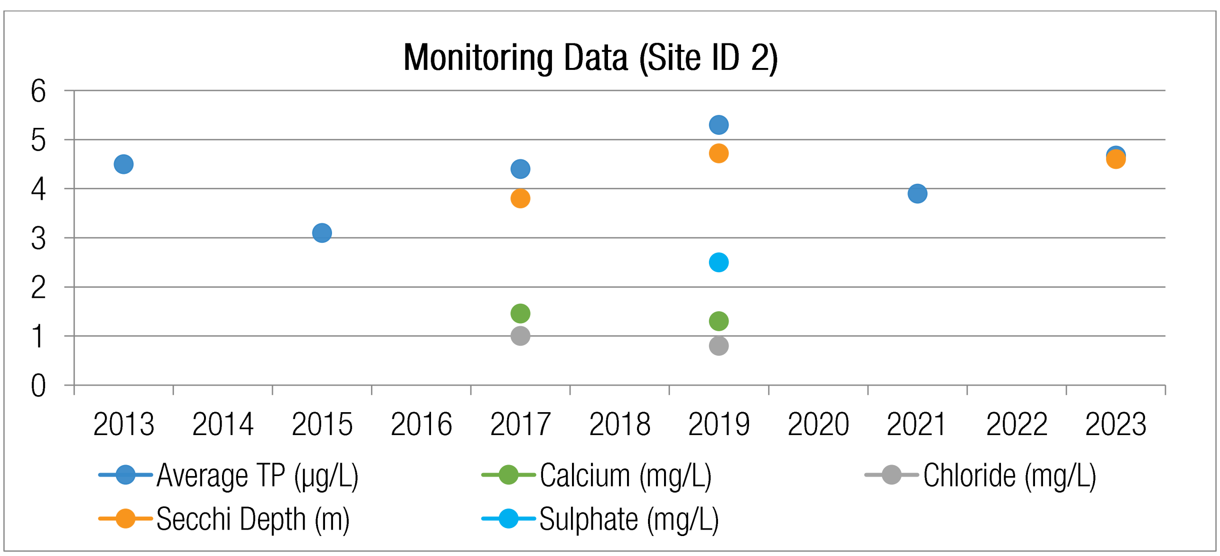

Figure 52. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 2 on Three Legged Lake.

Table 9. Summary of fish communities and their management in Three Legged Lake (see link)

Major fish species	Lake trout, smallmouth bass, largemouth bass (introduced 2005)
Other fish species	White sucker, cisco, yellow perch
Lake trout management	Designated; natural. Season open from third Saturday in May to September 30, no lake trout between 40-55 cm may be kept.
Current stocking	None
Historic stocking	Lake trout (1925-1988), rainbow trout (1999-2001), smallmouth bass (1947-1965)
Contaminants (species tested)	No testing done

In 1993, Three Legged Lake was assessed for bass and lake trout spawning habitat. Three sites were identified as 'promising' potential lake trout spawning sites. A more detailed assessment was completed in 1998. The spring littoral index netting (SLIN) revealed a very low catch per unit effort (0.36 ± 0.19) reflective of a low productivity level. Five of the 11 lake trout captured were naturals. The captured lake trout were found to have exceptionally slow growth rates and sexual maturation. Moreover, the condition (length-weight relationship) of the fish was poor, spawning habitat appeared to be limited, and the cisco population, a food source for lake trout, appeared to have crashed. It was concluded that significant rehabilitative efforts would be required if lake trout were to continue as a natural, self-sustaining population in the lake. The following year, winter creel surveys were conducted on seven occasions during February and March. On only one occasion a single person was interviewed, no lake trout had been caught indicating negligible winter angling pressure.

Over several years, optimal lake trout habitat as a percentage of lake volume (temp ≥10°C and dissolved oxygen ≥6 ppm) has been calculated. Optimal lake trout habitat percentages have fluctuated as follows: 55.8% (1980), 13.6% (1996), 42.4% (1999), 44% (2000), 37.4% (2002), and 41.1% (2003).

Woods Bay Community Association

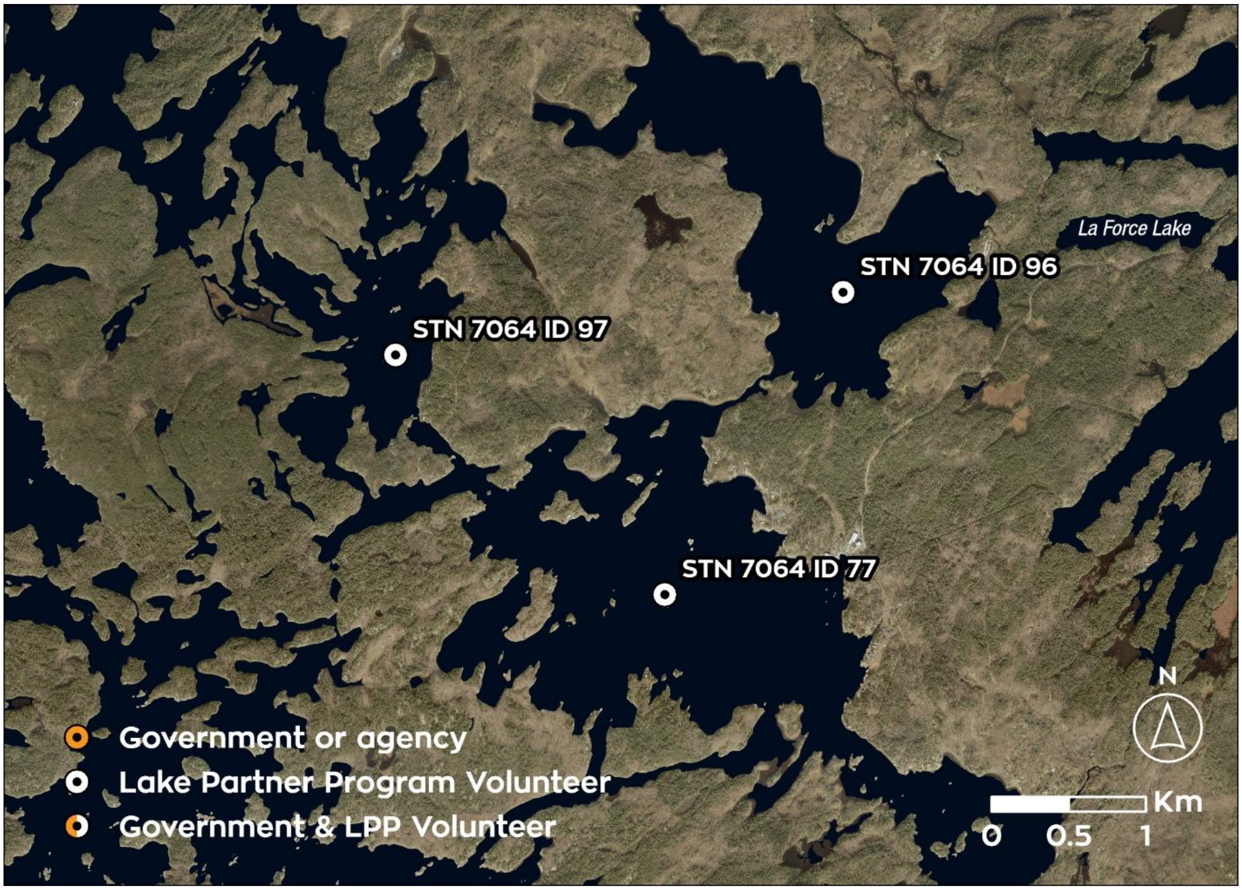

Figure 53. Recently active LPP sampling locations in the Woods Bay area.

Recommendation: reinitiate standard LPP monitoring at Site ID 77, 96, and 97 (i.e., TP, calcium, chloride, and sulphate sampling once in May, water clarity measurements at least once every two weeks throughout the summer).

Woods Bay	
• Station: 7064	• Average TP: 7.7 µg/L
• Site ID: 77	• Average Secchi depth: 3.7 m
• Description: Woods Bay, deep spot	• Average calcium: 3.2 mg/L
• Data collector: LPP volunteer	• Average chloride: 7.5 mg/L
• Trophic status: oligotrophic	• Average sulphate: 3.1 mg/L

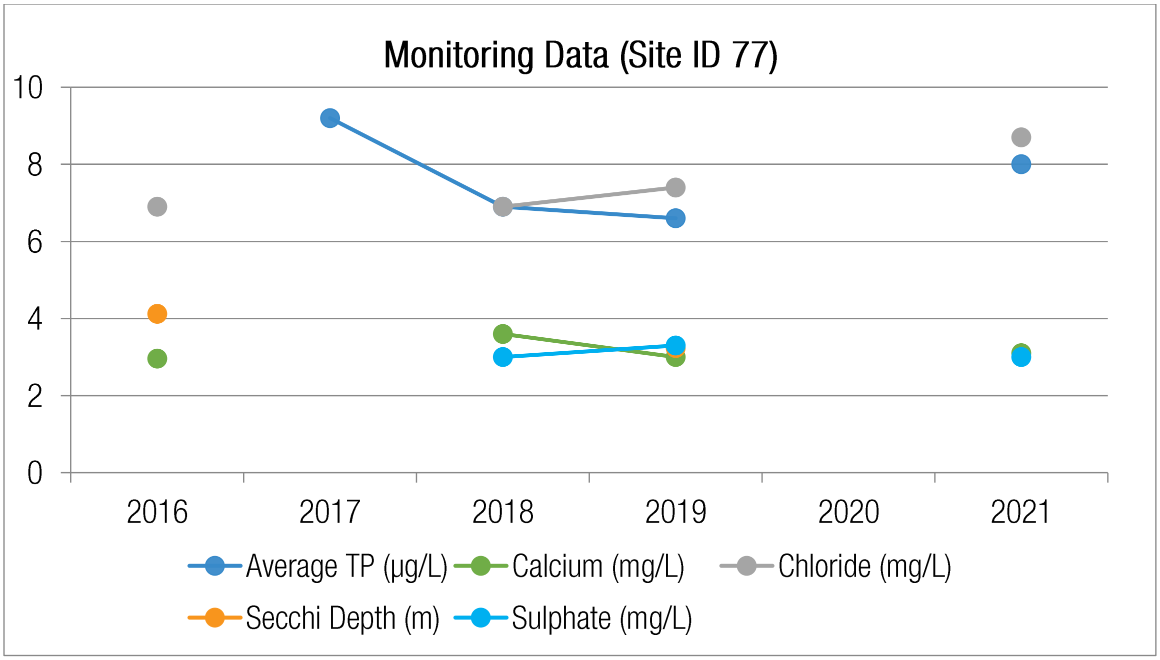

Figure 54. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 77 in Woods Bay.

Blackstone Harbour	
• Station: 7064	• Average TP: 6.9 µg/L
• Site ID: 96	• Average Secchi depth: 3.1 m
• Description: Blackstone Harbour	• Average calcium: 3.1 mg/L
• Data collector: LPP volunteer	• Average chloride: 12.3 mg/L
• Trophic status: oligotrophic	• Average sulphate: 3.0 mg/L

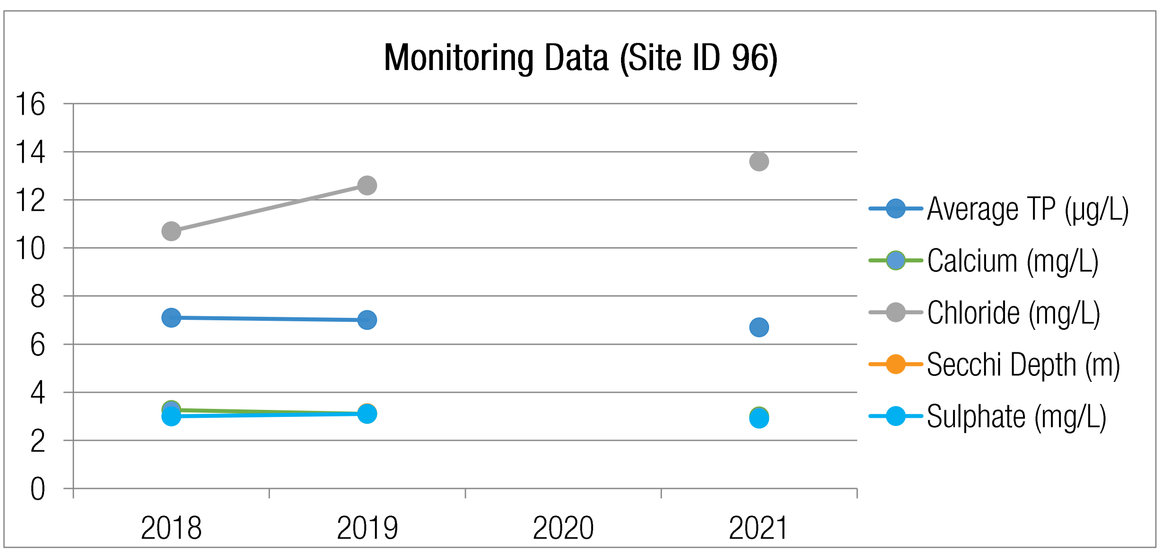

Figure 55. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 96 in Blackstone Harbour.

North Channel	
• Station: 7064	• Average TP: 6.7 µg/L
• Site ID: 97	• Average Secchi depth: 3.4 m
• Data collector: LPP volunteer	• Average calcium: 3.2 mg/L
• Description: North Channel	• Average chloride: 7.9 mg/L
• Trophic status: oligotrophic	• Average sulphate: 3.1 mg/L

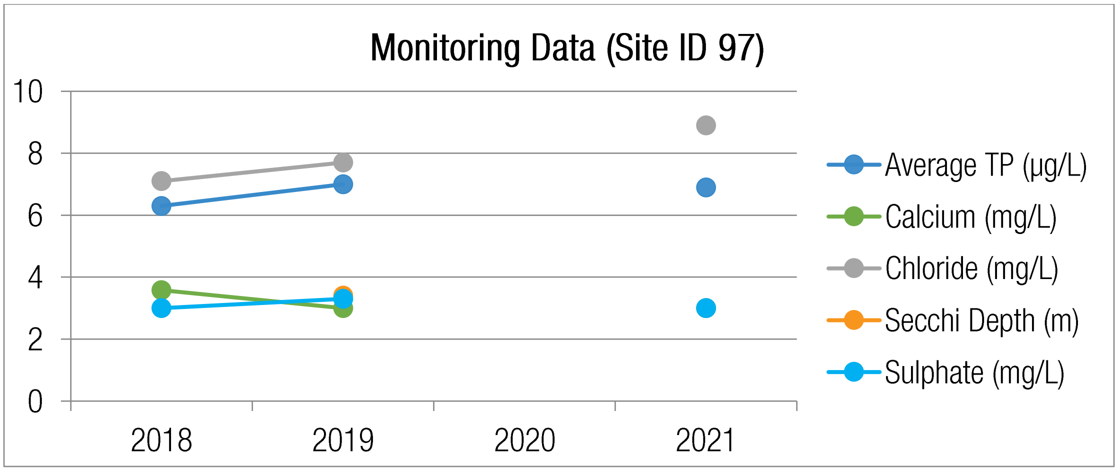

Figure 56. Monitoring data for average TP, Secchi depth, calcium, chloride, and sulphate concentrations at Site 97 in the Woods Bay area.

Enhanced Monitoring Sites

The objectives of enhanced nutrient monitoring efforts in the TOA are:

1) to identify areas that are thermally stratified;
2) to collect vertical dissolved oxygen and temperature profiles; and
3) to collect late summer total phosphorus samples near the bottom to confirm internal loads.

During summer months, many Ontario Shield lakes (that are deep enough) undergo thermal stratification (see Figure 57) whereby the surface water is mixed by wind down to a depth of ~4-7 m. This mixed layer is called the epilimnion. As the summer progresses, the epilimnion will deepen to ~8-10 m. Below the epilimnion, there is a zone where temperatures change very rapidly (getting colder) with depth; this is called the metalimnion. The metalimnion is usually several meters thick. The zone within the metalimnion where temperature changes the most rapidly is called the thermocline. Below the thermocline is the hypolimnion, where temperatures are colder and more stable with depth. During stratification, these waters do not mix with surface water and cannot, therefore, be replenished if they are depleted of oxygen. If all the oxygen is used up (e.g. by bacteria), the hypolimnion becomes anoxic (lacking oxygen); anoxic conditions can cause lake sediments to release stored phosphorus, which then enters the hypolimnion. This is called an internal load, and these additional nutrients can stimulate late summer algal blooms. Therefore, it is important to assess oxygen and nutrient concentrations in the hypolimnion to help predict the onset of conditions that might lead to algal blooms.

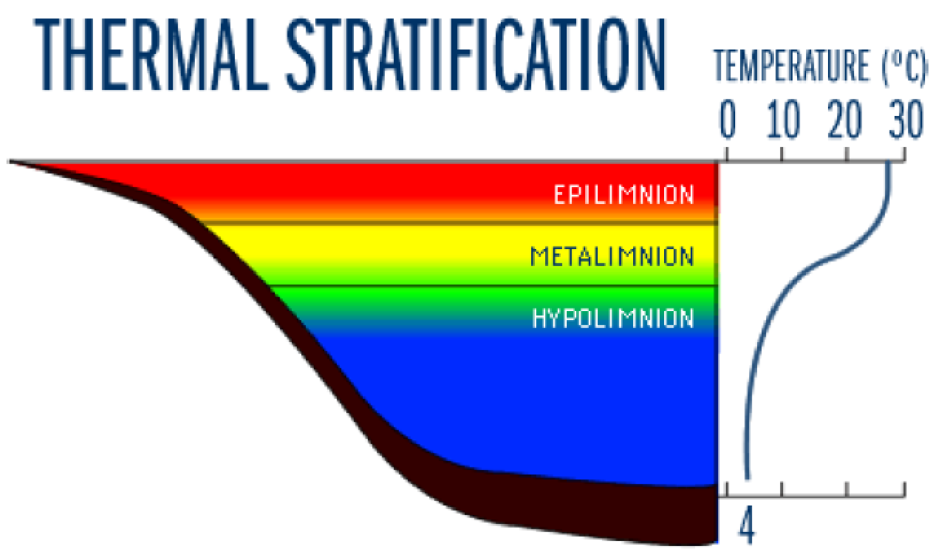

Figure 57. Thermal stratification of a lake into three identifiable layers (source: http://cfpub.epa.gov/watertrain/pdf/limnology.pdf).

In past years, enhanced monitoring has been conducted on Blackstone Lake, Crane Lake, and in Sturgeon Bay. Results for Blackstone Lake and Crane Lake can be found in the 2022 Environment Report and the most recent reporting on Sturgeon Bay can be found in the 2023 Environment Report. More recently, enhanced monitoring began on Healey Lake and Kapikog Lake.

Healey Lake

Temperature and oxygen profiles and TP samples at surface and 1m off bottom were taken at a deep spot in Healey Lake in September each year from 2022-2024. Results are provided in Table 10.

Table 10. Healey Lake TP sampling results for September 2022-2024

Year	TOP			BOTTOM		
	TP 1 (µg/L)	TP 2 (µg/L)	Average TP (µg/L)	TP 1 (µg/L)	TP 2 (µg/L)	Average TP (µg/L)
2022	20.7	5.0	12.9*	43.5	43.5	43.5
2023	7.1	7.1	7.1	11.2	11.1	11.2
2024	7.9	6.8	7.3	19.5	18.8	19.2

*TP1 and TP2 are duplicate TP concentrations which help to verify confidence in the results. If there are major differences between TP1 and TP2, it is likely that one of the two samples was contaminated, for example by zooplankton or other debris. Caution should be exercised when interpreting these results.

As shown in Table 10, the discrepancy between 2022 TP 1 and TP 2 for the top sample make it such that the average TP is not reliable. The 2022 1m off bottom sample indicates elevated TP levels, likely related to oxygen depletion in the bottom waters.

In 2023, TP concentration at 1m off bottom was only slightly elevated compared to the surface sample, despite low oxygen concentrations near the bottom of the lake (Table 11). Similar results were seen in 2024, although TP concentration at 1m off bottom was slightly more elevated than in 2023. Dissolved oxygen concentrations were lower near the bottom in 2024.

Table 11. Temperature and dissolved oxygen measurements for Healey Lake in 2023 and 2024

Depth (m)	September 14, 2023		September 16, 2024	
	Temperature (°C)	DO (mg/L)	Temperature (°C)	DO (mg/L)
1	20.9	8.2	23.0	10.2
2	20.9	8.2	21.4	10.3
3	20.9	8.2	20.3	10.0
4	20.8	8.1	19.7	9.6
5	20.7	8.1	19.4	9.0
6	20.7	8.0	19.1	8.6
7	17.6	3.9	18.8	7.8
8	15.2	2.7	15.8	2.3
9	13.0	2.2	13.3	1.5
10	12.5	2.2	12.4	1.3
11	11.9	2.0	12.2	1.3
12	11.6	2.0	12.1	1.2
13	11.4	2.0	12.0	1.2
14	11.4	1.9	12.0	1.1
15	11.3	1.9	12.0	1.1
16	11.3	1.8	11.9	1.0

Depth (m)	September 14, 2023		September 16, 2024	
	Temperature (°C)	DO (mg/L)	Temperature (°C)	DO (mg/L)
17	11.3	1.8	11.9	0.9
18	11.2	1.7	11.8	0.8
19	11.2	1.6	11.8	0.2
20	11.1	1.6	11.8	0.2
21	11.1	1.6		
22	11.1	1.5		

Kapikog Lake

Temperature and dissolved oxygen profiles and TP samples at surface and 1m off bottom were taken at a deep spot in Kapikog Lake in each September from 2022-2025. TP results from 2022-2024 are provided in Table 12. TP results for 2025 are not yet available and will be presented in a future report.

Table 12. Kapikog Lake TP sampling results for September 2022-2024

Year	TOP			BOTTOM		
	TP 1 (µg/L)	TP 2 (µg/L)	Average TP (µg/L)	TP 1 (µg/L)	TP 2 (µg/L)	Average TP (µg/L)
2022	6.2	5.8	6.0	14.1	14.1	14.1
2023	5.7	4.7	5.2	10.1	11.6	10.9
2024	5.0	6.6	5.8	30.3	49.2	39.8

As shown in Table 12, the 1m off bottom samples for 2022 and 2023 are only slightly elevated compared to the top TP samples. In 2024, the bottom concentration is close to seven times that of the top concentration and close to four times the bottom concentration from the previous year. Given these elevated bottom TP concentrations, it is not surprising that the temperature and dissolved oxygen profiles taken in Kapikog Lake in 2023 and 2024 (Table 13) show very low oxygen levels in the bottom waters.

Table 13. Temperature and dissolved oxygen measurements for Kapikog Lake in 2023 and 2024

Depth (m)	September 13, 2023		September 10, 2024	
	Temperature (°C)	DO (mg/L)	Temperature (°C)	DO (mg/L)
1	21.2	8.7	19.8	10
2	21.2	8.7	19.8	9.9
3	21.2	8.7	19.7	9.9
4	21.2	8.6	19.5	9.8
5	21.2	8.6	19.3	9.7
6	21.2	8.6	19.2	9.7
7	21.2	8.3	17.4	4.8
8	16.0	5.0	14.3	2.4
9	12.7	1.4	11.7	1.6
10	11.3	1.3	10.5	0.7
11	10.0	0.7	9.8	0.3
12	9.4	0.5	9.4	0.2

Depth (m)	September 13, 2023		September 10, 2024	
	Temperature (°C)	DO (mg/L)	Temperature (°C)	DO (mg/L)
13	9.2	0.4	9.1	0.2
14	8.9	0.4	8.9	0.2
15	8.6	0.4	8.9	0.2
16	N/A	N/A	8.8	0.1

Forest Health

There are many concerns over forest pests and diseases threatening local forests. This report provides an overview of featured species which have been found in the Parry Sound-Muskoka District along with links to further information. The report also provides information on beech leaf disease, hemlock wooly adelgid, and oak wilt which have not yet been located in the Parry Sound-Muskoka District, but have been found in southern parts of the province. Key updates in this year's report include:

- Beech leaf disease has been found in municipalities throughout southern Ontario.
- EAB induced mortality was observed in Henvey and Britt townships and along highway 529A. Dieback and mortality caused by EAB was also observed in stands in Grundy Lake Provincial Park.
- In 2025, there was 52,995 ha of moderate to severe forest tent caterpillar defoliation mapped in the MNR Southern Region.
- In 2025, hemlock wooly adelgid was confirmed in St. Catherines, Norfolk County, and the Greater Toronto Area.
- In 2024, there was light defoliation observed along the west side of the French-Severn Forest as a result of introduced pine sawfly. There were no new observations in 2025.
- In 2023, oak wilt was detected in the Niagara region and Township of Springwater in Ontario. All infected trees were removed and there were no new detections in 2024 or 2025.
- In the southern region of Ontario, 150,373 ha of moderate to severe spruce budworm defoliation was mapped in 2025 compared to 86,617 ha in 2024.

Beech Bark Disease

Beech bark disease (BBD) is caused by an insect-fungus complex consisting of a scale insect (*Cryptococcus fagisuga*) and a canker fungus (*Neonectria faginata*). The scale insect feeds on the bark making the beech tree vulnerable to the fungus.

BBD was introduced from Europe to the Halifax area in 1890. It was officially confirmed in Ontario in 1999 and then confirmed in Muskoka in 2010 in the Baysville and Vankoughnet area. BBD continues to have a devastating impact throughout the TOA and greater eastern Georgian Bay and Muskoka regions (Figure 58).

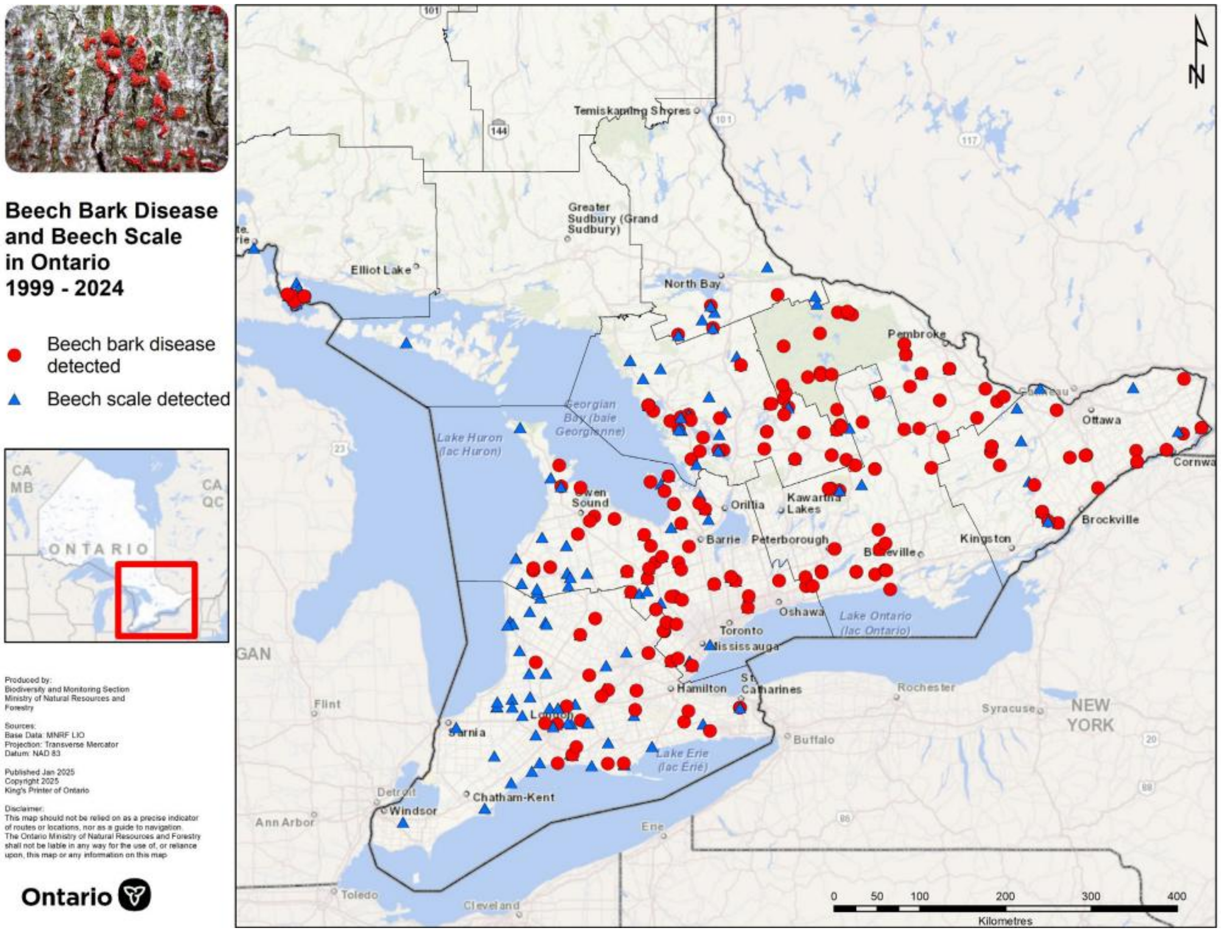

Figure 58. Beech bark disease and beech scale in Ontario 1999-2024 (MNR).

The stages of spread for BBD are known as:

1) The advancing front – characterized by arrival and colonization of the scale insect alone. Scale insects normally do not inflict much harm to the tree.
2) The killing front – characterized by the rapid build-up of scale infestation, canker fungus infection, and canker development. This results in heavy levels of beech tree mortality.
3) The aftermath forest – after the first wave of mortality, remnant beech trees gradually decline. Younger trees become infected and decline over time. There are more understory beech trees growing from the roots of the diseased older trees.

Identification

Mature beech scale insects are 0.5-1.0 mm long. They are most easily recognized by the white, wooly wax covering their outer body (Figure 59).

In the fall, the red fruiting bodies of the canker fungus are visible on the bark (Figure 60).

Figure 59. Scale insects on the bark of a beech tree.

Figure 60. Fungus fruiting bodies on the bark of a beech tree.

Monitoring and Control

Westwind Forest Stewardship continues to monitor the movement of the disease on Treaty/Crown land as well as working on projects with support from the Forestry Futures Trust to control beech regeneration in the French-Severn Forest. The management implication for Treaty/Crown land is that trees with definite BBD or noticeable amounts of scale are removed. Even if they were left standing, the trees' ability to produce mast (fruit) would be short-lived.

In terms of identifying trees that might be resistant to BBD, it is not possible to do so until the majority of trees have been impacted. In an aftermath forest, any remaining healthy beech might be considered resistant.

For more information on beech bark disease, please visit: https://www.invasivespeciescentre.ca/invasive-species/meet-the-species/invasive-pathogens/beech-bark-disease/.

Beech Leaf Disease

Beech leaf disease (BLD) is a disease associated with invasive nemotodes that leads to leaf deformity in beech trees of all ages. It was first detected in Ontario in 2017 but has now been found in municipalities throughout southern Ontario (Figure 61).

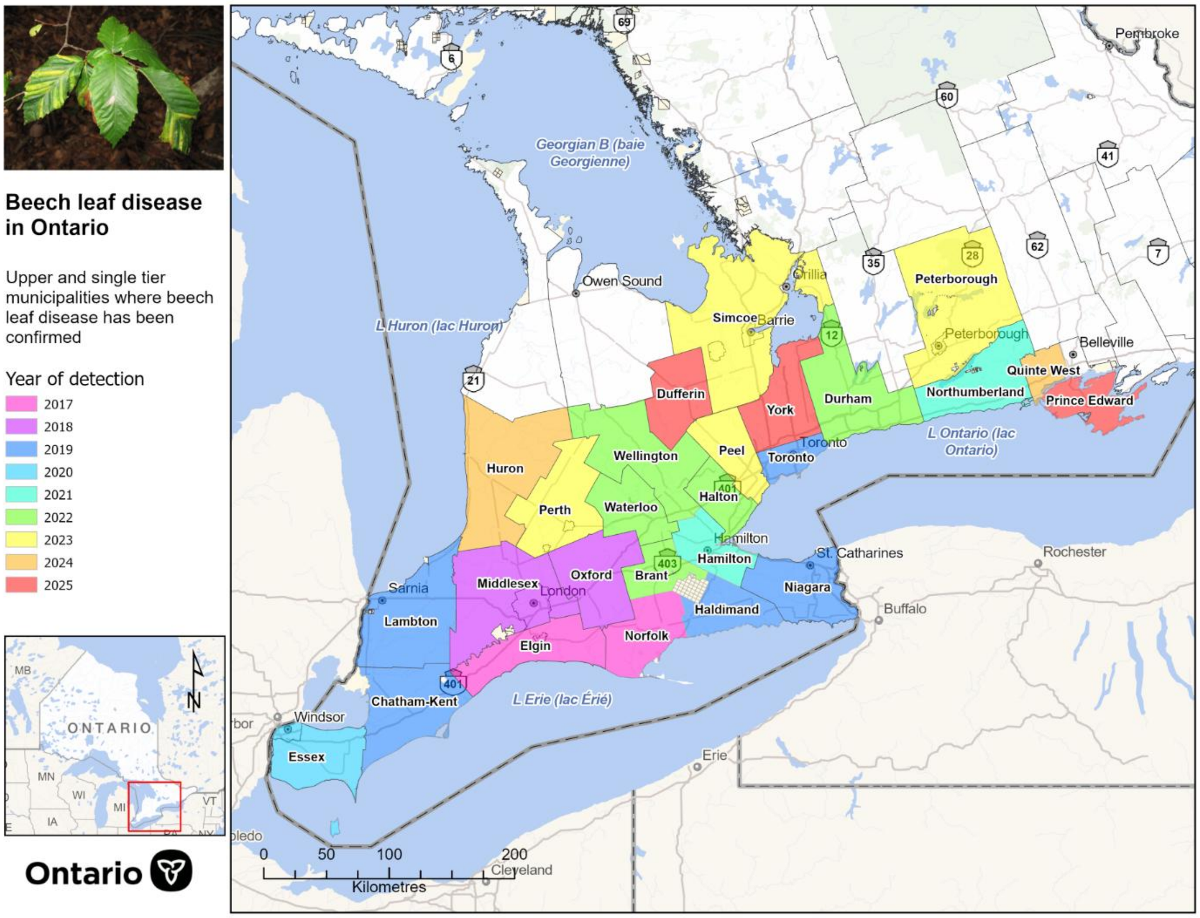

Figure 61. Beech leaf disease in Ontario 2017-2025 (MNR).

Identification

The early symptoms of BLD are dark green stripes or bands between the lateral veins of leaves (Figure 62).

Later symptoms include:

- Thickened leaves that may be yellow, curled, or deformed;
- Leaves may drop early;
- Buds may not develop; and
- Sapling sized trees may die within 2-5 years, older trees take longer to show effects.

Figure 62. Dark green stripes or bands between the lateral veins of leaves indicating the presence of beech leaf disease (Ontario.ca).

Monitoring and Control

No cure has been discovered for beech leaf disease. Avoiding or reducing infection in areas where disease occurs is the best approach.

- Do not move beech saplings, firewood, leaf litter, etc.
- Inspect trees for symptoms and quarantine areas with diseased trees.
- Increase the diversity of tree species on your property.
- Report observations of the disease to EDDMapS (www.eddmaps.org).

For more information on beech leaf disease, please visit: https://www.invasivespeciescentre.ca/invasive-species/meet-the-species/invasive-pathogens/beech-leaf-disease/.

Emerald Ash Borer

Emerald ash borer (EAB) is an invasive species from Asia. It was first discovered in North America in 2002. It has since been spotted throughout southern Ontario and Quebec. EAB has also been confirmed in Thunder Bay and Sault Ste. Marie. EAB affects all types of ash trees in Ontario.

In 2018, the presence of EAB was confirmed in the Muskoka area. In 2019, the presence of EAB was also confirmed in Port Severn, Bala, Parry Island, Parry Sound, and Killbear Provincial Park. Since then, it has continued to spread through the Muskoka/Parry Sound area. In 2024, severe damage caused by EAB was observed on Nares Inlet Road (northwest of Point au Baril). In 2025, EAB induced mortality was observed in Henvey and Britt townships and along highway 529A. Dieback and mortality caused by EAB was also observed in stands in Grundy Lake Provincial Park.

Identification

The defining features of EAB larvae and adults are listed below and shown in Figure 63.

Larvae	Adults
• Creamy-white • 10 bell-shaped abdominal segments • Four instars (stages of larvae) • Fully-mature larvae are 26-32mm long	• Dark metallic green • Elongated bullet-shaped bodies • 8.5mm long and 1.6mm wide • Flat head with black eyes

Figure 63. EAB adult and larvae (edrrontario.ca)

Monitoring and Control

The Canada Food Inspection Agency (CFIA) establishes regulated areas to maintain and enforce restrictions against moving potentially infested wood items from areas where EAB has been found. Generally, restrictions or prohibitions are placed on areas where the pest is present or suspected to occur and where there is merit in trying to slow or prevent the spread of the pest. Items restricted from leaving the regulated areas are:

- Ash nursery stock;
- Ash trees;
- Ash logs;
- Ash wood;
- Rough lumber (including pallets and other wood packaging materials containing ash, wood, bark, wood chips or bark chips from ash trees); and
- Firewood of all tree species.

In areas with an established EAB infection, insecticide treatment or removing trees are the main options for ash trees. Treeazin insecticide can be injected into the base of the tree between May and August by a licensed pesticide applicator. It can be effective for up to two years although in some areas it is recommended that ash trees be treated every year during the first few years of the infection. Alternatively, trees can be removed, particularly if the tree is declining and poses a risk to people or property. Check with your local municipality about tree cutting bylaws before removing trees. Once a tree is cut, ensure the wood is not moved to a new location where it can further spread EAB.

For more information on identifying EAB, please visit:
http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/26856.pdf

Forest Tent Caterpillar

Forest tent caterpillar is a native species to North America. Outbreaks of this insect have occurred on average in Ontario every 10 to 12 years with each outbreak lasting about 3 to 5 years. There was an infestation in the Parry Sound region back in 2017-2018. In 2024, for the first time in a number of years, there were small scattered areas of moderate to severe defoliation mapped in the MNR Southern Region (112 ha). In 2025, there was 52,995 ha of moderate to severe defoliation mapped in this region. In Parry Sound District, most of the mapped defoliation was in the northeast quadrant of the forest as seen in Figure 64.

Identification

Mature forest tent caterpillars are 50 mm long, hairy, dark brown with a blue stripe along each side, and have a row of white keyhole-shaped spots along the centre of the back (Figure 65).

For more information on forest tent caterpillar, please visit:
https://natural-resources.canada.ca/forests-forestry/insects-disturbances/forest-tent-caterpillar

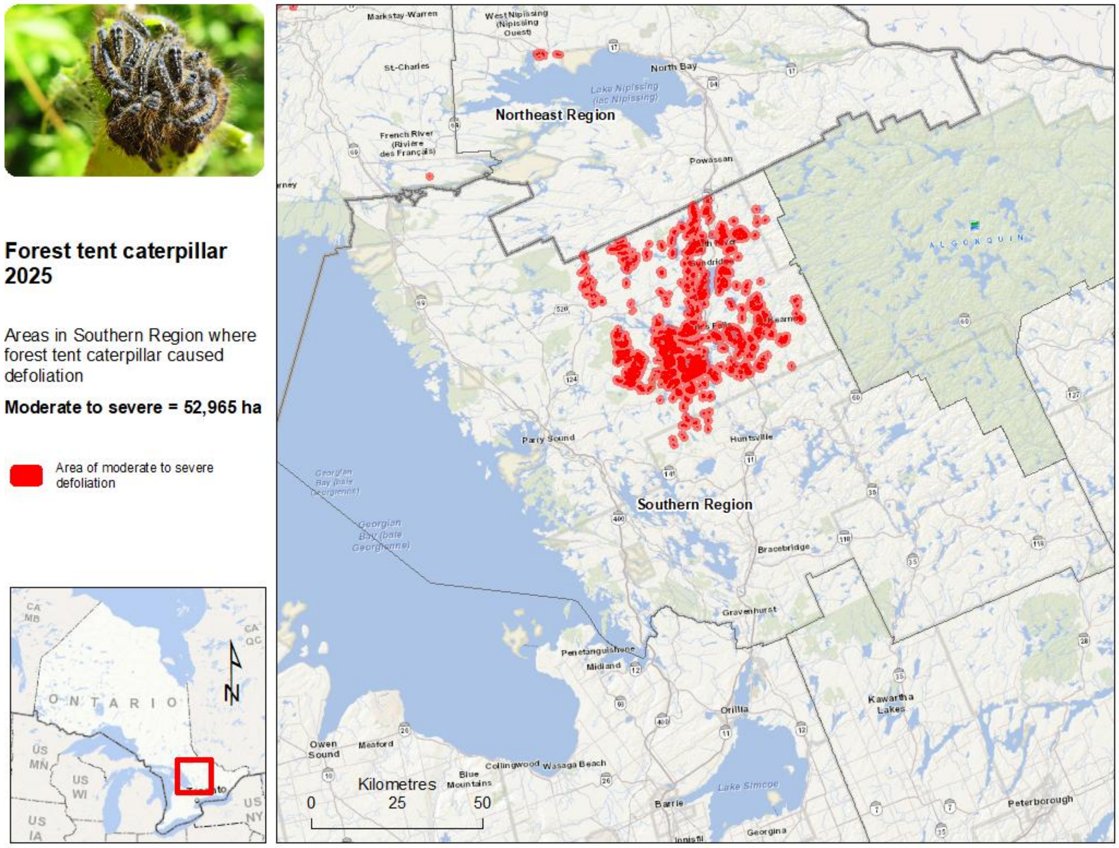

Figure 64. Forest tent caterpillar defoliation in 2025 (MNR).

Figure 65. Adult forest tent caterpillars (MNR).

Hemlock Wooly Adelgid

Hemlock wooly adelgid (HWA) is an invasive species from Japan that attacks and kills hemlock trees. It is an aphid-like insect that feeds on nutrient and water storage cells at the base of needles. It was first discovered in North America in Virginia, USA in the 1950s. It was detected in Ontario for the first time in 2012 in Etobicoke and then in 2013/2014 in the Niagara Glen Nature Reserve near Niagara Falls. These populations were all eradicated.

In 2019, two small populations of HWA were confirmed near Niagara Falls, Ontario and Wainfleet, Ontario (Figure 66). Official control measures were applied to prevent the spread of HWA into non-infested areas. In 2021, HWA was confirmed in a forest area in Fort Erie in Niagara Region. In 2022, the presence of HWA was confirmed in the town of Pelham in the Niagara Region. It was also confirmed in several hemlock trees near Grafton in Northumberland County. Both of these detections were outside the existing regulated areas in Ontario. Following the Grafton observation, there is concern about further HWA spread. It could spread through adjacent hemlock forests in southern and central Ontario faster than it has in more isolated stands previously identified in the Niagara Region.

In 2023, HWA was confirmed in Hamilton, Haldimand County, and Lincoln, Ontario. In 2024, it was confirmed in Port Colborne, Ontario. In 2025, it was confirmed in St. Catherines, Norfolk County, and the Greater Toronto Area.

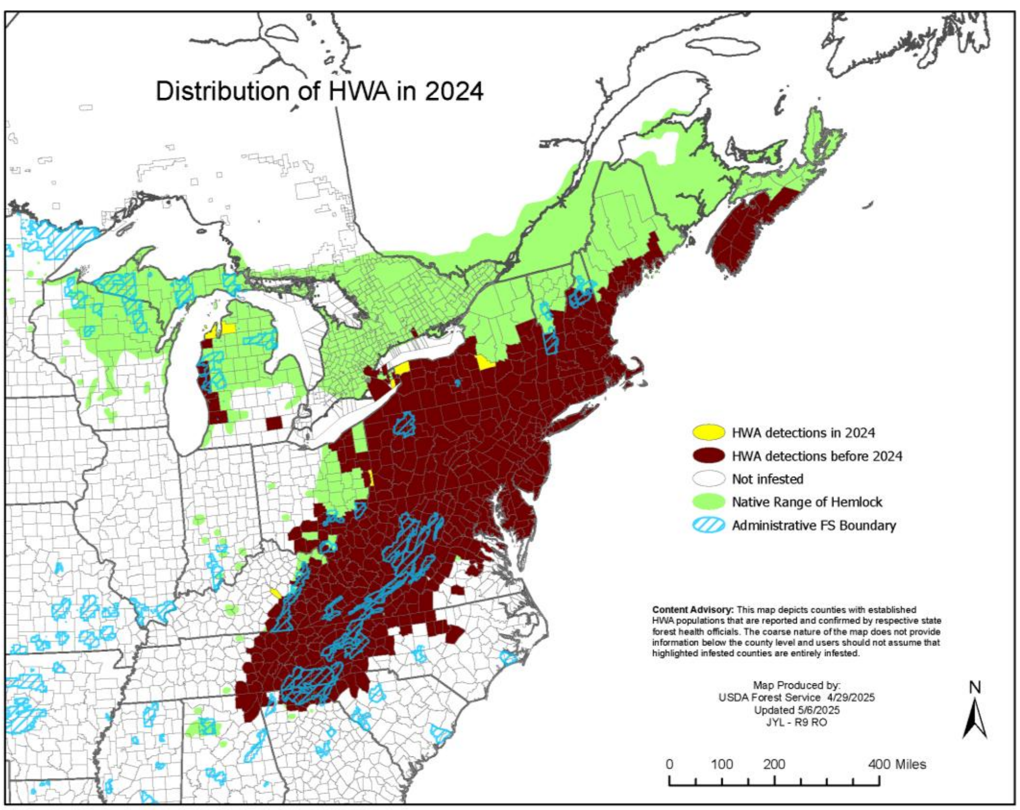

Figure 66. Distribution of HWA in Canada and the USA in 2024 (USDA).

Identification

Signs and symptoms for identifying HWA include:

- White, wooly egg sacs at base of needles (most obvious in spring; Figure 67);
- Premature bud and shoot dieback;
- Premature needle loss;
- Thinner, greyish-green crown;
- Dieback of twigs and branches;
- Discoloured foliage; and
- Tree death (within 4-15 years).

Figure 67. Hemlock wooly adelgid egg sacs at the base of hemlock needles (Margaret Scott).

Monitoring and Control

CFIA establishes regulated areas to maintain and enforce restrictions against moving potentially infested wood items from areas where HWA has been found. Generally, restrictions or prohibitions are placed on areas where the pest is present or suspected to occur and where there is merit in trying to slow or prevent the spread of the pest.

For more information on HWA, please visit:
https://www.inspection.gc.ca/plant-health/plant-pests-invasive-species/insects/hemlock-woolly-adelgid/eng/1325610383502/1325610993895

Introduced Pine Sawfly

Introduced pine sawfly (IPS) is an invasive species that was first found in Ontario in 1931. In 2015, IPS caused light defoliation between French River and Pointe au Baril. In 2019, MNR ground surveys identified light to moderate defoliation caused by IPS on a few white pine trees in Conger Township. In 2024, there was light defoliation observed along the west side of the French-Severn Forest as a result of IPS. There were no new observations in 2025.

The TOA may continue to experience small IPS outbreaks as Treaty/Crown land will not likely be treated for IPS infestations. Like most sawflies, infestations of IPS are short lived as they have many natural predators and other pathogens that keep populations in check.

Identification

IPS larvae have a black head, yellow-green body with yellow or black spots on sides, and a double black stripe along the centre of the back (Figure 68).

Figure 68. IPS larva (Steven Katovich, USDA Forest Service) and IPS cocoon after emergence (Gyorgy Csoka, Hungary Forest Research Institute).

Monitoring and Control

Practices for control should be applied during both IPS generations/hatchings. Typically, the first generation hatches in June and a second in September. Best practices include:

- Killing confirmed larvae;
- On smaller trees, picking off and destroying larvae and unhatched pupal cases; and
- On larger trees, using a water hose to knock larvae from branches to help curtail defoliation.

The application of TreeAzin is another option to control IPS. TreeAzin is a botanical insecticide licensed to BioForest Technologies. Using a hand drill, a hole is drilled in the tree and the insecticide is injected into the tree using a small plunger under low pressure. The tree absorbs the insecticide and distributes it throughout the tree, thus protecting it from IPS larvae.

For more information on IPS, please visit:
https://archipelago2021.municipalwebsites.ca/Pine_Sawfly_Spring2016.pdf

Oak Wilt

Oak wilt is a vascular disease that affects oak trees caused by the fungus *Bretziella fagacearum*. Oak wilt restricts the flow of water and nutrients through the tree and can kill a tree within months of exposure. It is spread through underground roots and beetles. Oak wilt affects all species of oak; however, the red oak group including red, black, and pin oak is the most susceptible while the white oak group including white and bur oak is affected but is more resistant.

In 2016, it was confirmed on Belle Isle which is 579 m from the shores of Windsor, Ontario. In 2023, oak wilt was detected in the Niagara region and Township of Springwater in Ontario. All infected trees were removed and there were no new detections in 2024 or 2025.

Identification

- Discolouration of leaves progressing from the edge to the middle
- Wilting and bronzing of leaves starting at top of crown and progressing downwards
- Premature leaf fall
- Fungal mats just under the bark that emit a fruity smell
- Vertical bark cracks in trunk and large branches

Figure 69. Oak wilt disease symptoms on a leaf (left; bugwood.org) and fungal growth on the sapwood of an infected oak (right; CFIA).

Monitoring and Control

As there is no cure for oak wilt infected trees, avoiding or reducing infection in areas where disease occurs is the best approach. This includes:

- Not moving firewood;
- Not pruning or damaging oak trees between April-July as this is the most vulnerable time for spore spread by insects;
- Identifying and removing diseased trees; and
- Disrupting root connections between diseased and healthy trees.

For more information on oak wilt, please visit: https://www.invasivespeciescentre.ca/invasive-species/meet-the-species/invasive-pathogens/oak-wilt/.

Spongy Moth

Spongy moth (previously referred to as gypsy moth and LDD moth) is an invasive pest that defoliates trees. It was first introduced to North America in the 1860s and first detected in Ontario in 1969. Spongy moth caterpillars defoliate most hardwood tree species including oak, birch, poplar, willow, and maple. Despite being an invasive species, spongy moth has reached a state of naturalization. As a result, the population may have periodic predictable outbreaks occurring every 7-10 years.

In the French-Severn Forest, 75,350 ha of moderate to severe defoliation was mapped in 2021 compared to 2,046 ha in 2020. The following year, the population and impacts of spongy moth were greatly reduced and no spongy moth defoliation was mapped in the Parry Sound District in 2022 (Figure 70).

Egg mass viability surveys completed by the MNR found egg masses below 30 cm, likely under snow cover, did hatch, but a high percentage of egg masses at a height greater than 30 cm did not hatch successfully. This could be attributed to several consecutive days of below -20˚C temperatures during the winter of 2021-2022.

Identification

The defining features of larvae and adult female and male moths are listed below and shown in Figure 71.

Larvae	Adult female moth	Adult male moth
• Full-grown larvae are hairy • 35-90 mm long • Pairs of five blue and six red dots along their backs • Chew holes in leaves or devour entire leaves	• Winged but too heavily bodied for flight • Mostly white • Wingspan 60-70 mm • Prominent dark wavy lines cross the forewings	• Dark brown to beige • Erratic flier • Dark wavy lines cross the forewings • Wingspan 35-40 mm

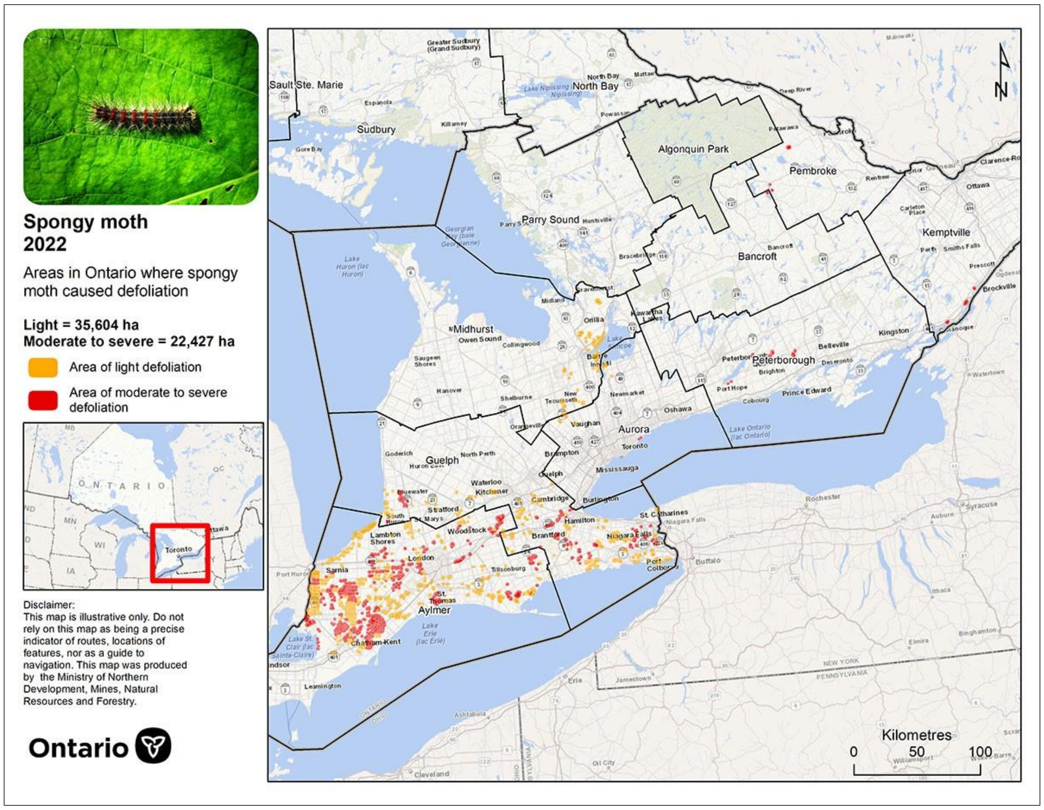

Figure 70. Areas in Ontario where spongy moth caused defoliation in 2022 (MNR).

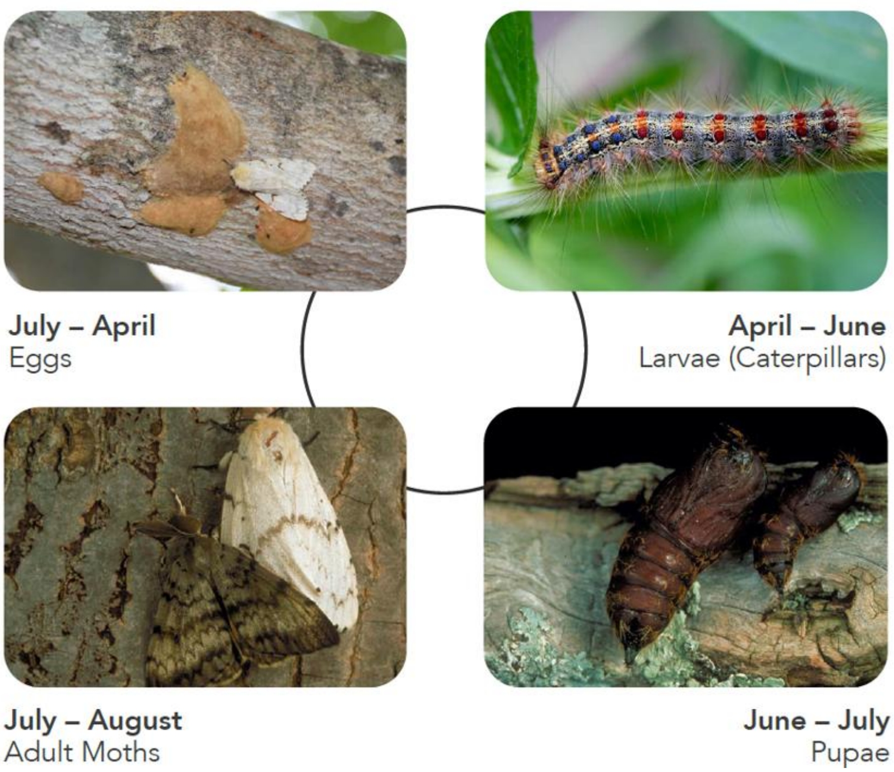

Figure 71. Spongy moth lifecycle (invadingspecies.com/Gypsy-Moth/).

Monitoring and Control

What you can do:

- Become familiar with, and learn to identify, the different life stages of spongy moth.
- Scrape egg masses off surfaces into soapy water. Leave in soapy water for 48 hours before disposing of egg masses.
- During the caterpillar stage, wrap burlap around trees with rope so there is an overhang of material. Caterpillars will collect under the burlap to seek shelter during the day and can be more easily collected and destroyed.
- Report sightings to the toll-free Invading Species Hotline at 1-800-563-7711 or email info@invadingspecies.com

For more information on spongy moth, please read: https://georgianbaybiosphere.com/wp-content/uploads/2022/06/GBB_LDD-info-package_May-5-2022.docx.pdf

Spruce Budworm

Spruce budworm (*Choristoneura fumiferana*) is a pest native to North America that defoliates primarily balsam fir and spruce trees.

In the southern region of Ontario, 150,373 ha of moderate to severe spruce budworm defoliation was mapped in 2025 compared to 86,617 ha in 2024 (Figure 72). Most of the defoliation that was mapped in the French-Severn Forest was in the northeast part of the district. Consecutive years of moderate to severe spruce budworm defoliation can cause mortality in white spruce and balsam fir. Stands exhibiting mortality were scattered throughout the area, particularly near South River and Sundridge.

Identification

The defining features of spruce budworm larvae and adult moths are listed below and shown in Figure 73.

Larvae	Adults
• Black head • Reddish brown body • Two rows of white spots along the back	• Dull grey forewings with brown bands and spots • Light grey hind wings

Spruce budworm larvae emerge in the spring and feed on needles, buds, flowers, and new shoots. Adult moths emerge in late June to early August. Defoliation progresses from the top of the tree downwards. Stands severely impacted by spruce budworm turn a rust colour due to dried out needles. Trees can usually withstand one year of defoliation; however, when combined with other stresses or when defoliation lasts multiple years, growth loss or mortality can result.

For more information on spruce budworm, please read:
https://www.nrcan.gc.ca/our-natural-resources/forests/wildland-fires-insects-disturbances/top-forest-insects-and-diseases-canada/spruce-budworm/13383

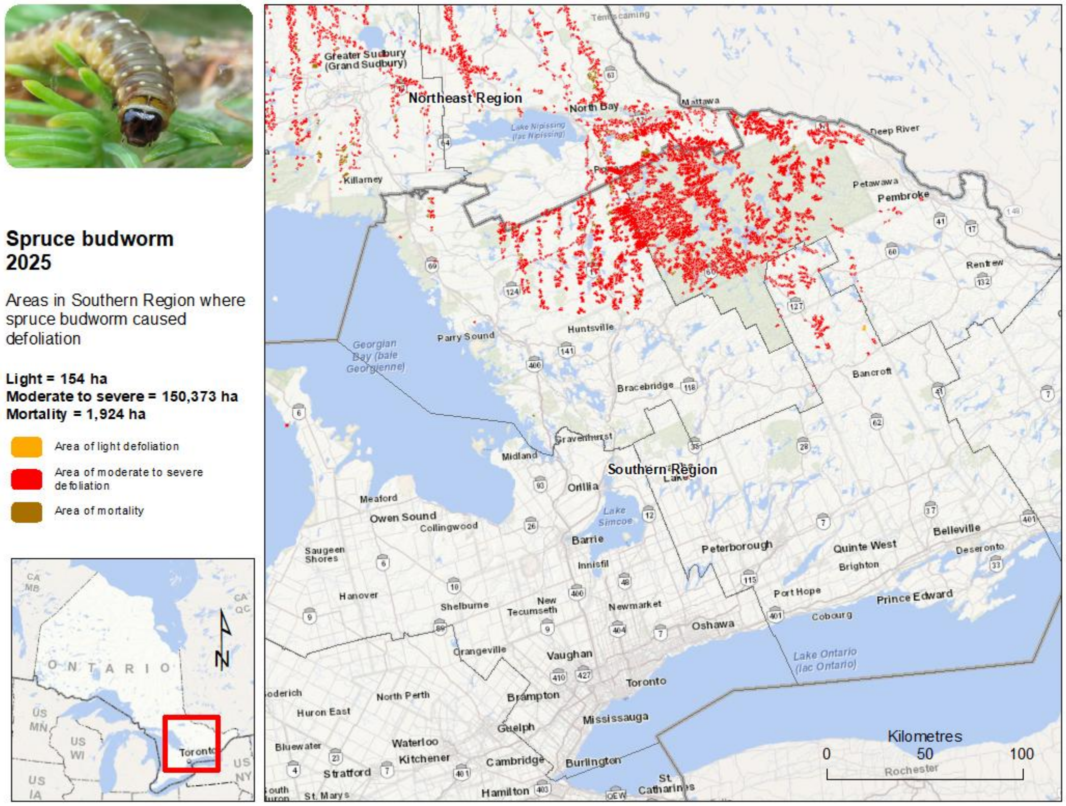

Figure 72. Spruce budworm defoliation in 2025 (MNR).

Figure 73. Spruce budworm larva and adult moth (www.ontario.ca/page/spruce-budworm).

French-Severn Harvest Areas 2026-2027

Each year, Westwind Forest Stewardship creates an annual work schedule which shows areas which may be harvested in that year. This schedule is posted on the Natural Resources Information Portal website. Although this aims to show most areas that will be harvested, some areas are added throughout the year depending on several factors including weather, markets, and logistics. These areas are added by revisions that are also posted on the website. In order to have the most up to date information, please look at both the annual work schedule and any revisions that have been added.

To view areas planned for harvest in the French-Severn Forest, please visit https://nrip.mnr.gov.on.ca/.

- Scroll down to Forestry, click “Forest Management Plans Online”
- Under “Select an area on the forest management unit”, select French-Severn Forest from the drop-down menu (“Select an Option”).
- Scroll down below the map to Annual Work Schedule, click on “Annual Work Schedule – 2026/2027”.
- Under Published Files: scroll down to Annual Work Schedule Maps
- Click “Preview” or “Download” beside Index Map 00.pdf This will open the index map which shows all areas in the French-Severn forest by Map number.
- Find the area you are interested in and the corresponding map number.
- Exit the Index Map.
- Scroll through the list of Operations maps and click on the one with your map number (ignore the 00 at the end of each operations map name). This will open the map.

Areas with a colour corresponding to those shown under PLAN FOREST UNIT – SGR in the Map Legend are areas that may be harvested this year. Table 14 explains what each colour/legend code represents.

Table 14. Description of map legend codes

Legend Code	Forest Unit Name	Silviculture System
HDSEL	Tolerant hardwood selection	Selection
HDUS3	Tolerant hardwood shelterwood	Uniform shelterwood
HESEL	Hemlock selection	Selection
ORUS2	Oak shelterwood	Uniform shelterwood
INTCC	Intolerant hardwood clearcut	Clearcut
MWCC	Mixedwood clearcut	Clearcut
PJCC	Jack pine clearcut	Clearcut
SFCC	Spruce fir clearcut	Clearcut
PWST	White pine seed tree	Clearcut – seed tree
PWUS2	2-cut white pine shelterwood	Uniform shelterwood - 2 cut
PWUS3	3-cut white pine shelterwood	Uniform shelterwood - 3 cut

Silviculture maps showing planting, tending, and site preparation are shown below the operations maps under “Annual Work Schedule Additional Maps”. To view Revision maps, start at the beginning of the steps below, but at the fourth step, click on any of the listed “Annual Work Schedule Changes” to see the individual revision.

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