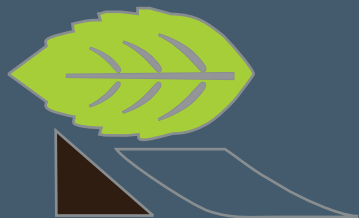


WATER QUALITY INITIATIVE MONITORING PROGRAM Summary Report 2009





RIVERSTONE
ENVIRONMENTAL SOLUTIONS INC.

February 18, 2010
RS#2009-06

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SUBJECT: Water Quality Initiative Monitoring Program Summary Report 2009

Dear Eleanor:

RiverStone Environmental Solutions Inc. is pleased to provide you with the attached Water Quality Initiative Monitoring Program Summary Report 2009

Please contact us if there are any questions regarding the report, or if further information is required.

Best regards,

RiverStone Environmental Solutions Inc.

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1. SUMMARY REPORT

The following report has been prepared to provide a general summary for each of the sampling areas (groups, basins or lakes) that were part of the 2009 Muskoka Lakes Association (MLA) Water Quality Initiative Program (WQI). Each summary page has been prepared using the data collected in 2009, as well as the historical data collected by the MLA. The long-term trends and specific 2009 water quality data were reviewed for each sampling area so that general and specific recommendations could be made for each sampling location. The comments and recommendations provided on the summary pages are intended to increase awareness of the water quality conditions in “your lake neighbourhood” and to promote active involvement in good stewardship practices and programs. In reviewing the summary pages, it is important to recognize that despite all the proactive steps that you take to be good waterfront stewards, your results may not be noticeable on a graph. Your success will be measured more, by the absence of change in the numbers (in terms of a negative trend) and your ability to keep things constant, as well as by the increased participation of all members of your lake community in good stewardship practices. It should be noted that measures taken by MLA members on their properties to improve water quality are also beneficial to other aspects of the natural environment.

2. BACKGROUND

The Muskoka Lakes Association has been conducting a monitoring program since 2001. Each year the water quality monitoring program has grown, with the 2009 program having 170 sampling sites from 46 sampling locations on 11 lakes and 4 rivers in Muskoka and Parry Sound. The monitoring program is conducted through the dedicated efforts of a group of volunteers, both in terms of data collection and management. The MLA staff in Port Carling provides administrative assistance and for 2009 RiverStone Environmental Solutions Inc. has provided scientific and technical support.

3. GENERAL METHODS AND WATER QUALITY PARAMETERS

A detailed description of the WQI program and methods are provided in 2009 Technical Report. The following information provides you with a brief background for the summary pages included in this report. Water quality parameters including phosphorus, total coliform, *Escherichia coli* (*E. coli*) and **Secchi** disk depth were measured every two weeks starting in mid May 2009. In terms of phosphorus, sample date 1 (May 15-May 18) is considered spring turnover, when the lake is not yet stratified and represents the average concentration of phosphorus within the lake. All deepwater (offshore) sites were sampled during this important period. **Secchi** disk depth, a simple method for evaluating water **clarity** or turbidity, was also taken at deepwater sites during spring turnover. Phosphorus was sampled at near shore sites throughout the sampling season in hopes of monitoring nutrient effects from various types of overland run-off. Bacteria sampling for total coliform and *E.*

coli was completed for near shore sites as well as some deepwater locations. Bacterial sampling can help identify biological pollution sources such as failing septic systems or other forms of fecal contamination.

4. **UNDERSTANDING THE SUMMARIES**

Based on the data analyzed in the 2009 Technical Report the water quality conditions in the lakes monitored by the MLA are good to excellent. The summary pages in this report are designed to provide you with a clear description of specific sampling locations, summarize the data collected in the 2009 season, and help you to understand the general water quality trends in your area. Data presented in the summaries are calculated “averages” to give a general view of the overall results for the sampling season. Unusually high phosphorus concentrations were not included in the “averages” as they are not representative of the lake’s true nutrient condition and are more likely the result of a contaminated sample. These values are easily identified as “outliers” when compared to other long-term data in the same sampling area. The summary sheets contain the “average” of the measurements taken from each individual sample site, with site locations shown on the map. Total phosphorus and **Secchi** disk depth “averages” were calculated using the **arithmetic mean** and bacterial samples including, total coliform and *E. coli* were calculated by **geometric mean**. Site descriptions were compiled based on local knowledge, aerial photos, Ontario Base Maps, and information provided by the District Municipality of Muskoka (DMM) by means of surveyed shoreline land use maps and historical lake data. Comments and recommendations are included to increase the understanding of the water quality conditions in “your lake neighbourhood” and to provide options for you to increase your community involvement and be actively involved in water quality and lake health.

4.1. **Total coliforms and *E. coli* Yearly Mean**

Both the *E. coli* and total coliform data are plotted on graphs that use a logarithmic scale on the y-axis (CFU/100 ml). This scale allows you to see the full range of data points that have a large range, without having very small values squished at the bottom of the graph. The **geometric mean** for *E. coli* is shown on the graph as a blue polyline, and reported in cfu/100 mL (that is, the number of colony forming units observed in 100 mL of lake water). The upper limit displayed as a blue dotted line is a reasonable limit established to maintain existing water quality through advice provide by Dr. Karl Scheifer (2003).

The **geometric mean** for **total coliform** is shown on the graph as a red polyline, and reported in cfu/100mL (that is, the number of colony forming units observed in 100 mL of lake water). The upper limit displayed as a red dashed line is the reasonable limit established to maintain existing water quality, again through advice provide by Dr. Karl Scheifer (2003).

4.2. **Total Phosphorus**

The data collected for **spring turnover** phosphorus concentration were compiled in a graphic format that presents data collected in 2009 and all previous sampling years. The graphs also present the MLA data in relation to the DMM **Background** and **Threshold** phosphorus concentrations as calculated in the report-Sensitivity Assessment and Threshold Calculation (Gartner Lee, 2005). DMM **Threshold Concentration** values are represented by a brown dashed line. The DMM **Background Concentration** is displayed as a dark grey dashed line. Total phosphorus as measured by the MLA is shown in µg/L on the y-axis and sampling year is indicated on the x-axis. Definitions for **Threshold** and **Background Concentrations** are found in the definitions section.

4.2.1. **Spring Turnover**

Spring Turnover phosphorus concentration is calculated using the **arithmetic mean** of the spring or mid-May sample, and duplicate, taken from the deepwater site reported for each year of MLA sampling. These values are shown as light blue diamonds. In many years duplicates were not taken and a single spring turnover sample is reported. Only samples collected in the month of May were considered spring turnover.

4.2.2. **Yearly Mean**

Yearly Mean total phosphorus concentration, is calculated as the arithmetic mean using all phosphorus concentration data for the deepwater site within a given summer sampling season. This average concentration is represented graphically as a red line and/or single red circles if consecutive years of samples were not available.

4.2.3. **Background Phosphorus**

Background Phosphorus concentration is the baseline concentration calculated/modelled by the DMM to represent the expected phosphorus concentration within a lake or bay prior to any development, but including all natural sources of phosphorus.

4.2.4. **Phosphorus Threshold**

A lake in the DMM is determined to be “over **threshold**” when (1) the calculated/modelled phosphorus concentration exceeds the **Background concentration** plus 50% (when the lake is modelled based on the existing development), and (2) the actual measured concentration of phosphorus exceeds the **Background** plus 50% (the DMM uses the measured **10-year Average Total Phosphorus** when available).

4.3. Maps

Updated 2008 aerial photos were extracted from the DMM website, and West Parry Sound Geography Network website and labelled to show sampling locations for the 2009 season. Site information was gathered using the MLA Water Quality Results map, with information for the new or changed sites provided by MLA staff or directly from volunteers. Yellow dots indicate nearshore sampling sites, while red stars represent deep water monitoring sites.

4.4. Program Recommendations for 2010-Taken from 2010 Technical Report

Based on the volunteer surveys, observations of the program through the 2009 sampling season, and a complete data review RiverStone would provide the following recommendations for the various components of the WQI program:

Training

- *Require that all team leaders attend training sessions and encourage as many team members as possible to attend.*
- *Review the present sampling locations with Team Leaders and discuss the implications of changing sites. Prepare new maps with sample locations.*

Methods

- *Resume the appropriate QA/QC protocols for phosphorus duplicates and coliform testing (duplicates and field blanks, and consider sending 5% of coliform samples to an accredited lab for testing).*
- *Resume filtering of phosphorus samples using an 80 micron filter.*
- *Continue to have a Field Coordinator to support the volunteers and manage data.*
- *Continue to have the Field Coordinator review data forms and data after every sampling date, including the E. coli results and follow up quickly to obtain missing information.*

Education

- *Continue to work with the Stewardship Initiative Groups and facilitate discussions with the DMM as required to help groups promote good practices in their own back yard as well as have a voice in the greater community.*
- *Continue to monitor the development practices of each municipality and provide input when possible for local official plans and zoning by-laws. Buffers around rivers, streams, and wetland and forest preservation go a long way toward protecting the water quality in the downstream watershed.*
- *Continue to review available public education programs and provide information for such programs on the MLA website. This will assist in promoting Good Stewardship Practices and awareness of Muskoka's Natural Environment with the membership and others.*

Program

- *Continue to review the data from all sites and determine the value of each sampling area and its contribution to the objectives of the WQI monitoring program.*
- *Consider promoting participation in Biological Monitoring Programs. The present WQI monitoring focuses on collecting water chemistry data for the detection of long term change. Biological indicators in a lake can often provide a more sensitive means of detecting change in water quality over the long term than water chemistry. This type of data can support water chemistry information. Biological indicators that are often associated with water quality monitoring include: phytoplankton, aquatic plants, benthic invertebrates*

(bottom dwelling bugs), algae, and fish. The DMM presently offers assistance with the OBBN program (benthic monitoring) offered by the MOE. For some WQI sampling areas it would be beneficial to have a reference sample collected as part of this program for use in future studies. Sampling areas that presently monitor both deepwater and nearshore phosphorus, that also have both developed and relatively undisturbed shorelines are good candidates for this program. Specific areas are recommended in the 2009 Summary Report.

5. **DEFINITIONS**

10-year Average Total Phosphorus: Arithmetic mean of all spring turnover total phosphorus concentration measurements collected within one program over a ten year period. In order for the District of Muskoka to classify a lake or segment as over-**threshold**, the 10-year average of measurements collected by the District of Muskoka through the Lake System Health Monitoring Program (consisting of at least three measurements) must exceed the **threshold** calculated by the Muskoka Recreational Water Quality Model.

Arithmetic mean: This type of average is calculated by adding together a group of numbers and dividing the sum by the number of numbers.

Clarity: Water clarity is a measure of how much light penetrates through the water column. The clarity of water is influenced both by suspended particulate matter (sediment, and plankton) and by coloured organic matter (tea coloured lakes). Clarity can provide some indication of a lake's overall water quality, especially the amount of algae present.

***E. coli*:** Fully known as *Escherichia coli*, it is a subset of total coliforms, and is exclusively associated with fecal waste (Schiefer, 2001) making it a good indicator of faecal contamination. There are several different strains of *E. coli*; most waterborne strains are themselves not harmful, but some (such as *E. coli* O157:H7) can cause serious illness (OMH, 2001).

Geometric Mean: This type of average is calculated by multiplying together a group of n numbers and then taking the n^{th} root of the resulting product. Geometric mean is used to indicate the central tendency or typical value of a set of numbers. It is typically used to calculate average bacteria counts because as a living organism, bacteria counts are highly sporadic and inconsistent.

Lake System Health Monitoring Program: A field-based program designed and operated by the DMM that monitors approximately 192 sample locations across Muskoka on a rotating basis depending upon development pressures and the specific characteristics of the lake. The purpose of the program is to establish a long-term record of key water quality parameters so that trends in water quality can be identified. Spring turnover total phosphorus results of this program inform Muskoka's Recreational Water Quality Model.

Mesotrophic: A mesotrophic lake typically has phosphorus concentrations between 10 and 20 µg/L (Level 2–mid-range, MOE). Mesotrophic lakes are lakes with an intermediate level of productivity, greater than oligotrophic lakes, but less than eutrophic lakes. These lakes are commonly clear water lakes and ponds with beds of submerged aquatic plants and medium levels of nutrients.

Oligotrophic: An oligotrophic lake typically has phosphorus concentrations less than 10 µg/L (Level 1–nutrient-poor, MOE). These lakes have low primary productivity, due to the low nutrient content. These lakes have low algal production, and consequently, often have very clear waters, with high drinking-water quality. The bottom waters of such lakes typically have ample oxygen; thus, such lakes often support many fish species, like lake trout, which require cold, well-oxygenated waters.

OBBN: (Ontario Benthic Biomonitoring Network) The Ministry of the Environment and Environment Canada have developed an aquatic macroinvertebrate biomonitoring network for Ontario's lakes, streams, and wetlands.

The program is built on the principles of partnership, free data sharing, and standardization. The OBBN is biological monitoring program (not chemistry) that uses a reference-condition approach to define criteria: samples from minimally impacted sites define an expectation (the normal range) for biological condition at a test site. Assessments evaluate whether a test site's biological condition is within the normal range. New partnerships, and the ability to generate local information on aquatic condition, will build capacity for adaptive water management and enhance the link between science and decision-making (Jones et al, 2006).

Background Phosphorus: The “Background” phosphorus concentration is the baseline concentration calculated by Muskoka’s Recreational Water Quality Model to represent the expected phosphorus concentration within the lake or bay without any development.

Phosphorus: Phosphorus is a chemical element that is essential for all living cells. Amongst other sources, it is found in fertilizers, soaps, and in human waste. Typically phosphorus is not removed from waste streams by conventional private treatment systems (septic systems) nor by some municipal treatment systems.

Phosphorus Threshold: The “Threshold” phosphorus concentration is 50% more than the baseline (Background) concentration calculated by the District of Muskoka. The threshold is used to classify lakes and bays as requiring a higher level of development control as a precautionary action to protect the long-term health of the lake.

Moderately Developed: Areas where much of the adjacent shoreline is converted to residential or commercial development with docks, houses, and clearing of vegetation for yards, septic, etc. Patches of native vegetation remain, mostly separating lots from each other. No large sections of natural shoreline remain, but native and non-native vegetation cover is found along much of the shoreline.

Muskoka Recreational Water Quality Model: An advanced numerical model operated by the District of Muskoka designed to predict the response of all individual lakes in Muskoka to the input of phosphorus. The model is based on the Ontario Lakeshore Capacity Simulation Model, originally published in 1986 by a Provincial inter-ministerial working group. This model was substantially updated in 2005 by Dr. Neil Hutchinson of Gartner Lee Ltd. for the District of Muskoka (GLL, 2005). The model includes a detailed phosphorus budget. Its inputs are the results of the District’s Lake System Health Monitoring Program. Among the model’s outputs is lake-specific Natural Phosphorus, Phosphorus Threshold and predicted phosphorus concentrations.

Sampling Area: A geographic location encompassing a group of WQI monitoring sites.

Secchi Depth: A measure of water **clarity**, measured using a Secchi disk - a small disk attached to a rope. Alternating quarters of the top side of the disk are coloured white and black. The Secchi depth is the depth of water whereby the sampler can no longer distinguish the white and black quarters of the disk.

Site: The discrete and unique location where samples are to be collected on each sample date.

Spring Turnover Phosphorus: A single phosphorus concentration measurement taken in a typically stratified lake during the spring turnover period. This measurement has been shown to adequately represent the overall phosphorus concentration in a lake (Clark, 1992). Typically the spring turnover lasts for a few days when the temperature of the entire water column is consistent (usually 4°C) allowing the water column to mix. In practice, measurements taken anytime in May are considered to be adequate by Ontario’s Ministry of the Environment (http://www.ene.gov.on.ca/envision/water/lake_partner/index.htm).

Yearly Mean Phosphorus: The arithmetic mean of phosphorus concentration measurements taken above a stratified water column’s thermocline over the ice-free period. **Note: yearly mean phosphorus concentration as reported by the WQI is for summer months only.**

Total Coliform: Coliform include a variety of bacteria. In practice, detectable coliform are usually enteric, found in the intestinal tracts of humans and other warm-blooded species.

Note many of these definitions have been taken from the WQI Monitoring Program Summary Report- Citizens Environment Watch 2009.

6. REFERENCES

Maps: <https://maps.muskoka.on.ca/exponare/publicapplication1280x1024.aspx>

<http://www.wpsgn.ca/default.html>

http://www.mla.on.ca/Page.asp?PageID=1224&SiteNodeID=213&BL_ExpandID=39

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Gartner Lee Limited (GLL), June 2005. Recreational Water Quality Management in Muskoka. Gartner Lee Limited, Bracebridge ON. 98 pp.

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ARTHURLIE BAY (ART)

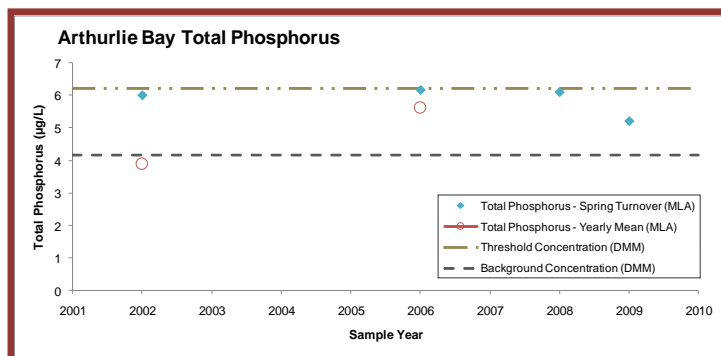


Area Description

Arthurlie Bay is in the southern basin of Lake Rosseau. The bay is quite shallow in the southern end. Development intensity is considered moderate to high, with some shoreline properties having extensive cleared areas. This bay has several lacustrine wetlands, some of which appear to be partially filled. One creek drains into the bay, flowing through agricultural land prior to entering the lake.

Volunteer Recognition

Arthurlie Bay was monitored in 2009 by Peter Seybold.



2009 Data

ART-0:TP-Spring turnover=5.1 µg/L
Secchi=3.00 m

*this is a single spring sample site

Recommendations & Comments

- Lake Rosseau at Arthurlie Bay has good water quality characteristic of an oligotrophic or low nutrient lake.
- Promote good shoreline stewardship to maintain water quality.
- Prevent loss of any more wetland areas.

Trends

Monitoring of Arthurlie Bay started in 2002. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. The overall trend in spring phosphorus is declining over time. The lowest concentration of phosphorus since the start of the monitoring program was documented in 2009. Total coliform and *E. coli* were not monitored at this location.

ARUNDLE LODGE (ARN)

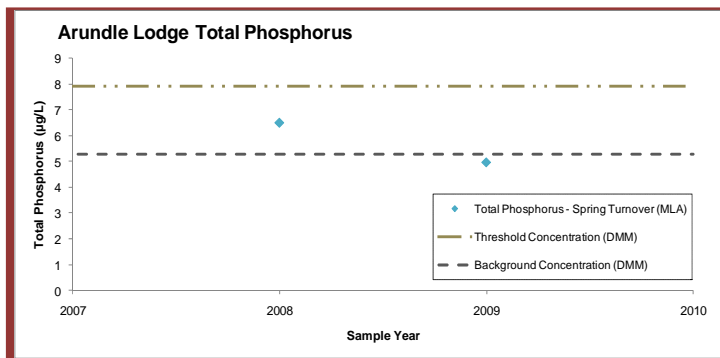


Area Description

The Arundle Lodge sampling area is in the eastern portion of Lake Muskoka. This is a moderately developed area with several creeks that outlet into the bay. There are few roads or other major development features to affect water quality in this sample area.

Volunteer Recognition

The deep water site at Arundle Lodge was monitored in 2009 by Brian Yeates and Diane Yeates.



2009 Data

ARN-0: TP-Spring turnover=5.0 µg/L
Secchi=3.25 m

*This was a single spring sample site

Recommendations & Comments

- Muskoka Lake at Arundle Lodge has water quality water clarity characteristics of oligotrophic or low nutrient lake.
- Promote good shoreline stewardship to maintain water quality for the long term.

Trends

Between 2008 and 2009, spring turnover phosphorus concentrations are generally decreasing, with 2009 values similar to background concentrations. Total coliform and *E. coli* were not measured at this site.

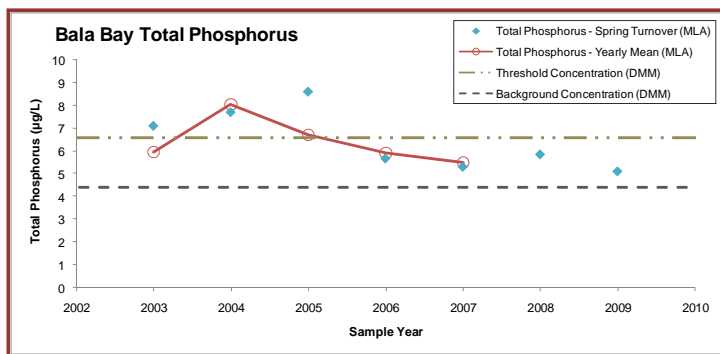


Area Description

Bala Bay is a large isolated bay in the eastern part of Lake Muskoka. Most of the bay is densely developed but there is intact forest cover along most of the shoreline area. Drainage from the village of Bala does enter the bay along the western shore. The entire Muskoka River Watershed drains through Bala Bay into the Moon River System. There are also two small wetlands that drain into the bay.

Volunteer Recognition

Bala Bay was monitored in 2009 by Eleanor Lewis.



2009 Data

BAL-0: TP-Spring turnover=5.1 µg/L
Secchi=2.50 m

*this was a single spring sample site

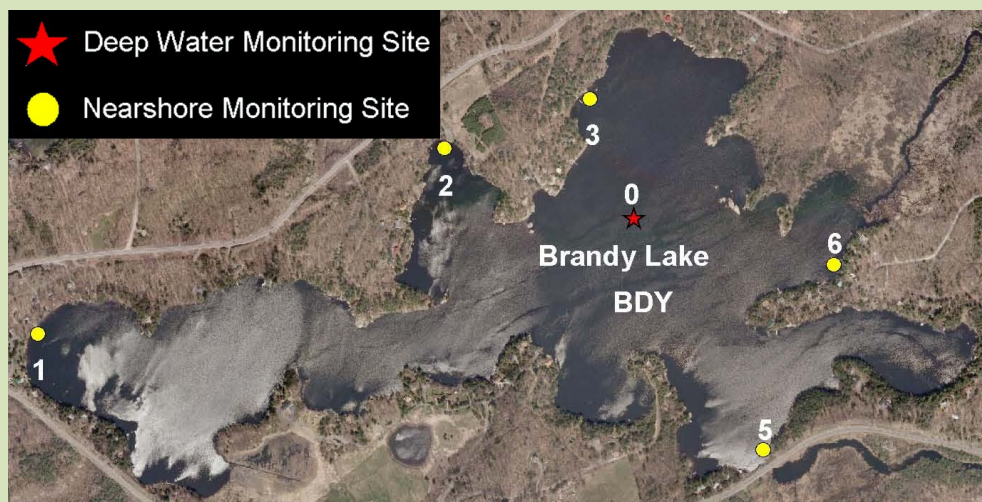
Recommendations & Comments

- Lake Muskoka at Bala Bay has water quality and clarity values characteristic of oligotrophic or low nutrient lakes.
- Promote good shoreline stewardship to maintain good water quality.

Trends

Monitoring of Lake Muskoka in Bala Bay started in 2003. Since that time spring turnover phosphorus concentrations have fluctuated between the background and over threshold concentrations, with 2003 to 2005 being over threshold. 2009 was the lowest value recorded since 2003. Total coliform and *E. coli* were not measured at this site.

BRANDY LAKE (BDY)

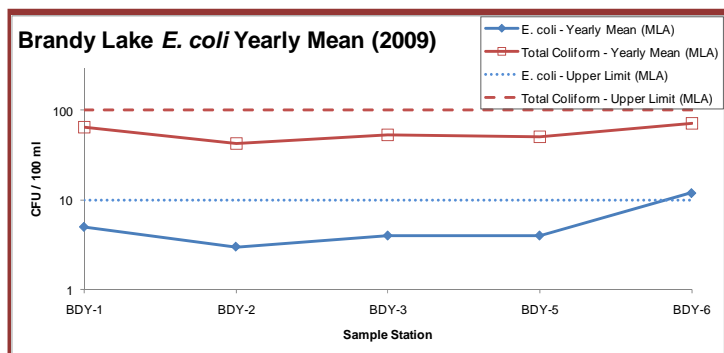
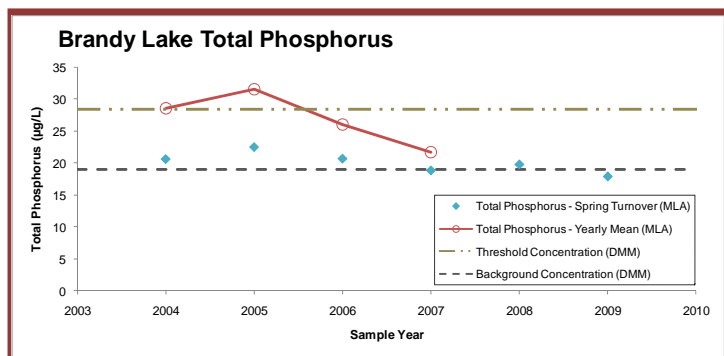


Area Description

The shoreline of Brandy Lake is moderately developed with many residences and access roads. A large number of the properties maintain a natural shoreline but there is close to 10% un-buffered lawn. Approximately 40% of the lake shoreline is natural wetland. In the eastern portion of the lake there is a large wetland with a creek outlet; a second creek located to the southeast. Brandy Lake is a dystrophic or “tea-coloured” lake, which is naturally rich in carbon.

Volunteer Recognition

Brandy Lake was monitored in 2009 by Tony Mathia, Peter Sale, Donna Sale, and Gary Staley



Trends

Monitoring in Brandy Lake started in 2004, with phosphorus showing a consistent downward trend, both at spring turnover and based on the yearly mean. Total coliforms and *E. coli* are fairly consistent between sampling locations, suggesting that these are the natural background levels for this lake.

2009 Data

BDY-0: TP-Spring turnover = 17.9 µg/L*
Secchi = 1.25 m

BDY-1: Total coliforms = 64 CFU/100 ml
Total *E. coli* = 5 CFU/100 ml

BDY-2: Total coliforms = 43 CFU/100 ml
Total *E. coli* = 3 CFU/100 ml

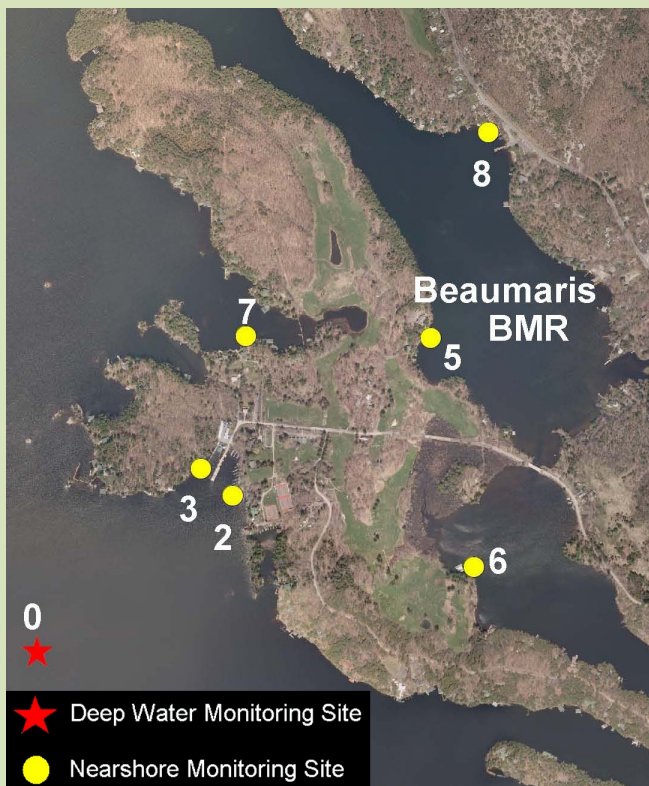
BDY-3: Total coliforms = 53 CFU/100 ml
Total *E. coli* = 4 CFU/100 ml

BDY-5: Total coliforms = 50 CFU/100 ml
Total *E. coli* = 4 CFU/100 ml

BDY-6: Total coliforms = 72 CFU/100 ml
Total *E. coli* = 12 CFU/100 ml
*duplicate samples skewed (13.8/21.9)

Recommendations & Comments

- Brandy Lake is a mesotrophic lake/bordering on eutrophic. The large numbers of wetlands within the watershed make it a naturally productive lake.
- Coliform values are within the expected range for lakes in Muskoka, with Site 6 having the highest values.
- Promote good shoreline stewardship, and focus the monitoring efforts away from the natural wetlands, as their input to phosphorus and coliforms is naturally high.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

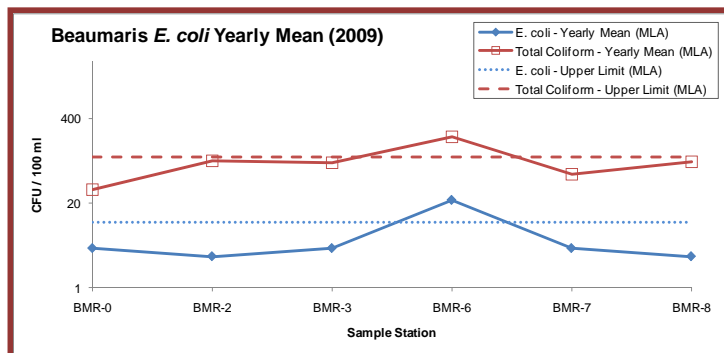
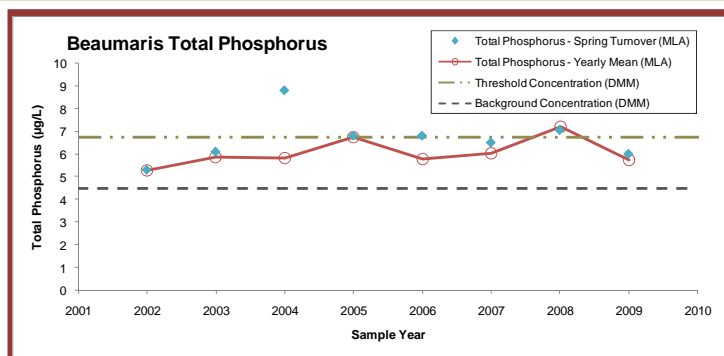


Area Description

This island in the Milford Bay area of northeastern Lake Muskoka is approximately 132 ha in size. A golf course takes up much of the island, which is associated with a resort and marina. Most of the natural shoreline vegetation is intact, but there are many large boathouses in this area. There is a large wetland to the east where the causeway joins the mainland and island. BMR-8 is located near the mainland where Milford Bay road is in close proximity to Lake Muskoka.

Volunteer Recognition

The Beaumaris samples were collected in 2009 by Louise Cragg, Chris Cragg, Allen Flye, Eliza Nevin, and Helen Servick.



2009 Data

BMR-0: TP-Spring turnover=6.0 µg/L

TP-Yearly mean=5.8 µg/L

Secchi=2.78 m

Total coliforms=32 CFU/100 ml

Total *E. coli*=4 CFU/100 ml

BMR-2: TP-Yearly mean =7.1 µg/L

Total coliforms=88 CFU/100 ml

Total *E. coli*=3 CFU/100 ml

BMR-3: Total coliforms=84 CFU/100 ml

Total *E. coli*=4 CFU/100 ml

BMR-6: TP-Yearly mean =8.1 µg/L

Total coliforms=206 CFU/100 ml

Total *E. coli*=22 CFU/100 ml

BMR-7: TP-Yearly mean =6.7 µg/L

Total coliforms=55 CFU/100 ml

Total *E. coli*=4 CFU/100 ml

BMR-8: TP-Yearly mean =7.5 µg/L

Total coliforms=86 CFU/100 ml

Total *E. coli*=3 CFU/100 ml

*Began sampling in week two

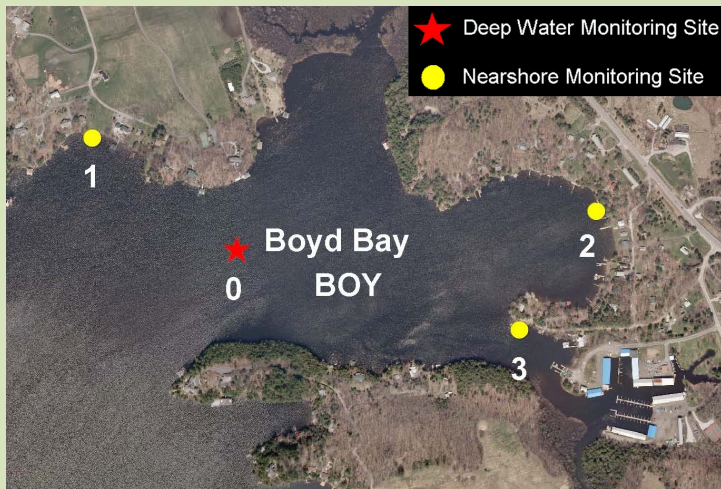
Recommendations & Comments

- Lake Muskoka at Beaumaris has water quality characteristics typical of an oligotrophic lake.
- Coliform values are within the expected range for lakes in Muskoka, with Site 6 (adjacent to a wetland) having slightly elevated values.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Site 6 in 2010.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

Trends

Monitoring of Lake Muskoka at Beaumaris started in 2002. Since that time spring turnover phosphorus concentrations have fluctuated between the background and over threshold concentrations, with 2004 and 2008 being over threshold. 2009 was the second lowest value recorded since 2002. Total coliform and *E. coli* were elevated at Site 6, which is adjacent to a lacustrine wetland.

BOYD'S BAY (BOY)

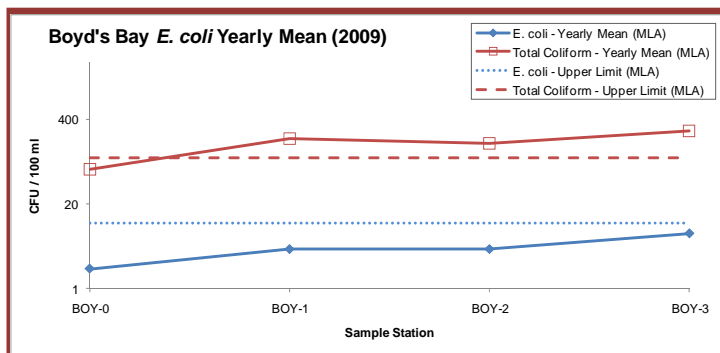
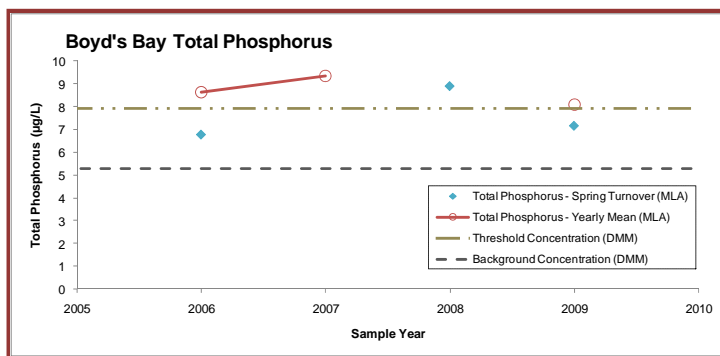


Area Description

Boyd Bay is a small bay in the central part of eastern Lake Muskoka. The water quality in Boyd Bay is influenced by several natural and man-made features; including a marina in southeast, a large wetland in the north, Highway 118 to the east and several inflowing creeks. The creeks that drain into the bay are potentially influenced by agricultural areas. Much of the shoreline is developed and many residential properties have manicured lawns along the shoreline.

Volunteer Recognition

Boyd Bay was monitored in 2009 by Chris Blaymires, Rayma Blaymires, John Jarvis, Thelma Jarvis, Dave Langford, and Lynne Langford.



Trends

Monitoring of Boyd Bay started in 2006. Since that time spring turnover phosphorus concentrations have fluctuated around the threshold value, with the yearly mean also above threshold, but showing a declining trend. Data collected in 2009 had spring values below threshold. Total coliform values are elevated at Sites 1, 2 and 3, with *E. coli* showing a similar trend.

2009 Data

BOY-0: TP-Spring turnover=7.2 µg/L
TP-Yearly mean=8.0 µg/L
Secchi=2.57 m
Total coliforms=67 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

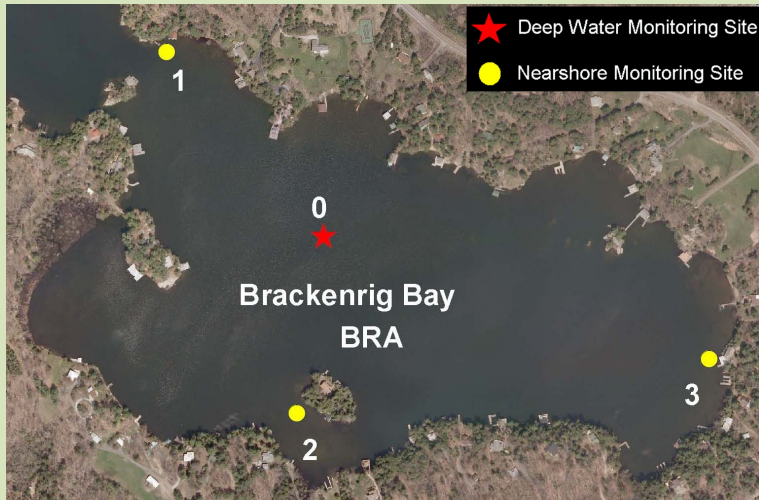
BOY-1: TP-Yearly mean=8.7 µg/L
Total coliforms=200 CFU/100 ml
Total *E. coli*=4 CFU/100 ml

BOY-2: TP-Yearly mean=9.9 µg/L
Total coliforms=168 CFU/100 ml
Total *E. coli*=4 CFU/100 ml

BOY-3: TP-Yearly mean=17.5 µg/L
Total coliforms=264 CFU/100 ml
Total *E. coli*=7 CFU/100 ml

Recommendations & Comments

- Lake Muskoka at Boyd Bay is considered to have oligotrophic or low nutrient conditions, with good water quality and clarity.
- Coliform values are elevated above the expected range for lakes in Muskoka at Sites 1, 2 and 3.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Sites 1, 2 and 3 during 2010 sampling.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

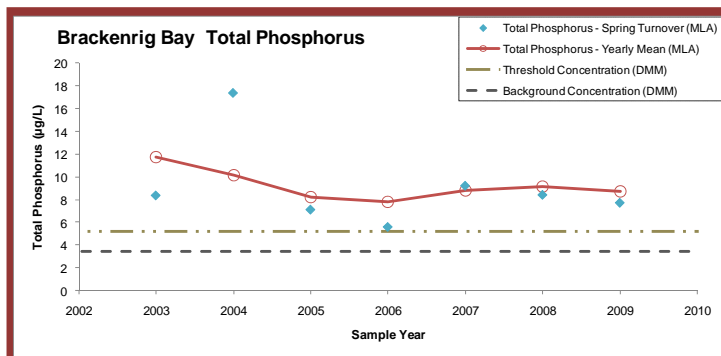


Area Description

Brackenrig Bay is located in southern Lake Rosseau, is approximately 0.44 km² in area and has a maximum depth of 3m. This isolated bay is moderately developed with residential properties. Approximately 20% of the immediate shoreline has been altered with over 60% of backlot areas cleared of natural forest. Four creeks drain into the bay, one which flows through an agricultural area adjacent to a garden center before entering the lake. Brackenrig Road comes in close proximity to the lake along the northeast shoreline. Brackenrig Bay has been classified as moderately sensitive and over threshold by the DMM.

Volunteer Recognition

Brackenrig Bay was monitored in 2009 by Janet Palmer, Bud Purves and Arianne Purves.



Trends

Monitoring of Brackenrig Bay started in 2003. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2006, with 2009 values approaching the threshold value. Total coliform and *E. coli* were not monitored at this location.

2009 Data

BRA-0: TP-Spring turnover=7.7 µg/L
TP-Yearly mean=8.6 µg/L
Secchi=2.59m

BRA-1: TP-Yearly mean=8.9 µg/L

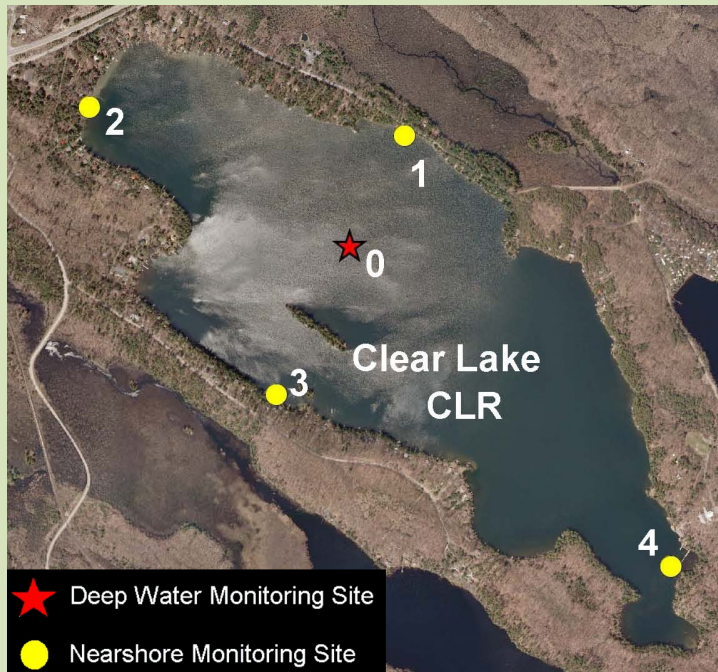
BRA-2: TP-Yearly mean=8.3 µg/L

BRA-3: TP-Yearly mean=8.3 µg/L

*many of the higher samples > 10 had notes that samples were below line.

Recommendations & Comments

- Lake Rosseau at Brackenrig Bay has water quality characteristic of an oligotrophic or low nutrient lake, that is currently elevated above the DMM threshold value.
- Promote good shoreline stewardship to maintain and improve water quality.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.
- The Stewardship Initiative Group should have discussions with the DMM about development of an area specific stewardship plan.

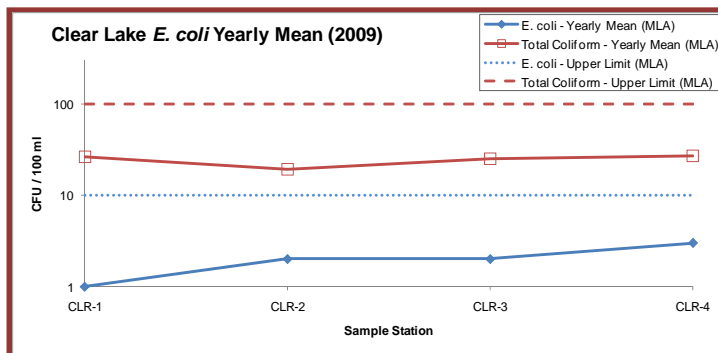
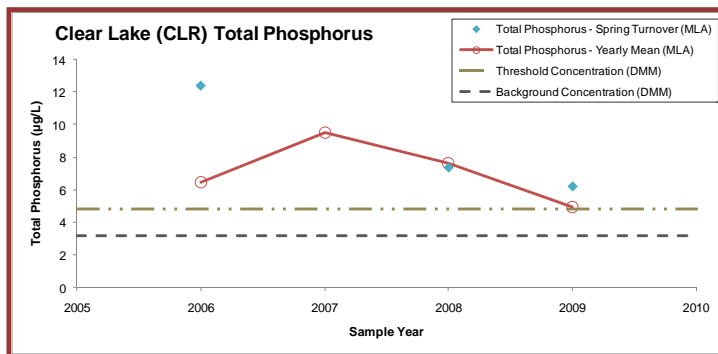


Area Description

Clear Lake, also called Torrance Lake, is a moderately developed lake with much of the shoreline area converted into residential lots. It is also adjacent to highway 169. This lake is 152 ha in size, has a maximum depth of 16 m and has a very small watershed. There is limited inflow and outflow of water on this lake. Clear Lake has been classified as moderately sensitive and over threshold by the DMM.

Volunteer Recognition

This lake was monitored in 2009 by Bob Cleverdon and Sharon Cleverdon.



Trends

Since 2006 there has been a general decrease in total phosphorus, both at spring turnover and based on the yearly mean. Total coliforms and *E. coli* are fairly consistent between sampling sites, with the exception of Site 4 which appears to have slightly elevated *E. coli* as compared to other sites.

2009 Data

CLR-0: TP-Spring turnover=6.2 µg/L
TP-Yearly mean=4.9 µg/L
Secchi=6.55 m

CLR-1: TP-Yearly mean=9.5 µg/L
Total coliforms=26 CFU/100 ml
Total *E. coli*=1 CFU/100 ml

CLR-2: TP-Yearly mean=6.5 µg/L
Total coliforms=19 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

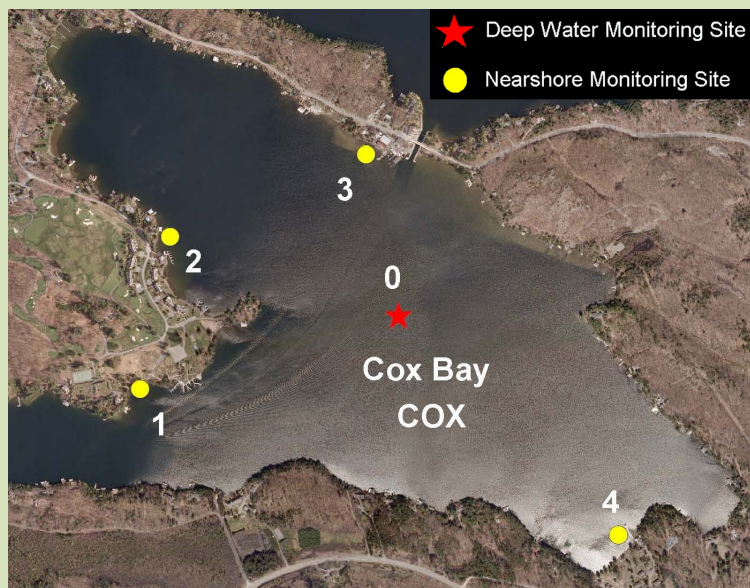
CLR-3: TP-Yearly mean=5.8 µg/L
Total coliforms=25 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

CLR-4: TP-Yearly mean=5.5 µg/L
Total coliforms=27 CFU/100 ml
Total *E. coli*=3 CFU/100 ml

Recommendations & Comments

- Clear Lake is an oligotrophic or low nutrient lake, with good water quality and clarity.
- Coliform values are within the expected range for lakes in Muskoka, with Site 4 having the highest values.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Site 4 during 2010 sampling.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

COX BAY (COX)

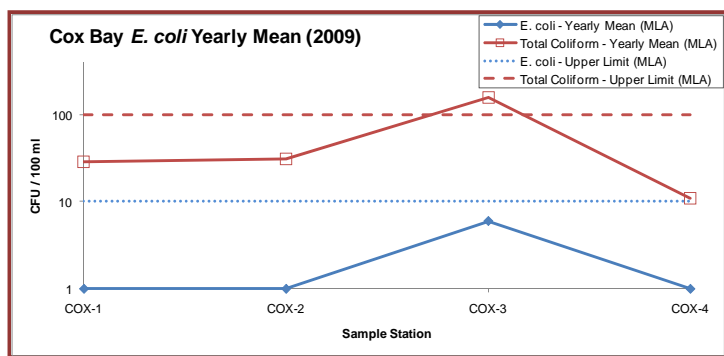
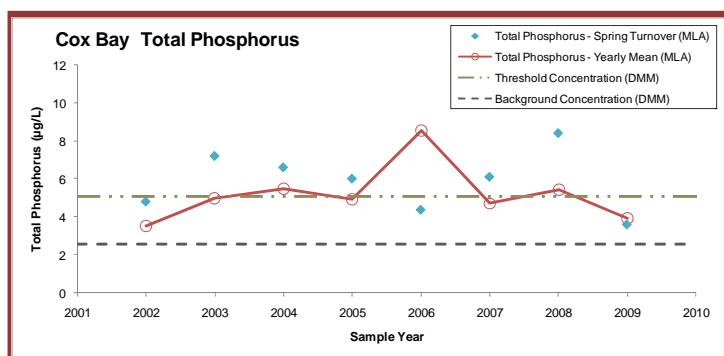


Area Description

Cox Bay is the southernmost bay of Lake Joseph. The bay area is 1.84 km² in area and has water depths of up to 12m. A large resort and golf course are located adjacent to the lake, along with two marinas and a canal crossing into Lake Rosseau at Port Sandfield. Most of the shoreline area is developed, but many residences maintain a forested cover on their properties. More than 15% of the shoreline is open lawn, pavement or is intensely landscaped. Cox Bay is classified as moderately sensitive and over-threshold by the DMM.

Volunteer Recognition

Cox Bay was monitored in 2009 by Gord Ross and Keith Shantz.



Trends

Monitoring of Cox Bay started in 2002. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009. Total coliform and *E. coli* were elevated at Site 3.

2009 Data

COX-0: TP-Spring turnover=3.6 µg/L
TP-Yearly mean=3.8 µg/L
Secchi=5.14 m

COX-1: TP-Yearly mean=4.2 µg/L
Total coliforms=29 CFU/100 ml
Total *E. coli*=1 CFU/100 ml

COX-2: TP-Yearly mean=4.7 µg/L
Total coliforms=31 CFU/100 ml
Total *E. coli*=1 CFU/100 ml

COX-3: TP-Yearly mean=5.8 µg/L
Total coliforms=158 CFU/100 ml
Total *E. coli*=6 CFU/100 ml

COX-4: TP-Yearly mean=4.0 µg/L
Total coliforms=11 CFU/100 ml
Total *E. coli*=1 CFU/100 ml

Recommendations & Comments

- Cox Bay is highly developed and used as a transportation corridor connecting Lakes Rosseau and Joseph. Despite it being a high activity centre it still has water quality conditions characteristic of oligotrophic or low nutrient lakes and good clarity.
- Coliform values are on the high side at Site 3 for lakes in Muskoka. This may be related to urban run-off, or marina uses.
- Promote good shoreline stewardship on both private and commercial properties.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.
- Stewardship Initiative Group should continue developing remedial action plans in cooperation with the DMM.

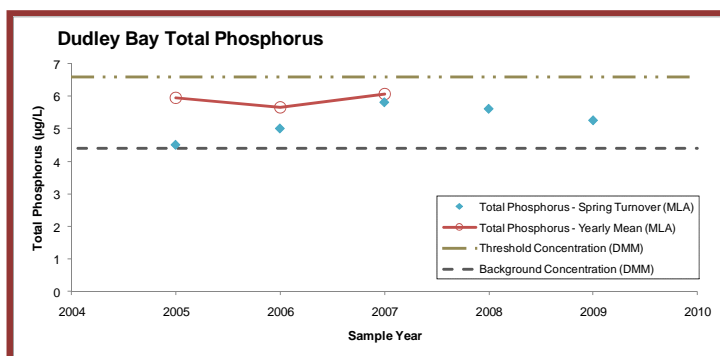


Area Description

Dudley Bay is located in eastern Lake Muskoka, and is approximately 3.6 km² in size with a maximum depth of 20 m. It is considered moderately developed, with primarily residential properties and several roads, including Highway 169, that are in close proximity to the shoreline. Several creeks and wetlands drain into the bay, including that from the cranberry marsh. Dudley Bay is classified as moderately sensitive by the DMM.

Volunteer Recognition

Dudley Bay was monitored in 2009 by Eleanor Lewis.



2009 Data

MUS-2: TP-Spring turnover=5.3 µg/L
Secchi=2.50 m

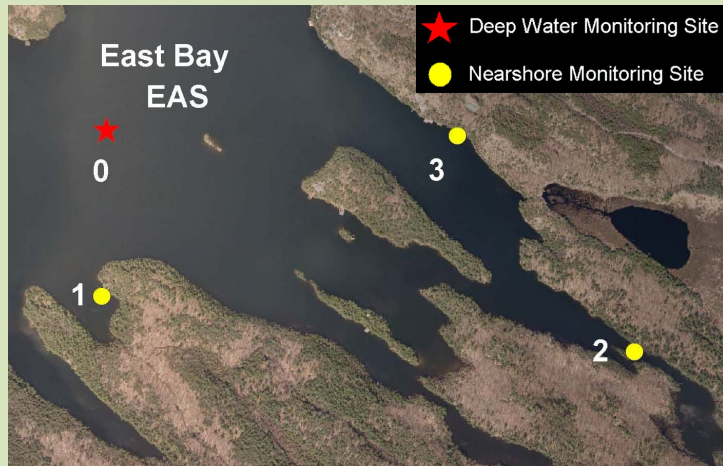
*This was a single spring sample site

Recommendations & Comments

- Lake Muskoka at Dudley Bay has water quality characteristic of an oligotrophic or low nutrient lake and moderate clarity.
- Promote good shoreline stewardship, to maintain water quality.

Trends

Monitoring of Lake Muskoka at Dudley Bay started in 2005. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. Data from 2009 suggest a decreasing trend, with a spring phosphorus concentration approaching background. From a nutrient perspective water quality conditions appear very good. Total coliform and *E. coli* were not sampled at this location.

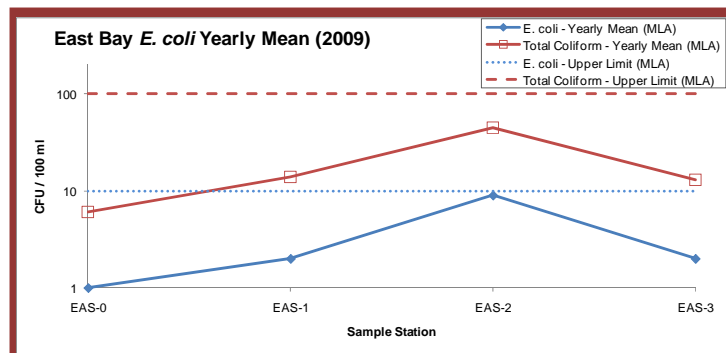
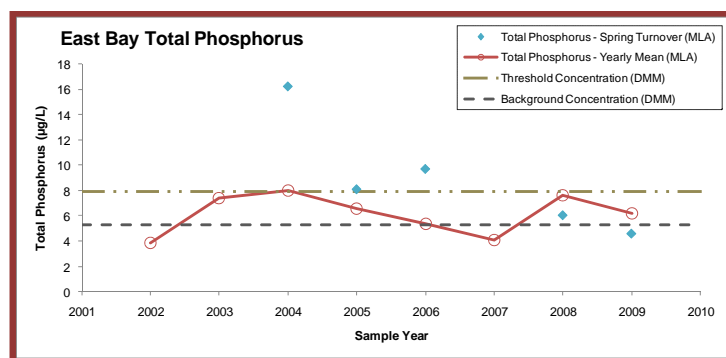


Area Description

East Bay is in the western portion of Lake Muskoka and is part of Hardy Lake Provincial Park. This is a low development area with very few cottages/residences and no access roads. Several long narrow bays form the drainage area where five creeks outlet into the main bay from the park. These creeks also drain wetland areas into East Bay.

Volunteer Recognition

East Bay was monitored in 2009 by Lloyd Walton.



Trends

Monitoring of East Bay started in 2002. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. Some of the lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009. From a nutrient perspective water quality conditions appear good in the river. Total coliform and *E. coli* were elevated at Site 2.

2009 Data

EAS-0: TP-Spring turnover=4.6 µg/L

TP-Yearly mean=6.0 µg/L

Secchi=3.37 m

Total coliforms=6 CFU/100 ml

Total *E. coli*=1 CFU/100 ml

EAS-1: TP-Yearly mean=8.7 µg/L

Total coliforms=14 CFU/100 ml

Total *E. coli*=2 CFU/100 ml

EAS-2: TP-Yearly mean=8.6 µg/L

Total coliforms=45 CFU/100 ml

Total *E. coli*=9 CFU/100 ml

EAS-3: TP-Yearly mean=5.3 µg/L

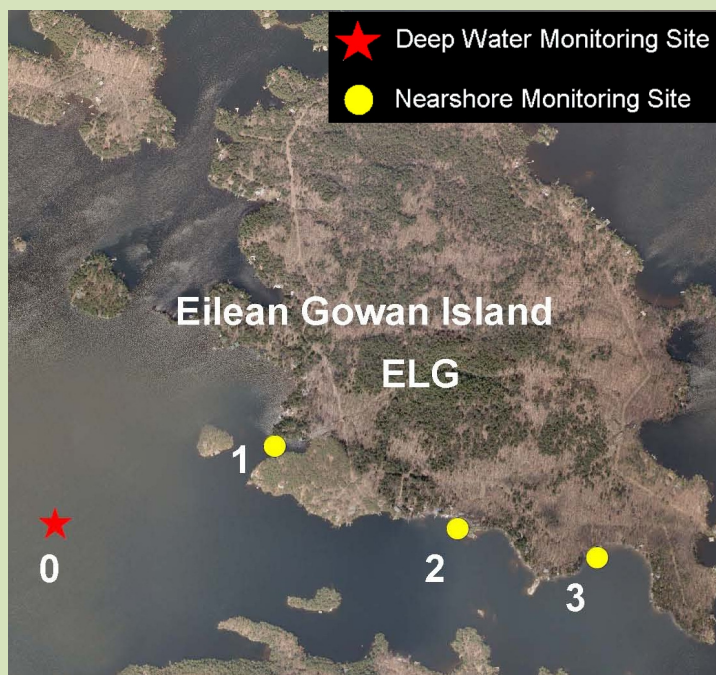
Total coliforms=13 CFU/100 ml

Total *E. coli*=2 CFU/100 ml

Recommendations & Comments

- Lake Muskoka at East Bay is an oligotrophic or low nutrient lake, with good water quality and clarity.
- Coliform values are within the expected range for lakes in Muskoka, with Site 2 having elevated values of *E. coli* which may be due to wetland discharge.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

EILEAN GOWAN ISLAND (ELG)

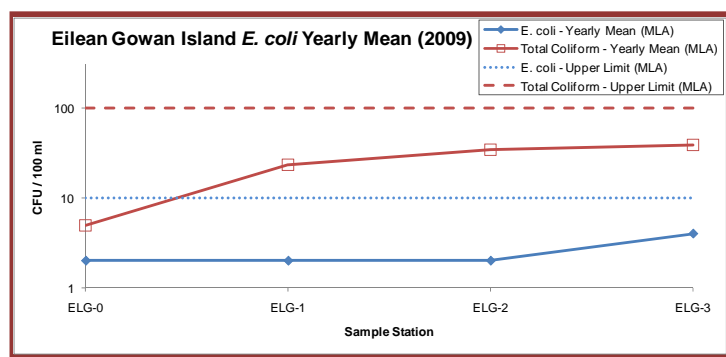
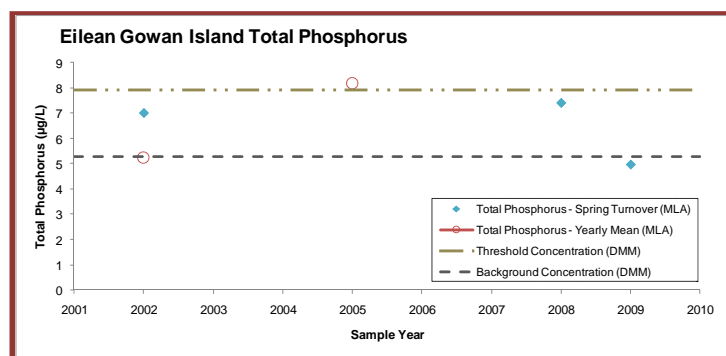


Area Description

Eilean Gowan Island is located in the eastern part of Lake Muskoka and is largely developed with residential cottages. Most of these properties appear to retain a well-vegetated shoreline with the exception of a few lawns and tennis courts directly adjacent to the lake. The interior of this island is completely forested and two small streams outlet from upland areas at sample sites ELG-1 and ELG-3.

Volunteer Recognition

Water quality sites at Eilean Gowan Island were monitored in 2009 by Susan Murphy, Howard Quennell, Beth Tate, and Doug Tate



2009 Data

ELG-0: TP-Spring turnover=5.0 µg/L
Secchi=3.13 m
Total coliforms=5 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

ELG-1: Total coliforms=23 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

ELG-2: Total coliforms=34 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

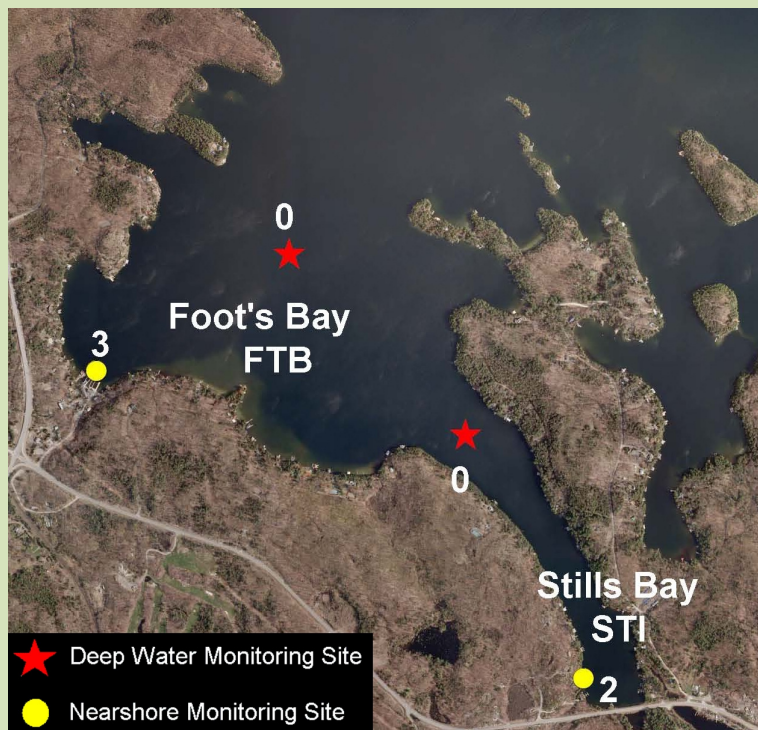
ELG-3: Total coliforms=39 CFU/100 ml
Total *E. coli*=4 CFU/100 ml

Recommendations & Comments

- Lake Muskoka at Eilean Gowan Island has water quality characteristic of an oligotrophic or low nutrient lake.
- Coliform values are within the expected range for lakes in Muskoka, no sites were above the upper limits.
- Promote good shoreline stewardship to maintain water quality.

Trends

Monitoring of Lake Muskoka at Eilean Gowan Island started in 2002. Since that time spring turnover phosphorus concentrations have fluctuated. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009. Total coliform and *E. coli* were as expected.

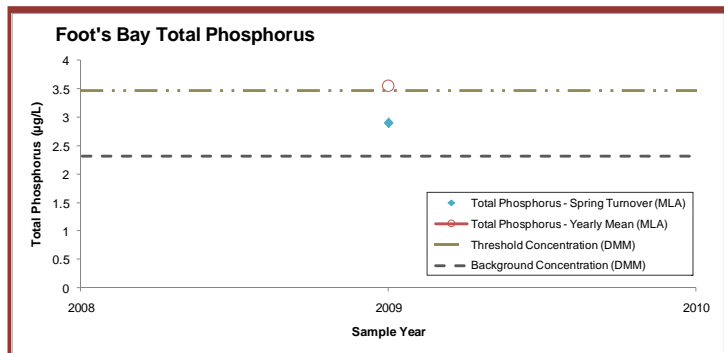
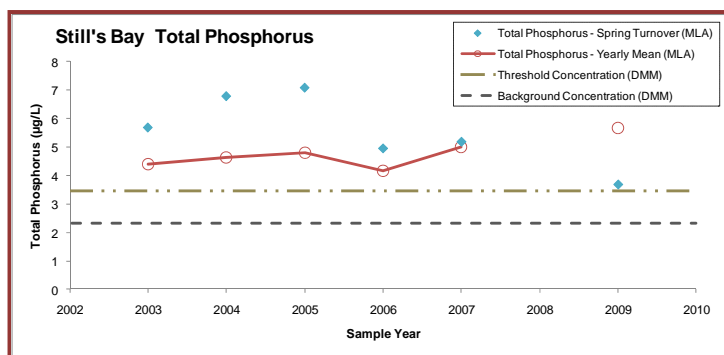


Area Description

Foot's Bay and Still's Bay are connecting bays in the south-eastern portion of Lake Joseph. Still's Bay is long, narrow, and moderately developed. The southern end of the bay is directly adjacent to highway 169. This bay receives drainage from watercourses that are adjacent to a golf course. Foot's Bay has a higher intensity of development in the southern section, with areas that are adjacent to the highway and a marina. There are still large areas of shoreline with mostly intact forests. The main basin of Lake Joseph is classified as highly sensitive by the DMM.

Volunteer Recognition

Foot's and Still's Bays were monitored in 2009 by Joanne Brown and Neil Shaw.



Trends

Monitoring of Still's Bay started in 2003, with no data available for 2008. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated, with a general downward trend noted in 2006. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009. From a nutrient perspective water quality conditions are good, as is water clarity.

2009 Data

FTB-0: TP-Spring turnover 2.9 µg/L
TP-Yearly mean =3.4 µg/L
Secchi=6.21 m

FTB-3:TP-Yearly mean =4.1 µg/L

STI-0: TP-Spring turnover =5.3 µg/L
TP-Yearly mean =5.5 µg/L
Secchi=5.72 m

STI-2: TP-Yearly mean =17.8 µg/L

*no data available for last two sample dates at all locations

Recommendations & Comments

- Foot's and Still's Bay are moderately developed waterfront communities, with water quality conditions characteristic of oligotrophic or low nutrient lakes and good clarity.
- Promote good shoreline stewardship on both private and commercial properties.
- Consider becoming involved in coliform monitoring program.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

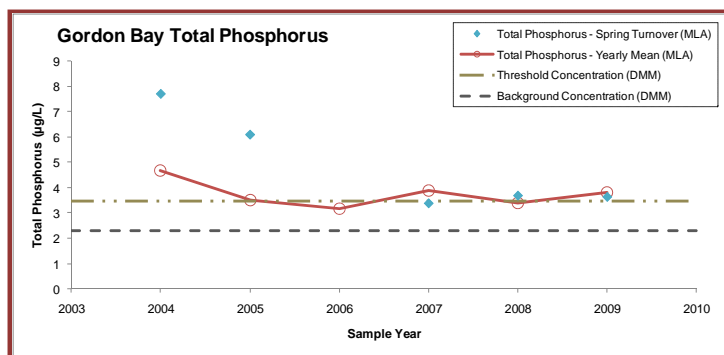


Area Description

Gordon Bay is in the north-western part of Lake Joseph. This bay is moderately developed and highway 169 follows along the shoreline for a large portion of the bay. There is a large marina in the northern part of the bay where one of three creeks discharges into the bay. The main basin of Lake Joseph is classified as highly sensitive by the DMM.

Volunteer Recognition

Gordon Bay was monitored in 2009 by Andrew Watson.



2009 Data

GNB-0: TP-Spring turnover=3.7 µg/L
Secchi=4.63 m

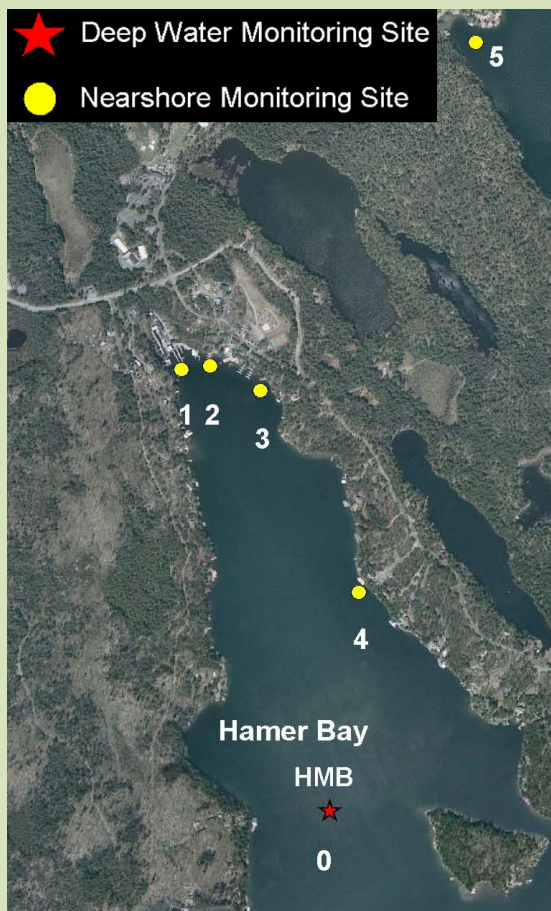
Recommendations & Comments

- Gordon Bay is a moderately developed waterfront community, with water quality conditions characteristic of oligotrophic or low nutrient lakes and good clarity.
- Promote good shoreline stewardship on both private and commercial properties.

Trends

Monitoring of Gordon Bay started in 2004. Since that time both spring turnover and yearly mean phosphorus concentrations have shown a gradual decrease. The phosphorus concentrations have remained relatively stable over the past three years. From a nutrient perspective water quality conditions appear good in the bay.

HAMER BAY (HMB)



Area Description

Hamer Bay is a large bay in the northern part of Lake Joseph. This bay receives drainage from a variety of natural and anthropogenic sources. There are three creeks that outlet into the bay, one flows through a large golf course and wetland in the north, and the others through smaller lakes and wetlands. There is a large marina with several parking lots, a resort, and many residential properties along most of the available shoreline. The main basin of Lake Joseph is classified as highly sensitive by the DMM.

2009 Data

HMB-0: TP-Spring turnover=3.8 µg/L
TP-Yearly mean=4.0 µg/L
Secchi=5.39 m
Total coliforms=6 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

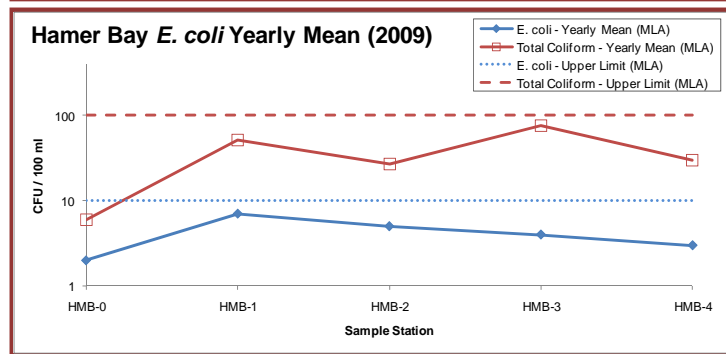
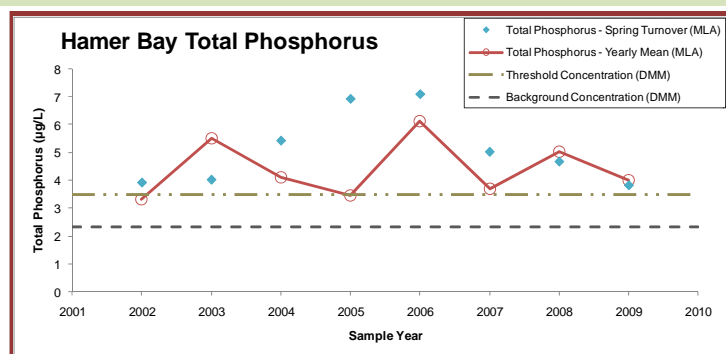
HMB-1: TP-Yearly mean=6.7 µg/L
Total coliforms=52 CFU/100 ml
Total *E. coli*=7 CFU/100 ml

HMB -2: TP-Yearly mean=5.4 µg/L
Total coliforms=27 CFU/100 ml
Total *E. coli*=5 CFU/100 ml

HMB -3: TP-Yearly mean=4.3 µg/L
Total coliforms=75 CFU/100 ml
Total *E. coli*=4 CFU/100 ml

HMB -4: TP-Yearly mean=4.0 µg/L
Total coliforms=30 CFU/100 ml
Total *E. coli*=3 CFU/100 ml

HMB -5: TP-Yearly mean=4.5 µg/L



Trends

Monitoring of Hamer Bay started in 2002. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009. From a nutrient perspective water quality conditions appear good. *E. coli* were elevated at Site 1 when compared to the rest of the bay.

Recommendations & Comments

- Hamer Bay is a highly developed and has many commercial uses. Despite it being a high activity centre it still has water quality conditions characteristic of oligotrophic or low nutrient lakes and good clarity.
- E. coli* values are on the high side at Site 1 for lakes in Muskoka. This may be related to wetland/creek run-off, or marina uses.
- Promote good shoreline stewardship on both private and commercial properties.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

Volunteer Recognition

Hamer Bay was monitored in 2009 by Jim McLellan and John Offutt.

INDIAN RIVER (IND)

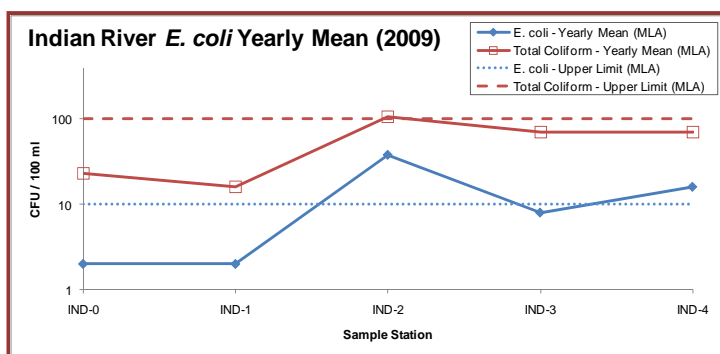
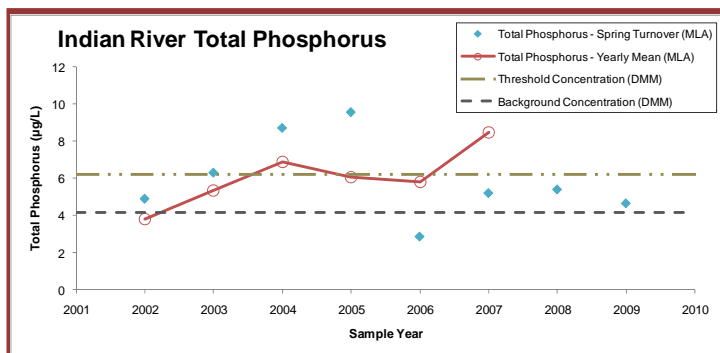


Area Description

The Indian River flows from Lake Rosseau, through Port Carling and into Mirror Lake and Lake Muskoka. This is a highly developed area receives stormwater from the Port Carling urban area, has high boat traffic with a locks system and marinas, along with many commercial and residential properties. There is also a large lacustrine wetland adjacent to the river.

Volunteer Recognition

The Indian River was monitored in 2009 by Susan Carson, Nick Turnbull, and Diane Turnbull.



Trends

Monitoring in the Indian River started in 2002, with spring phosphorus showing a fairly consistent increase until 2005, when the phosphorus concentrations started to decrease. From a nutrient perspective water quality conditions appear good in the river. Total coliform and *E. coli* are elevated above the suggested upper limit at Site 2, with *E. coli* also elevated at Site 4.

2009 Data

IND-0: TP-Spring=4.7 µg/L
Secchi=4.09 m
Total coliforms=23 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

IND-1: Total coliforms=16 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

IND-2: Total coliforms=106 CFU/100 ml
Total *E. coli*=38 CFU/100 ml

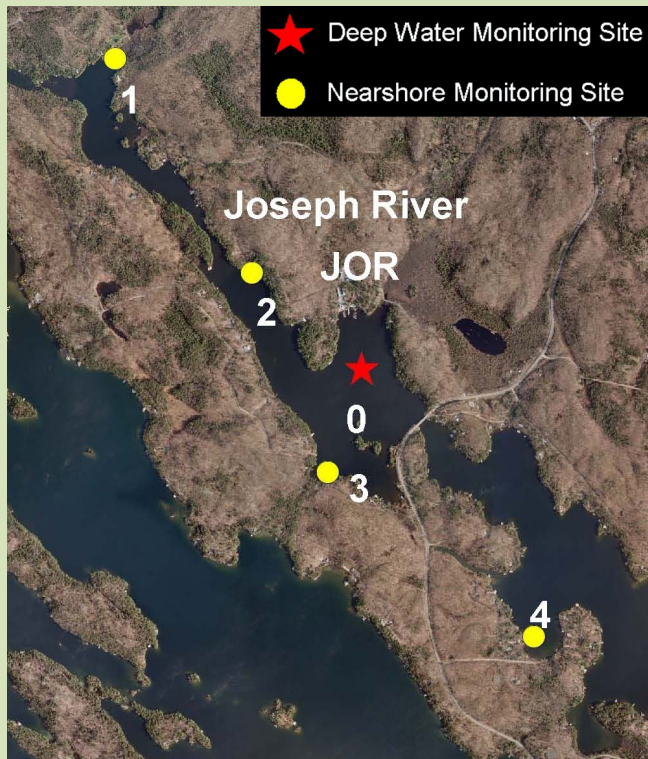
IND-3: Total coliforms=71 CFU/100 ml
Total *E. coli*=8 CFU/100 ml

IND-4: Total coliforms=71 CFU/100 ml
Total *E. coli*=16 CFU/100 ml

Recommendations & Comments

- The Indian River is a highly developed transportation and commercial corridor connecting Lakes Rosseau and Muskoka. Despite it being a high activity centre it still has water quality conditions characteristic of oligotrophic or low nutrient lakes and good clarity.
- Coliform values are on the high side for lakes in Muskoka, which may be related to urban run-off, wetlands and un-buffered shorelines and parkland.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Sites 2, 3 and 4 during 2010 sampling.

JOSEPH RIVER (JOR)

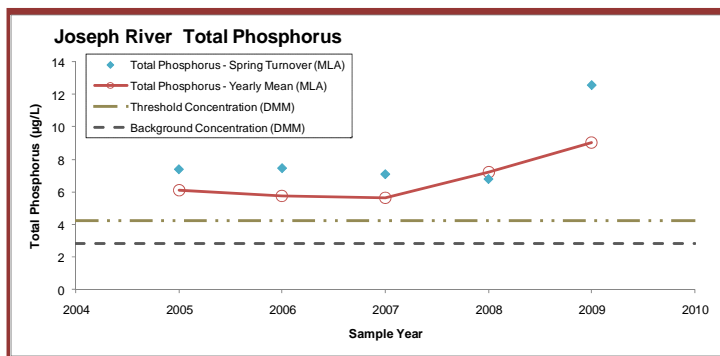


Area Description

Joseph River is the water body connecting Lake Joseph and Lake Rosseau. The river area is 1.37 km² in size, 8 m deep and classified as moderately sensitive. Direction of flow is from Lake Joseph into Lake Rosseau. There is a marina, bridge crossing for Peninsula road and two wetlands adjacent to the channel. This area receives significant boat traffic as the main navigable waterway between the two large lakes.

Volunteer Recognition

The Joseph River was monitored in 2009 by Beth Guy and Paul Heenan.



Trends

Monitoring of the Joseph River started in 2005. Since that time both spring turnover and yearly mean phosphorus concentrations have remained relatively stable. It is likely that the high concentrations recorded for 2009 are the result of contaminated samples and should not cause concern. From a nutrient perspective water quality conditions appear good in the river.

2009 Data

JOR-0: TP-Spring=12.6 µg/L*
TP-Yearly mean =9.7 µg/L
Secchi=3.89 m

JOR-1: TP-Yearly mean = 6.6 µg/L

JOR-2: TP-Yearly mean = 19.3 µg/L

JOR-3: TP-Yearly mean = 8.3 µg/L

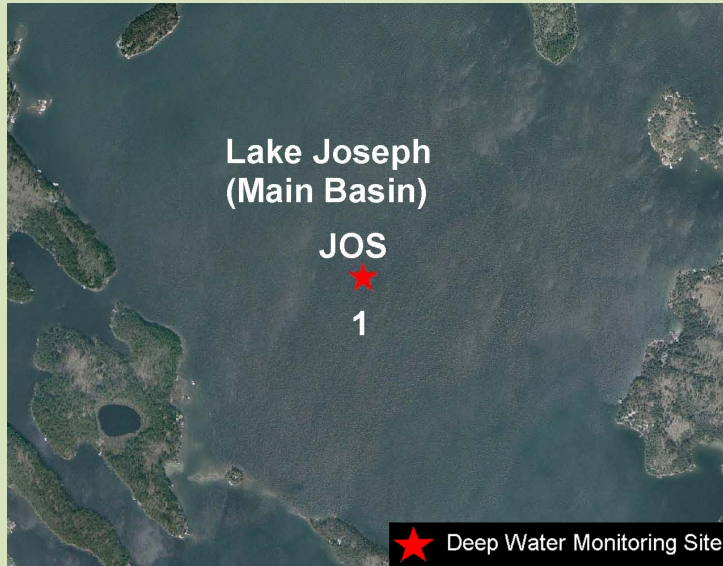
JOR-4: TP-Yearly mean = 16.4 µg/L

*more than 4.7 µg/L difference between duplicate samples

*Several TP samples had very high concentrations; samples may have been contaminated with plankton or detritus.

Recommendations & Comments

- The Joseph River is a highly developed transportation corridor connecting Lakes Rosseau and Joseph. Despite it being a high activity centre it still has water quality conditions characteristic of oligotrophic or low nutrient lakes and reasonable clarity.
- Promote good shoreline stewardship.

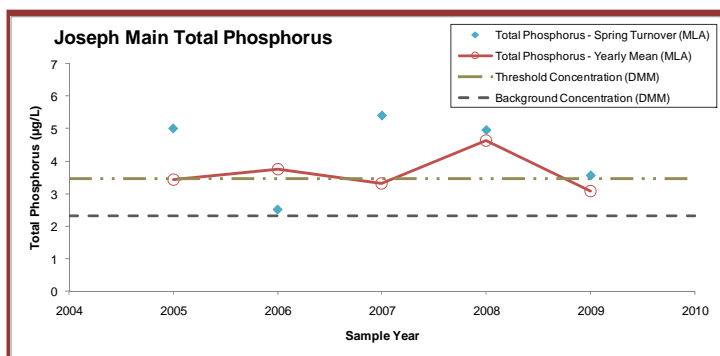


Area Description

Lake Joseph is a large lake with a surface area of 50.9 km² and water depths of up to 60m. Wetlands account for a small portion of the lake area at approximately 5%. The lake has various points of inflow and outflow, with drainage from north to south. The Lake Joseph watershed area is 55 km² and has a coldwater fishery. The DMM classifies the main basin of the lake as highly sensitive.

Volunteer Recognition

Lake Joseph was monitored in 2009 by Dean Martin.



2009 Data

JOS-1: TP-Spring turnover=3.1 µg/L
TP-Yearly mean=3.6 µg/L
Secchi=5.44 m

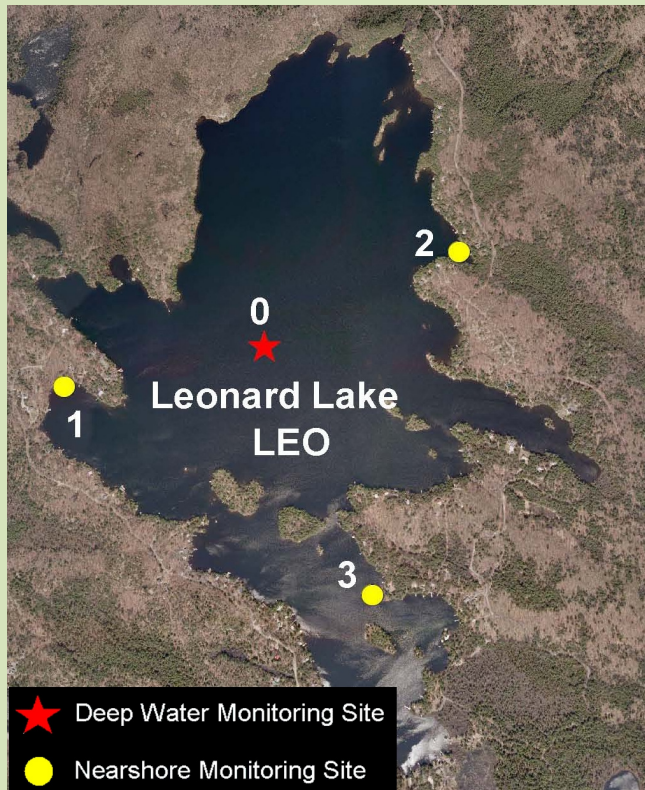
Recommendations & Comments

- Lake Joseph is a moderately developed waterfront community, with water quality conditions characteristic of oligotrophic or low nutrient lakes and good clarity.
- Promote good shoreline stewardship on both private and commercial properties.

Trends

Monitoring of the main basin of Lake Joseph started in 2005. Since that time phosphorus concentrations at spring turnover have fluctuated with yearly mean concentrations remaining consistent with the exception of 2008. From a nutrient perspective, water quality conditions are consistent with those characteristic of an oligotrophic or nutrient poor lake.

LEONARD LAKE (LEO)



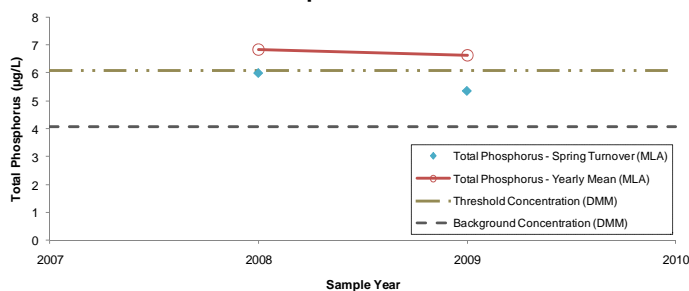
Area Description

Leonard Lake is medium sized lake 1.52 km² in size and has a maximum depth of 16m. This lake is moderately developed with primarily residential properties. Immediate shoreline alteration is limited to 9% but backlot clearing and forest thinning is found in 77% of properties. There is limited inflow and outflow of water on this lake, and few wetlands in the vicinity. Leonard Lake is classified as moderately sensitive and over-threshold by the DMM.

Volunteer Recognition

Leonard Lake was monitored in 2009 by Betty Isbister and Gordon Roberts.

Leonard Lake Total Phosphorus



2009 Data

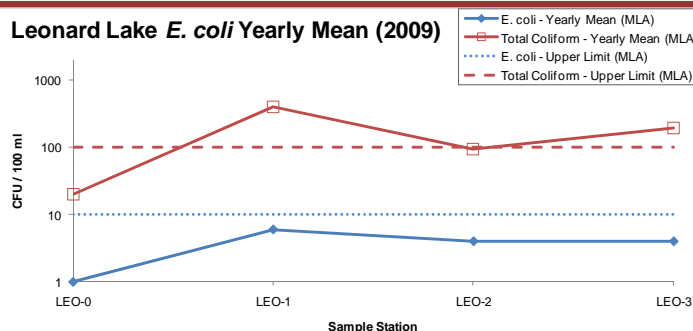
LEO-0: TP-Spring turnover=5.4 µg/L
TP-Yearly mean=6.6 µg/L
Secchi=4.07 m
Total coliforms=20 CFU/100 ml
Total *E. coli*=1 CFU/100 ml

LEO-1: Total coliforms=396 CFU/100 ml
Total *E. coli*=6 CFU/100 ml

LEO-2: Total coliforms=95 CFU/100 ml
Total *E. coli*=4 CFU/100 ml

LEO-3: Total coliforms=193 CFU/100 ml
Total *E. coli*=4 CFU/100 ml

Leonard Lake *E. coli* Yearly Mean (2009)



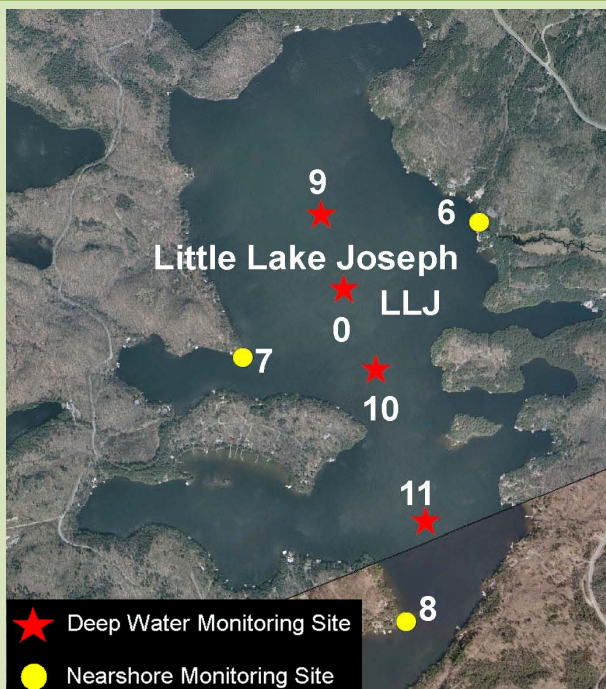
Recommendations & Comments

- Leonard Lake has water quality conditions characteristic of oligotrophic or low nutrient lakes and good clarity.
- Total coliform values are on the high side at Site 1 relative to other sites on Leonard Lake.
- Promote good shoreline stewardship and encourage retention of forests in the backlots.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

Trends

Monitoring of Leonard Lake started in 2008. Over the two years of sampling both spring turnover and yearly mean phosphorus concentrations have remained stable. From a nutrient perspective water quality conditions appear good. Of interest is that total coliform concentrations are higher than expected in the Muskoka Lakes. That said *E. coli* levels are within the typical range, with only site 1 having some elevated values.

LITTLE LAKE JOE (LLJ)

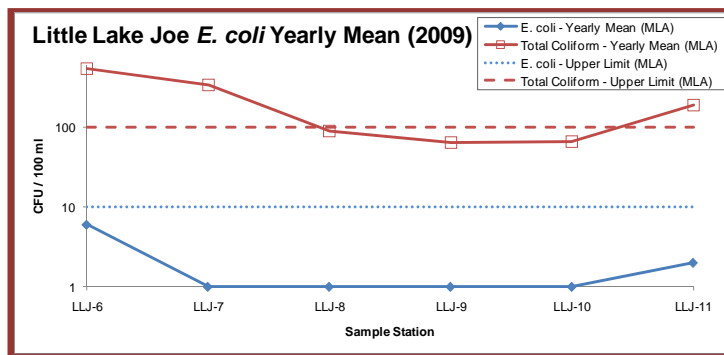
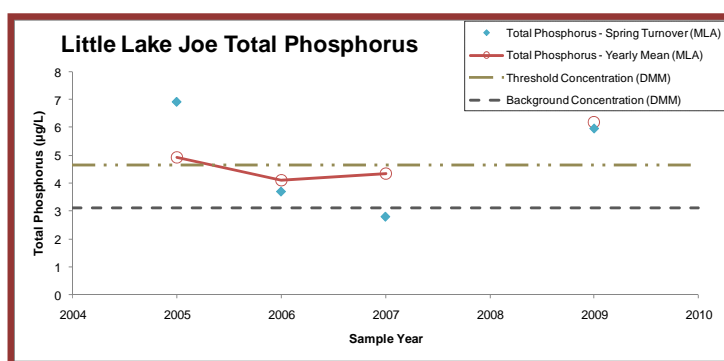


Area Description

Little Lake Joe is an isolated arm 2.8 km² in size off the eastern side of Lake Joseph. This is a deep bay with depth up to 40 m. Most of the shoreline is in a natural state despite many cottages. Three small wetlands outlet into the bay and the DMM has classified Little Lake Joe as moderately sensitive.

Volunteer Recognition

Little Lake Joe was monitored in 2009 by Mark Johnstone and Dirk Soutendijk.



2009 Data

LLJ-0: TP-Spring Turnover =6.0µg/L

TP-Yearly Mean =6.0µg/L

Secchi=5.00 m

LLJ-6: Total coliforms=531 CFU/100 ml

Total *E. coli*=6 CFU/100 ml

LLJ-7: Total coliforms=335 CFU/100 ml

Total *E. coli*=1 CFU/100 ml

LLJ-8: Total coliforms=89 CFU/100 ml

Total *E. coli*=1 CFU/100 ml

LLJ-9: Total coliforms=64 CFU/100 ml

Total *E. coli*=1 CFU/100 ml

LLJ-10: Total coliforms=66 CFU/100 ml

Total *E. coli*=1 CFU/100 ml

LLJ-11: Total coliforms=189 CFU/100 ml

Total *E. coli*=2 CFU/100 ml

*Only second half of sample dates are represented by data as sample sites were changed half way through sampling season (except LLJ-0)

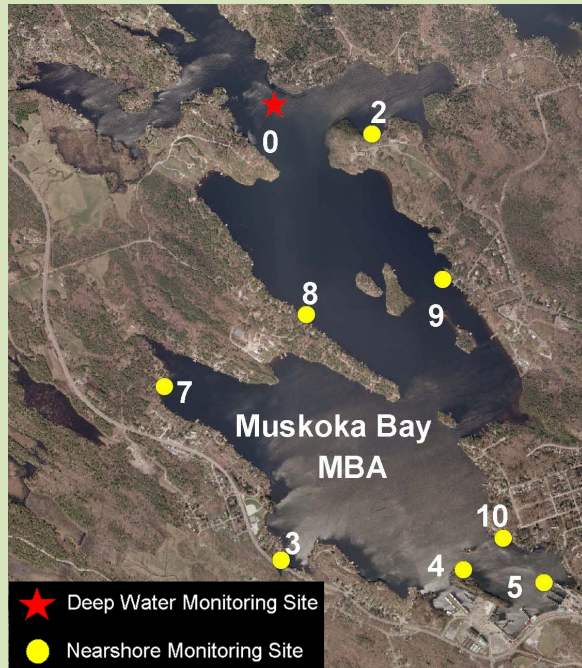
Trends

Monitoring of Little Lake Joe started in 2005. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. Relatively high concentrations were recorded in 2009, which is not consistent with the findings in other sampling areas. From a nutrient perspective water quality conditions appear good. Of interest is that total coliform concentrations are higher than expected in the Muskoka Lakes. This may be related to the number of wetlands. That said *E. coli* levels were quite low relative to other sampling areas.

Recommendations & Comments

- Little Lake Joe has water quality conditions characteristic of oligotrophic or low nutrient lakes and good clarity.
- *E. coli* values are on the high side at Site 6 relative to other lakes in Muskoka. This may be related to wetland/creek run-off.
- Maintain consistent sampling sites to maximize long term value of the data.
- Promote good shoreline stewardship.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

MUSKOKA BAY (MBA)

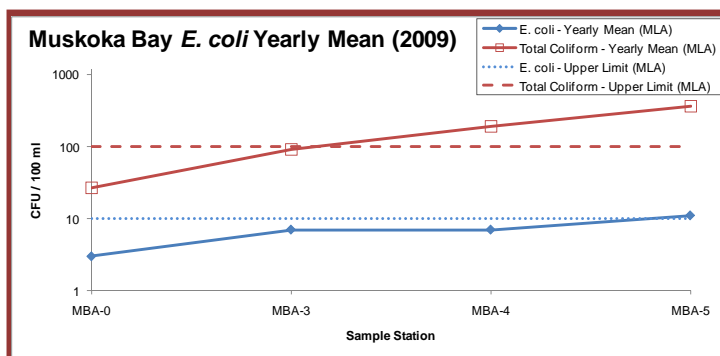
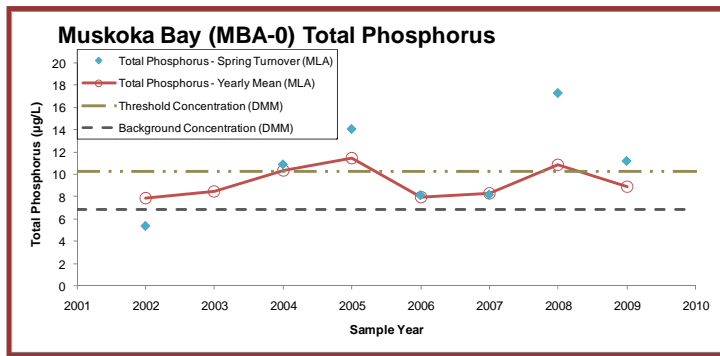


Area Description

Muskoka Bay is the most southern bay in Lake Muskoka. The bay has a long history of industrial uses, and nutrient issues. While water quality in the bay has improved dramatically since the 1970's, it is still classified as moderately sensitive and over threshold by the DMM. Although the bay has a high intensity of development, 80% of the shoreline is presently in a natural state. The most southern end of this bay includes a large commercial development and is the receiver of most of Gravenhurst's urban storm water. Several creeks outlet into the bay and wetlands account for 9.4% of the shoreline.

Volunteer Recognition

This lake was monitored in 2009 by Brian Yeates, Diane Yeates, and George Genereux.



Trends

Muskoka Bay has seen improvements in phosphorus concentrations since the 1970's. The most recent data shows variable results between 2002 and 2009, with 2009 concentrations in line with the "average". The coliform data indicates values higher than typically seen in other parts of Muskoka Lake, with both total coliform and *E. coli* values higher than suggested upper limit.

2009 Data

MBA-0: TP-Spring turnover=11.2 µg/L

TP-Yearly mean =9.2 µg/L

Secchi=3.02 m

Total coliforms=27 CFU/100 ml

Total *E. coli*=3 CFU/100 ml

MBA-2: TP-Yearly mean=13.4 µg/L

MBA-3: TP-Yearly mean=16.2 µg/L

Total coliforms=92 CFU/100 ml

Total *E. coli*=7 CFU/100 ml

MBA-4: TP-Yearly mean=11.6 µg/L

Total coliforms=191 CFU/100 ml

Total *E. coli*=7 CFU/100 ml

MBA-5: TP-Yearly mean=11.4 µg/L

Total coliforms=366 CFU/100 ml

Total *E. coli*=11 CFU/100 ml

MBA-7: TP-Yearly mean=12.3 µg/L

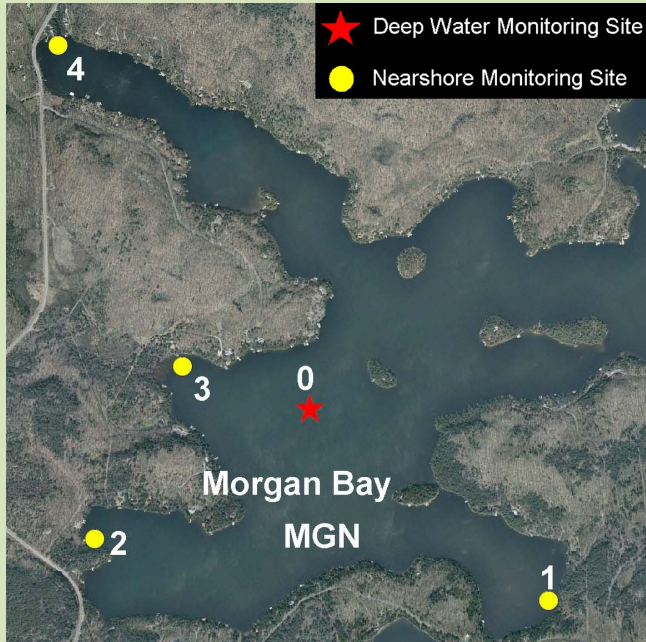
MBA-8: TP-Yearly mean=14.6 µg/L

MBA-9: TP-Yearly mean=9.5 µg/L

MBA-10: TP-Yearly mean=17.1 µg/L

Recommendations & Comments

- Promote good shoreline stewardship practices to bay residents and extend the program to the urban, non-waterfront residents in the Town of Gravenhurst.
- Promote the preservation of wetlands, streams and appropriate buffers in the Muskoka Bay watershed.
- For *E. coli*- public education about the impacts of animal feces not properly disposed of and ongoing monitoring of septic systems.
- The Stewardship Initiative Group should continue developing remedial action plans in cooperation with the DMM.

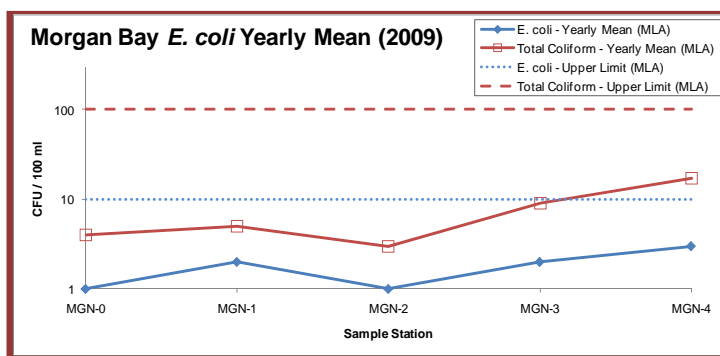
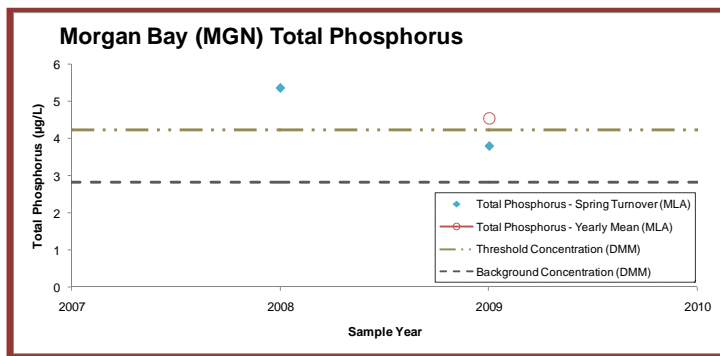


Area Description

Morgan Bay is in the most northern part of Lake Rosseau, and a series of small bays make up this large sampling area. Several creeks outlet into this bay close to the nearshore sample sites and there is a wetland adjacent to the lake at site 3. Most of the shoreline area is developed with residential properties, but many retain natural riparian vegetation. Almost the entire area has road access and several of these roadways come very close to the water, this is particularly evident at site 4.

Volunteer Recognition

Morgan Bay sites in Lake Rosseau were monitored in 2009 by David Peacock



Trends

Monitoring of Morgan Bay started in 2008. Spring turnover phosphorus concentration declined between 2008 and 2009, with values below the DMM threshold. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009. Total coliform and *E. coli* values were very low at all sites, well below MLA upper limits.

2009 Data

MGN-0: TP-Spring turnover=3.8 µg/L
TP-Yearly mean=4.5 µg/L
Secchi=3.29 m
Total coliforms=4 CFU/100 ml
Total *E. coli*=1 CFU/100 ml

MGN-1: TP-Yearly mean=4.6 µg/L
Total coliforms=5 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

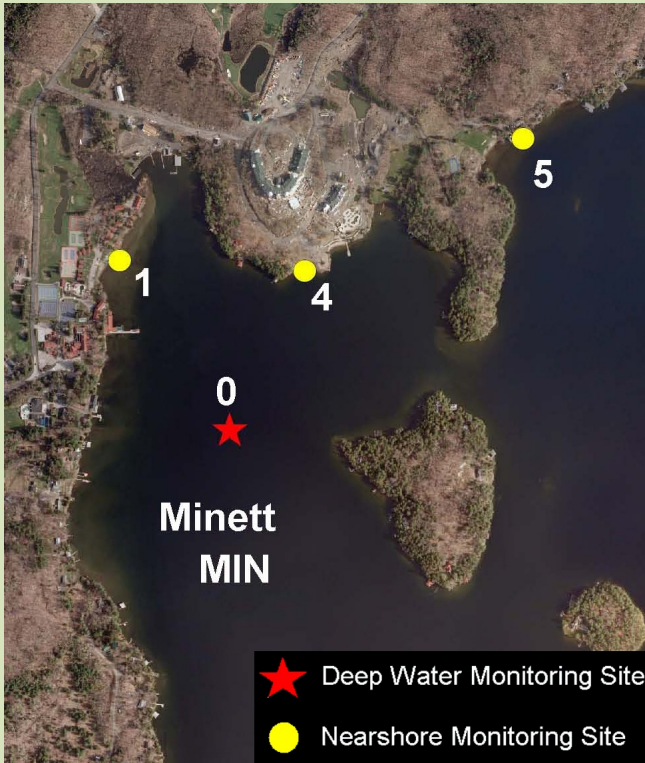
MGN-2: TP-Yearly mean=4.6 µg/L
Total coliforms=3 CFU/100 ml
Total *E. coli*=1 CFU/100 ml

MGN-3: TP-Yearly mean=5.3 µg/L
Total coliforms=9 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

MGN-4: TP-Yearly mean=5.2 µg/L
Total coliforms=17 CFU/100 ml
Total *E. coli*=3 CFU/100 ml

Recommendations & Comments

- Lake Rosseau at Morgan Bay water quality is typical of an oligotrophic or low nutrient lake, with good water quality and clarity.
- Coliform values are within the expected range for lakes in Muskoka, well below the MLA upper limit.
- Promote good shoreline stewardship to maintain water quality.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

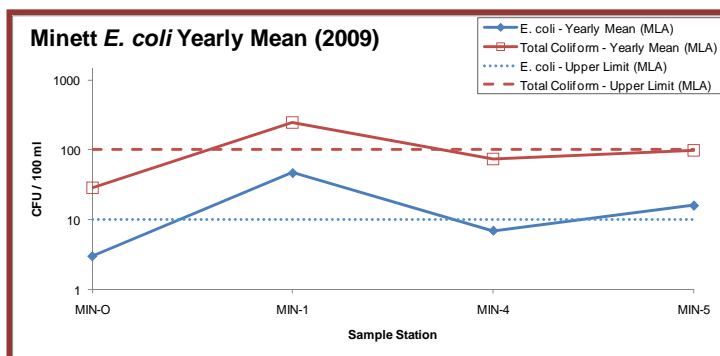
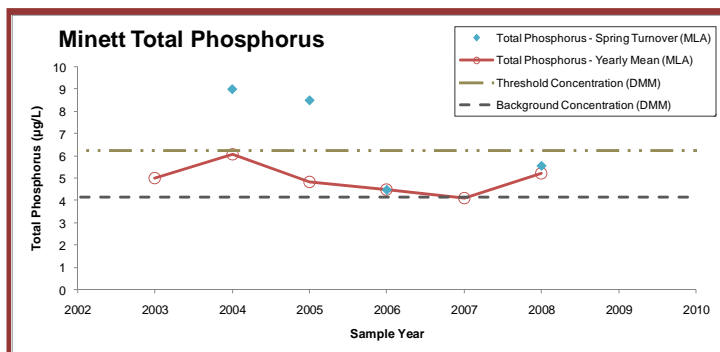


Area Description

The village of Minett is located in western Lake Rosseau, and has 4 sample sites. The monitoring of these sites is intended to provide data to determine the potential effects of high intensity development in this bay. The area contains two large resorts with golf courses, several roads, a marina, and many private residential properties. There is one wetland adjacent to the lake and several other small ones in the area of the bay. Sample sites 1, 4, and 5 are taken from shallow locations in the nearshore area.

Volunteer Recognition

The Minett sites on Lake Rosseau were monitored in 2009 by Laurie Thomson and Greg Thomson.



Trends

Monitoring of Lake Rosseau at Minett started in 2003. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. Phosphorus concentrations have remained below the DMM threshold value between 2006 and 2008 (no data was collected in 2009). Total coliforms and *E. coli* were elevated at Sites 1, and 5, with the former above the MLA upper limit for both parameters.

2009 Data

MIN-0: Secchi=4.71 m
Total coliforms=29 CFU /100 ml
Total *E. coli*=3 CFU/100 ml

MIN-1: Total coliforms=248 CFU/100 ml
Total *E. coli*=47 CFU/100 ml

MIN-4: Total coliforms=75 CFU/100 ml
Total *E. coli*=7 CFU/100 ml

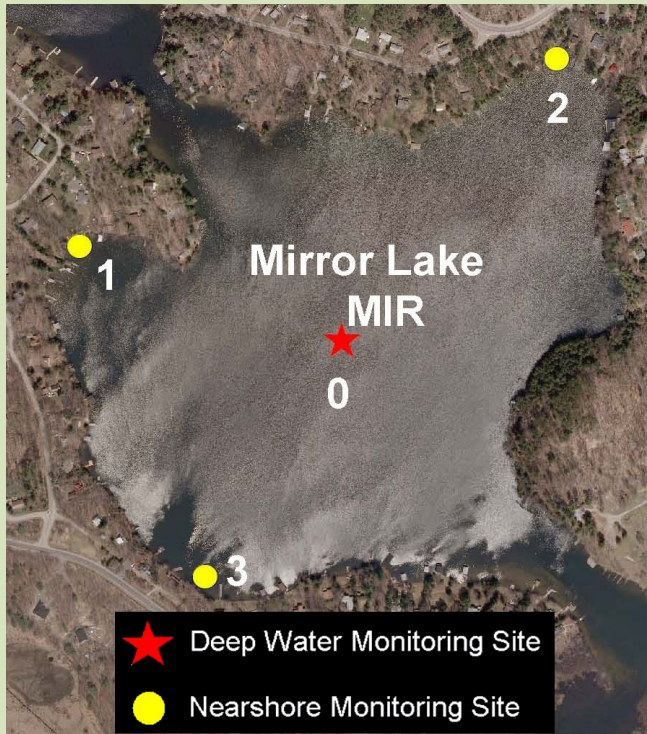
MIN-5: Total coliforms=99 CFU/100 ml
Total *E. coli*=16 CFU/100 ml

*missed first sample date for all sites, data missing (2 TP from 2 sites), so did not include.

Recommendations & Comments

- Lake Rosseau at Minett has good water quality, typical of an oligotrophic or low nutrient lake.
- Coliform values are on the high side for lakes in Muskoka, with Sites 1, and 5 having elevated values for both total coliforms and *E. coli*.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Sites 1, and 5 during 2010 sampling.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

MIRROR LAKE (MIR)

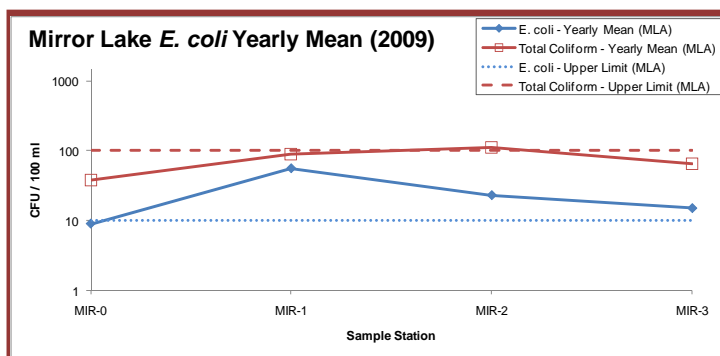
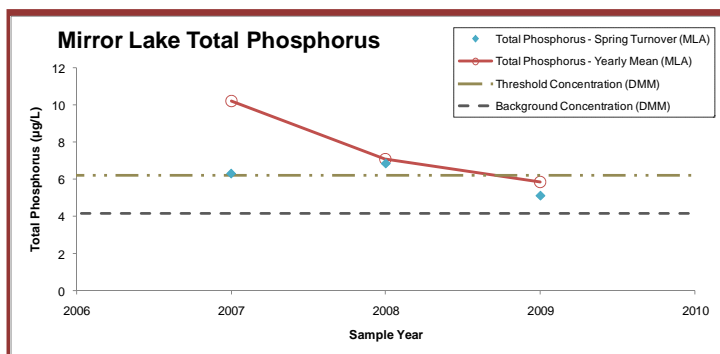


Area Description

Mirror Lake is essentially a widening of the Indian River as it flows between Lake Rosseau to the north and Lake Muskoka to the south. The lake is approximately 0.46 km² in area, with a maximum depth of 8m. Two small creeks outlet into the lake near sample sites MIR-1 and MIR-2. Much of the lake is within the Town of Port Carling and receives drainage from the urban area. Mirror Lake has a small watershed, approximately 0.97 km², and is classified as moderately sensitive and over-threshold by the DMM.

Volunteer Recognition

Mirror Lake was monitored in 2009 by Sandy Tozer-Spence.



Trends

Monitoring of Mirror Lake started in 2007. Since that time both spring turnover phosphorus values have fluctuated while yearly mean values have shown a steady decline. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009. *E. coli* values were elevated above the MLA upper limit at all Sites and coliform values were elevated at Sites 1 and 2, approaching the MLA upper limit.

2009 Data

MIR-0: TP-Spring turnover=5.1 µg/L
TP-Yearly mean=5.7 µg/L
Secchi=3.30 m
Total coliforms=38 CFU/100 ml
Total *E. coli*=9 CFU/100 ml

MIR-1: TP-Yearly mean=6.9 µg/L
Total coliforms=90 CFU/100 ml
Total *E. coli*=56 CFU/100 ml

MIR-2: TP-Yearly mean=11.3 µg/L
Total coliforms=111 CFU/100 ml
Total *E. coli*=23 CFU/100 ml

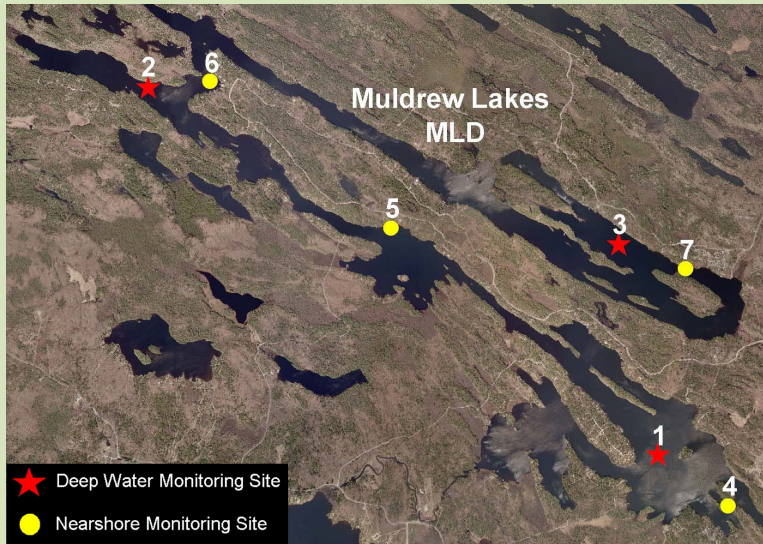
MIR-3: TP-Yearly mean=7.4 µg/L
Total coliforms=65 CFU/100 ml
Total *E. coli*=15 CFU/100 ml

*No bacteria testing done for first sample date

Recommendations & Comments

- Mirror Lake is essentially a widening of the Indian River, with good water quality and clarity.
- Coliform values are within the expected range for lakes in Muskoka, with Sites 1 and 2 having elevated values.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Sites 1, 2, and 3 during 2010 sampling.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

MULDREW LAKE (MLD)



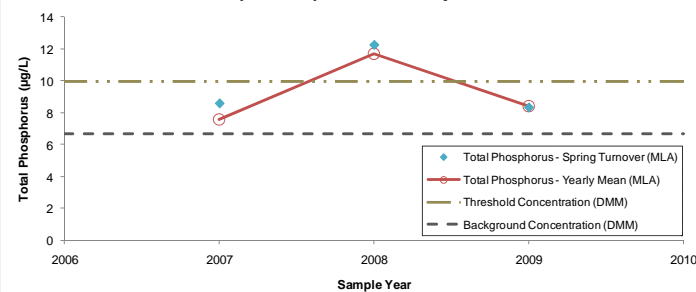
Area Description

North and South Muldrew Lakes are oriented northwest to southeast, formed as a result of glacial retreat. North Muldrew Lake is approximately 1.52 km² in size, a maximum of 16 m deep and is considered moderately sensitive by the DMM. Several creeks and five wetland areas drain into the lake. There is a large resort area along the eastern shoreline, and considerable residential development, most retaining a natural shoreline. South Muldrew Lake is approximately 2.7 km² in area, with a maximum depth of 18 m, and is classified as moderately sensitive. South Muldrew Lake has less shoreline development than North Muldrew, likely due to the extent of adjacent wetlands. Approximately ten wetland areas drain into the eastern portion of south Muldrew Lake.

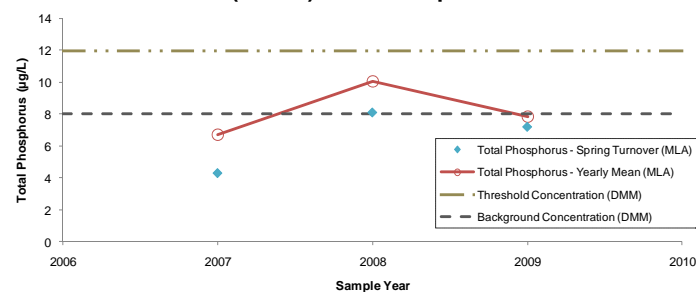
Volunteer Recognition

North and South Muldrew Lakes were monitored in 2009 by Lola Bratty, Michael Foster, John Twist, Jane Gunther, Janice McElwain, John McElwain, and Eric Steeves

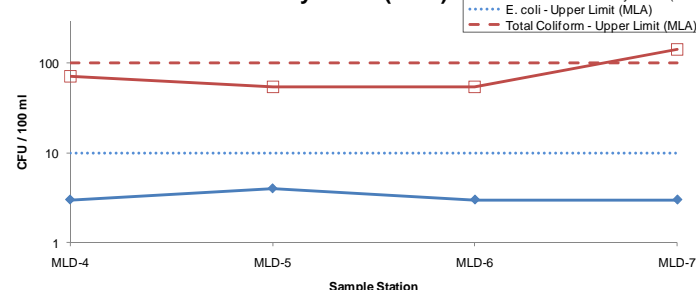
South Muldrew Lake (MLD-1) Total Phosphorus



North Muldrew Lake (MLD-3) Total Phosphorus



Muldrew Lake E. coli Yearly Mean (2009)



2009 Data

MLD-1: TP-Spring turnover=8.4 µg/L

TP-Yearly mean=7.1 µg/L

Secchi=2.11 m

MLD-2: TP-Yearly mean =7.5 µg/L

Secchi=2.15 m

MLD-3: TP-Yearly mean =8.4 µg/L

Secchi=2.36 m

MLD-4: Total coliforms=72 CFU/100 ml

Total *E. coli*=3 CFU/100 ml

MLD-5: Total coliforms=55 CFU/100 ml

Total *E. coli*=4 CFU/100 ml

MLD-6: Total coliforms=54 CFU/100 ml

Total *E. coli*=3 CFU/100 ml

MLD-7: Total coliforms=144 CFU/100 ml

Total *E. coli*=3 CFU/100 ml

Trends

Monitoring of North and South Muldrew Lakes started in 2007. Since that time, both lakes showed a similar trend with respect to spring turnover and yearly mean phosphorus concentrations, peaking in 2008. Total coliforms were elevated above the MLA upper limit at Site 7.

Recommendations & Comments

- North and South Muldrew Lakes are oligotrophic or low nutrient lakes, with good water quality and moderate clarity.
- Coliform values are within the expected range for lakes in Muskoka, with Site 7 having the highest values, elevated above the MLA upper limit.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Site 7 during 2010 sampling.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

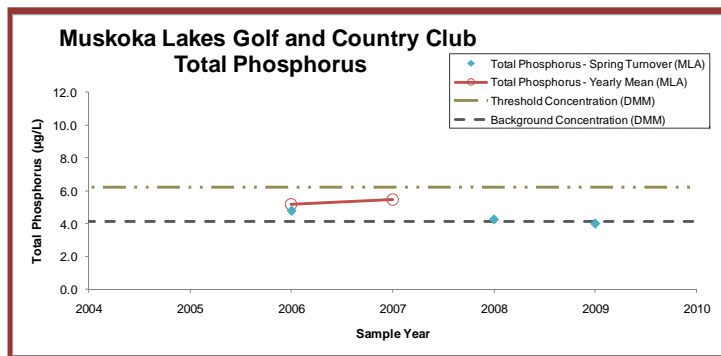


Area Description

The Muskoka Lakes Golf and Country Club sampling site is located along the southern shore of the Lake Rosseau main basin, near the Town of Port Carling. This bay collects run-off from a golf course area with associated clubhouse and marina. The bay also contains a large wetland that drains into the lake. Dominant northwest winds and large fetch would result in considerable wave action long the southern shoreline of the bay.

Volunteer Recognition

The Muskoka Lakes Golf and Country Club sites in Lake Rosseau was monitored in 2009 by Peter Seybold.



Trends

Monitoring of Lake Rosseau at Muskoka Lakes G & CC started in 2006. Since that time both spring turnover and yearly mean phosphorus concentrations have steadily declined. The lowest concentration of phosphorus since the start of the monitoring program was documented in 2009. Total coliform and *E. coli* were not monitored at this location.

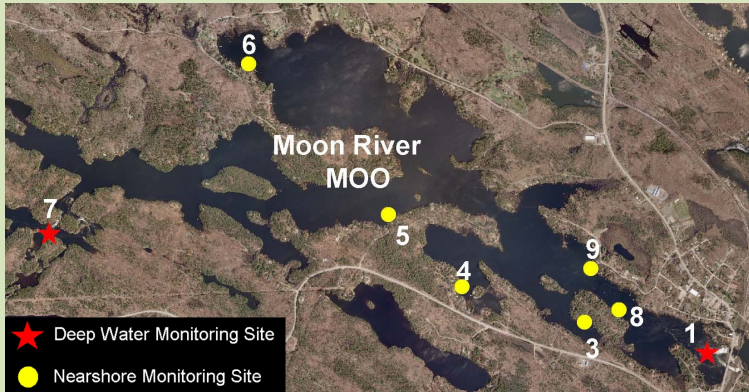
2009 Data

MLG-0:TP-Spring turnover=4.0 µg/L
Secchi=3.20 m

*this is a single spring sample site

Recommendations & Comments

- Lake Rosseau at Muskoka Lakes G & CC has water quality characteristic of an oligotrophic or low nutrient lake.
- Promote good shoreline stewardship and Best Management Practices to maintain and improve water quality.

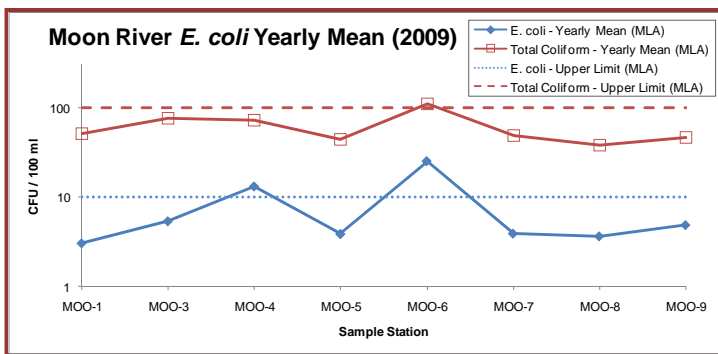


Area Description

The Moon River is the main outlet of the Muskoka Watershed, flowing from Lake Muskoka to Georgian Bay. The river receives overland drainage from the Town of Bala and its urban area, including many roads and the developed shoreline. Approximately 12 creeks outlet into this sampling area, several draining wetland areas.

Volunteer Recognition

The Moon River was monitored in 2009 by Doug Ball, Carol Ball, Allen Bossin, Jane Bossin, Steve Burdick, Bruce Calder, Nancy Calder, Sandy Currie, Jon Gurr, Peter Hemming, Bob McTavish, William Niess, Clark Northcott, Bob Phillips, Walt Scott, Carol Sullivan, and Mike Webb.



Trends

Monitoring of the Moon River is focussed on total coliform and *E. coli*. In 2009, total coliforms were above the MLA upper limit at Site 6. The same is true for *E. coli* which was above the MLA upper limit as well. Site-1 had the lowest total coliform and *E. coli* values of all sites in the Moon River.

2009 Data

MOO-1: Total coliforms=51 CFU/100 ml
Total *E. coli*=3 CFU/100 ml

MOO-3: Total coliforms=76 CFU/100 ml
Total *E. coli*=5 CFU/100 ml

MOO-4: Total coliforms=72 CFU/100 ml
Total *E. coli*=13 CFU/100 ml

MOO-5: Total coliforms=44 CFU/100 ml
Total *E. coli*=4 CFU/100 ml

MOO-6: Total coliforms=109 CFU/100 ml
Total *E. coli*=25 CFU/100 ml

MOO-7: Total coliforms=48 CFU/100 ml
Total *E. coli*=4 CFU/100 ml

MOO-8: Total coliforms=38 CFU/100 ml
Total *E. coli*=4 CFU/100 ml

MOO-9: Total coliforms=45 CFU/100 ml
Total *E. coli*=5 CFU/100 ml

Recommendations & Comments

- The Moon River drains the entire Muskoka River Watershed.
- Coliform values are within the expected range, with Sites 4, and 6 above the upper limit established by the MLA for total coliform and *E. coli*.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Sites 4, and 6 during 2010 sampling.

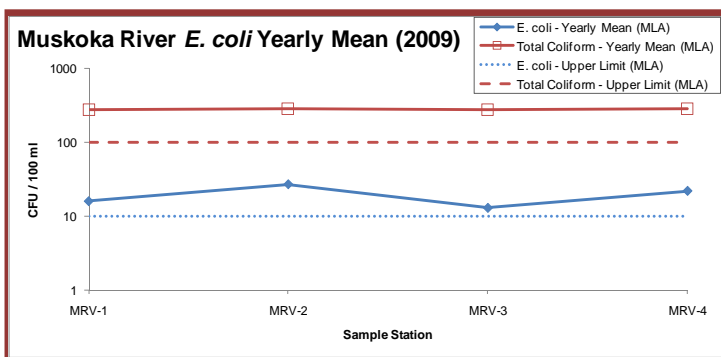
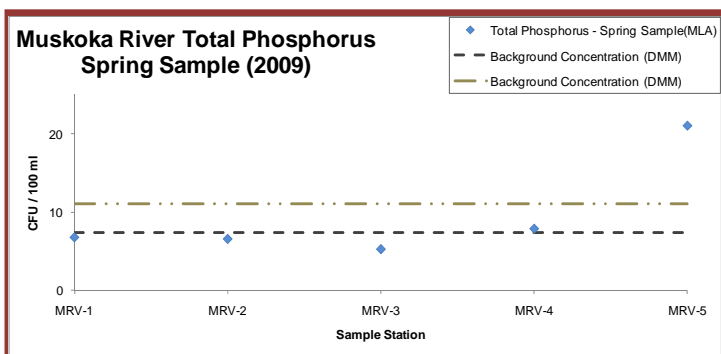


Area Description

This sample area includes the most downstream reach of the Muskoka River where flows from the Town of Bracebridge to Allport Bay, Lake Muskoka. This area is highly developed on both banks, and includes the Bracebridge urban area, large agricultural fields, and extensive residential properties along the entire reach of shoreline. Roads are located along both sides of the river for most of the reach length. Several creeks outlet into the river through this area, and there are limited wetland areas adjacent to the river.

Volunteer Recognition

The Muskoka River was monitored in 2009 by Deb Hastings and John Wood.



2009 Data

MRV-1: TP-Spring = 6.8 µg/L
Total coliforms = 276 CFU/100 ml
Total *E. coli* = 16 CFU/100 ml
Secchi = 2.43 m

MRV-2: TP-Spring = 6.6 µg/L
Total coliforms = 286 CFU/100 ml
Total *E. coli* = 27 CFU/100 ml

MRV-3: TP-Spring = 5.3 µg/L
Total coliforms = 277 CFU/100 ml
Total *E. coli* = 13 CFU/100 ml
Secchi = 2.81 m

MRV-4: TP-Spring = 7.9 µg/L
Total coliforms = 281 CFU/100 ml
Total *E. coli* = 22 CFU/100 ml

MRV-5: TP-Spring = 21.0 µg/L
TP-Yearly mean = 17.1 µg/L
Secchi = 1.29 m

Trends

Monitoring of the Muskoka River includes sites from the Town of Bracebridge to Lake Muskoka. The phosphorus concentration threshold value set by the DMM is exceeded in 2009 at Site 5, with the remainder of sites comparable to background concentrations. The lowest concentrations of phosphorus occur at the confluence of the North and South Branches (Site 3). Total coliforms and *E. coli* were elevated at all sites, above the upper limit recommended by the MLA.

Recommendations & Comments

- This reach of the Muskoka River connects the Town of Bracebridge and Lake Muskoka.
- Coliform and *E. coli* values are elevated above the MLA upper limits at all sites in 2009.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to each site during 2010 sampling.

MUSKOKA SANDS (MSN)

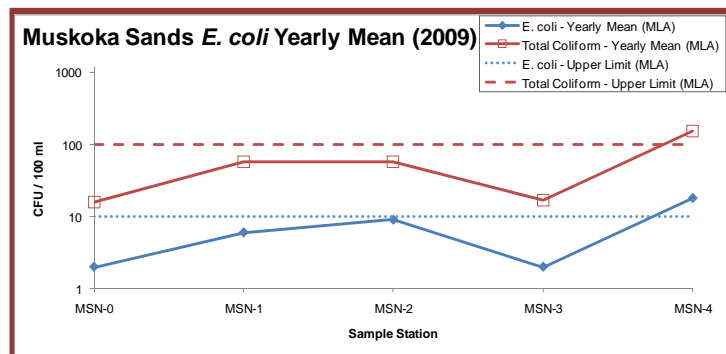
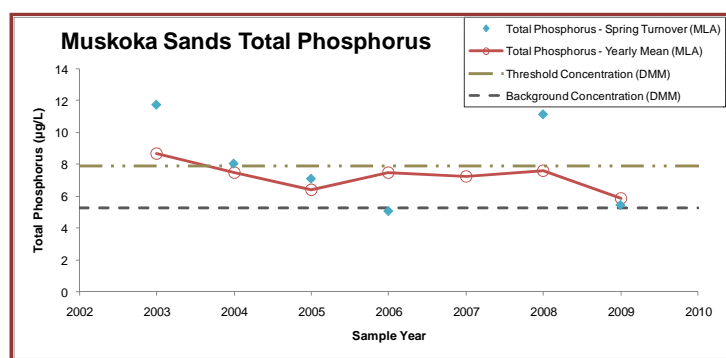


Area Description

The Muskoka Sands sampling area is located in southeastern Lake Muskoka at the confluence with the Hoc Roc River. This area has a high intensity of development with a large resort with golf course, along with a high density of residential properties and roads adjacent to the lake. The Hoc Roc River flows through agricultural, industrial, residential and natural wetland areas before it drains into a shallow bay. Dominant northwest winds and a considerable fetch would subject this area to heavy onshore wave action.

Volunteer Recognition

The Muskoka Sands sites were monitored in 2009 by Al Ward and Carole Ward



Trends

Monitoring of Lake Muskoka at the Muskoka Sands started in 2003. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated considerably. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2006 and 2009. Total coliform and *E. coli* were elevated at Site 4 above the MLA upper limit.

2009 Data

MSN-0: TP-Spring turnover=5.5 µg/L
TP-Yearly mean=6.1 µg/L
Secchi=3.18 m
Total coliforms=16 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

MSN-1: Total coliforms=58 CFU/100 ml
Total *E. coli*=6 CFU/100 ml

MSN-2: Total coliforms=57 CFU/100 ml
Total *E. coli*=9 CFU/100 ml

MSN-3: Total coliforms=17 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

MSN-4: Total coliforms=155 CFU/100 ml
Total *E. coli*=18 CFU/100 ml

Recommendations & Comments

- Lake Muskoka near the former Muskoka Sands is an oligotrophic or low nutrient lake, with good water quality and clarity.
- Coliform values are within the expected range for lakes in Muskoka, with Site 4 having the highest values. This high value may be related to the wetlands upstream in the Hoc Roc River.
- Promote good shoreline stewardship, and Best Management Practices.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

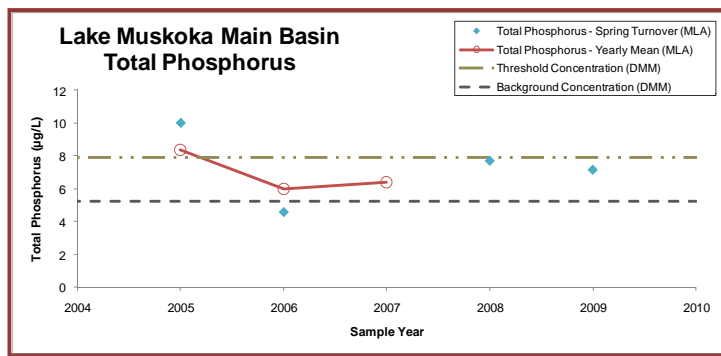


Area Description

Lake Muskoka is one of the big three lakes in Muskoka, covering an area of approximately 62 km² and a maximum depth of 47 m, with wetlands accounting for 10% of upper watershed area. Lake Muskoka is considered a coldwater lake, supporting a naturally reproducing Lake Trout population. Lake Muskoka has a long history as a cottage and resort destination as well as a natural resource based economy. Although some individual bays remain a concern, water quality in the main lake has been steadily improving since the 1970's. Lake Muskoka is classified as moderately sensitive by the DMM.

Volunteer Recognition

The Main Basin of Lake Muskoka was monitored in 2009 by Brian Yeates



2009 Data

MUS-3: TP-Spring turnover=7.2 µg/L
Secchi=3.25 m

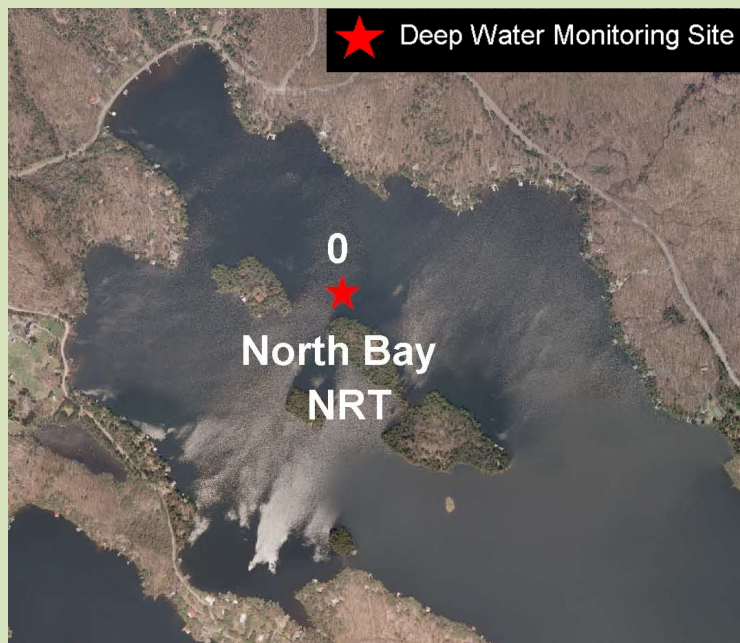
*this is a single spring sample location

Recommendations & Comments

- The Main Basin of Lake Muskoka is an oligotrophic or low nutrient lake, with good water quality and clarity.
- Promote good shoreline stewardship to maintain water quality.

Trends

Monitoring of the Main Basin of Lake Muskoka started in 2005. Since that time spring turnover phosphorus concentrations have fluctuated. In 2009, spring turnover values were below the lake threshold value. Total coliform and *E. coli* were not monitored at this location.

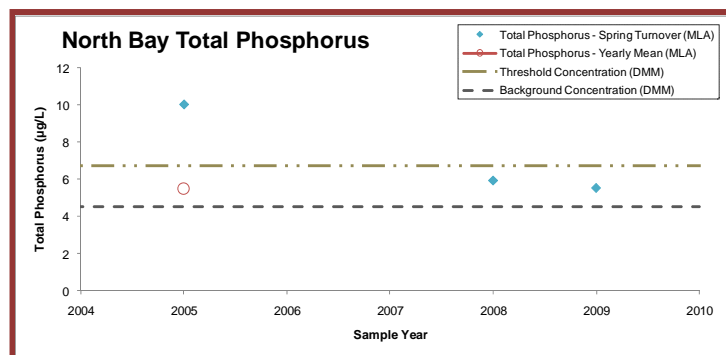


Area Description

The North Bay sampling area is a large bay in northwestern Lake Muskoka. A total of eight creeks outlet into the bay, several draining wetland areas and one that passes through a District landfill site north of the lake. This is a moderately developed part of the lake, having many residential properties and several roads that are in close proximity to the shoreline. Development is mostly restricted to the areas adjacent to the lake leaving most of the upland forested areas in a natural state.

Volunteer Recognition

Lake Muskoka North Bay was monitored in 2009 by Eleanor Lewis.



2009 Data

NRT-0: TP-Spring turnover=5.5 µg/L

Secchi= 2.25 m

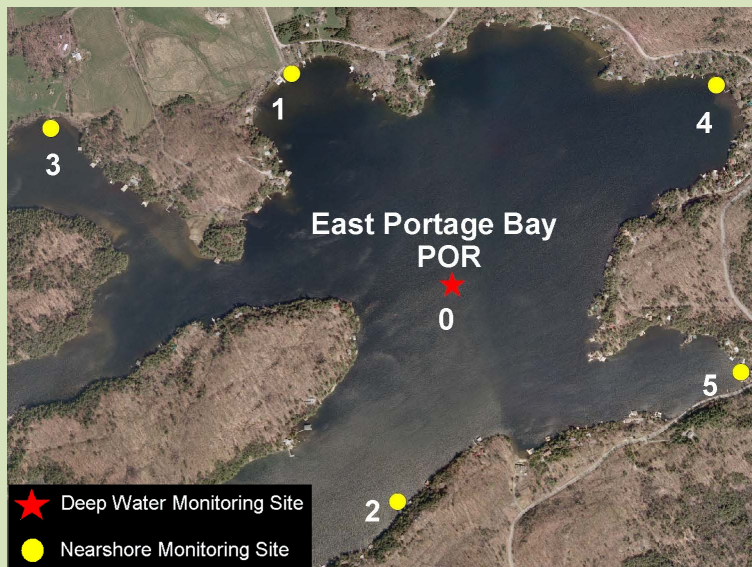
*this is a single spring sample location

Recommendations & Comments

- Lake Muskoka North Bay has the characteristics of an oligotrophic or low nutrient lake, with good water quality and clarity.
- Promote good shoreline stewardship to maintain water quality.

Trends

Monitoring of North Bay started in 2005. Since that time both spring turnover phosphorus concentrations have shown a steady decline. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009. Total coliform and *E. coli* were not monitored at this site.

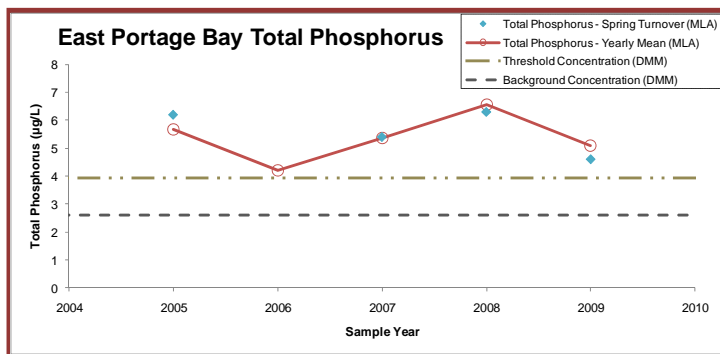


Area Description

East Portage Bay is located in eastern Lake Rosseau, has an area of approximately 1.33 km², and reaches a maximum depth of 12 m. This moderately developed bay has many roads, with several areas directly adjacent to the shoreline. There is a large agricultural area adjacent to the northern shoreline of the bay. No creeks outlet into the bay and there are no wetlands draining from the upper watershed. East Portage Bay is classified as highly sensitive and over threshold by the DMM.

Volunteer Recognition

East Portage Bay was monitored in 2009 by Joan McKinnon, Wayne McKinnon, Lawton Osler, and Marcia Shortreed.



Trends

Monitoring of East Portage Bay started in 2005. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated, consistently above the DMM threshold value. The lowest spring turnover phosphorus concentration since the start of the monitoring program was documented in 2009. Total coliform and *E. coli* were not monitored at this location.

2009 Data

POR-0: TP-Spring turnover=5.3 µg/L
TP-Yearly mean=6.2 µg/L
Secchi=4.23 m

POR-1: TP-Yearly mean=6.2 µg/L

POR-2: TP-Yearly mean=4.6 µg/L

POR-3: TP-Yearly mean=6.4 µg/L

POR-4: TP-Yearly mean=6.5 µg/L

POR-5: TP-Yearly mean=10 µg/L

Recommendations & Comments

- Lake Rosseau at East Portage Bay has water quality characteristic of an oligotrophic or low nutrient lake.
- Phosphorus concentrations are elevated above the DMM threshold value and the bay is classified as highly sensitive.
- Promote good shoreline stewardship to maintain and improve water quality.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.
- The Stewardship Initiative Group should have discussions with the DMM about development of an area specific stewardship plan.

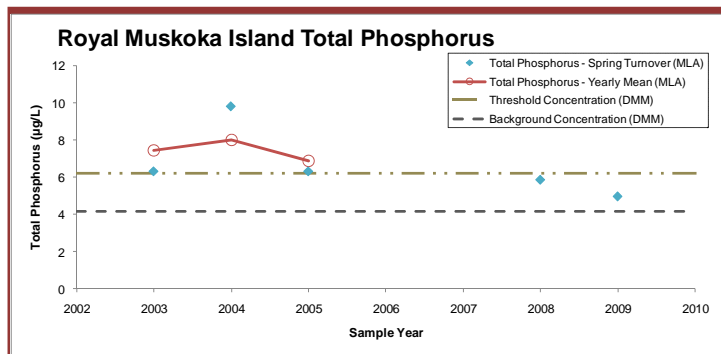


Area Description

Royal Muskoka Island is a deep water sample site located in the central portion of Lake Rosseau. This is a highly developed residential island with many roads and cottages along the shoreline, with much of the interior of the island cleared or otherwise altered. The eastern shore, opposite the sample site, is less developed with residences spread out along the shore. Northwest winds and a long fetch would result in significant wave action.

Volunteer Recognition

The sampling site at Royal Muskoka Island was monitored in 2009 by Peter Seybold.



2009 Data

RMI-0:TP-Spring turnover=5.0 µg/L

Secchi=3.00 m

*this is a single spring sample site

Recommendations & Comments

- Lake Rosseau at Royal Muskoka Island has water quality characteristic of an oligotrophic or low nutrient lake.
- Promote good shoreline stewardship to maintain and improve water quality.

Trends

Monitoring of Lake Rosseau at Royal Muskoka Island started in 2003. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009, where values approached background. Total coliform and *E. coli* were not monitored at this location.

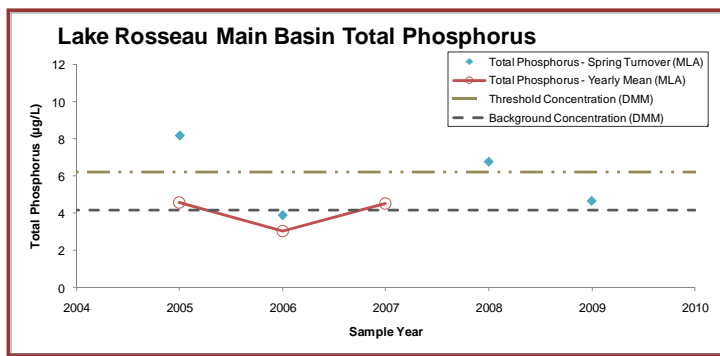


Area Description

The Main Basin of Lake Rosseau is approximately 55.5 km² in area with a maximum depth of 60 m. The lake is classified as a coldwater lake, and supports a naturally reproducing population of Lake Trout. Wetlands account for 5% of the upper watershed. The Lake Rosseau watershed, excluding the lake itself is 204.5 km². The DMM classifies the lake as moderately sensitive.

Volunteer Recognition

The main basin of Lake Rosseau was monitored in 2009 by Peter Seybold.



Trends

Monitoring of the Main Basin of Lake Rosseau started in 2005. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. The lowest spring turnover concentration of phosphorus, since the start of the monitoring program, was documented in 2006, with 2009 values approaching the background concentration. Total coliform and *E. coli* were not monitored at this location.

2009 Data

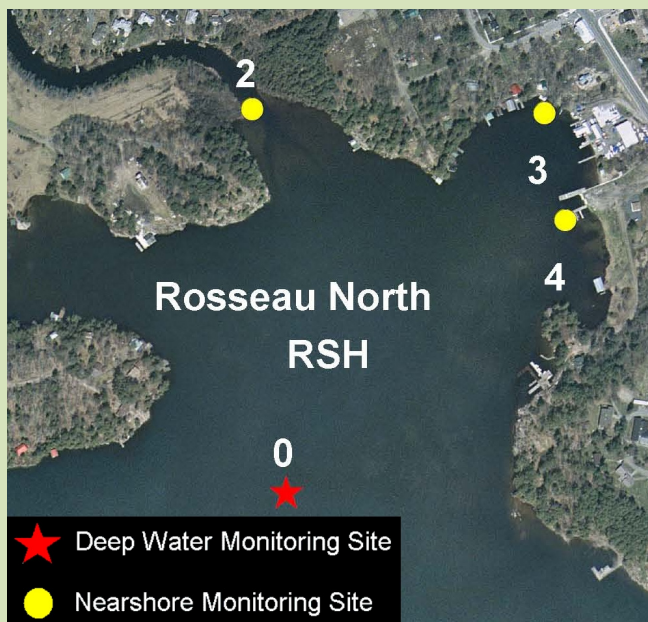
ROS-1:TP-Spring turnover=4.7 µg/L

Secchi=3.10 m

*this is a single spring sample site

Recommendations & Comments

- Lake Rosseau has good water quality characteristic of an oligotrophic or low nutrient lake.
- Promote good shoreline stewardship to maintain and improve water quality.

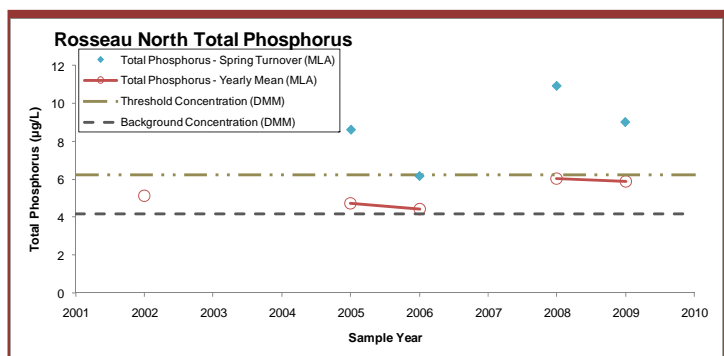


Area Description

The Rosseau North sample area is within the limits of the Village of Rosseau, at the northern portion of Lake Rosseau. Drainage from the village enters the lake at the sample locations as well as at the mouth of Shadow River. Two creeks drain into the bay, one through a lacustrine wetland along the western shoreline and the other near Highway 141 to the east. There is a high level of development not only along the shoreline of the lake and Shadow River, but in much of the watershed area in the form of residential and agricultural properties. North Lake Rosseau is classified as moderately sensitive by the DMM and over threshold.

Volunteer Recognition

Rosseau North sites were monitored in 2009 by David Peacock and Barry Rowland.



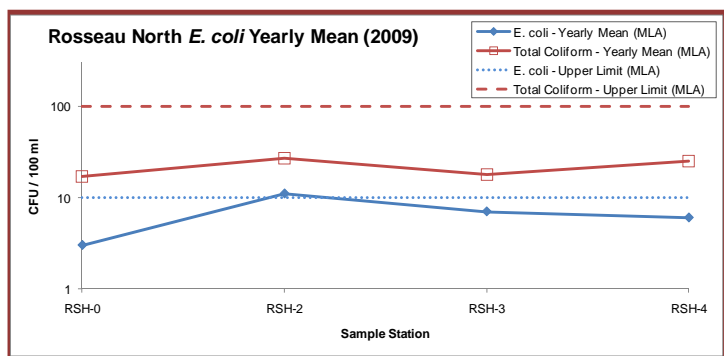
2009 Data

RSH-0: TP-Spring turnover=5.4 µg/L
TP-Yearly mean=µg/L
Secchi=3.13 m
Total coliforms=17 CFU/100 ml
Total *E. coli*=3 CFU/100 ml
*spring duplicate 25.6 did not use

RSH-2: TP-Yearly mean=10.9 µg/L
Total coliforms=27 CFU/100 ml
Total *E. coli*=11 CFU/100 ml

RSH-3: TP-Yearly mean=5.9 µg/L
Total coliforms=18 CFU/100 ml
Total *E. coli*=7 CFU/100 ml

RSH-4: TP-Yearly mean=6.3 µg/L
Total coliforms=25 CFU/100 ml
Total *E. coli*=6 CFU/100 ml



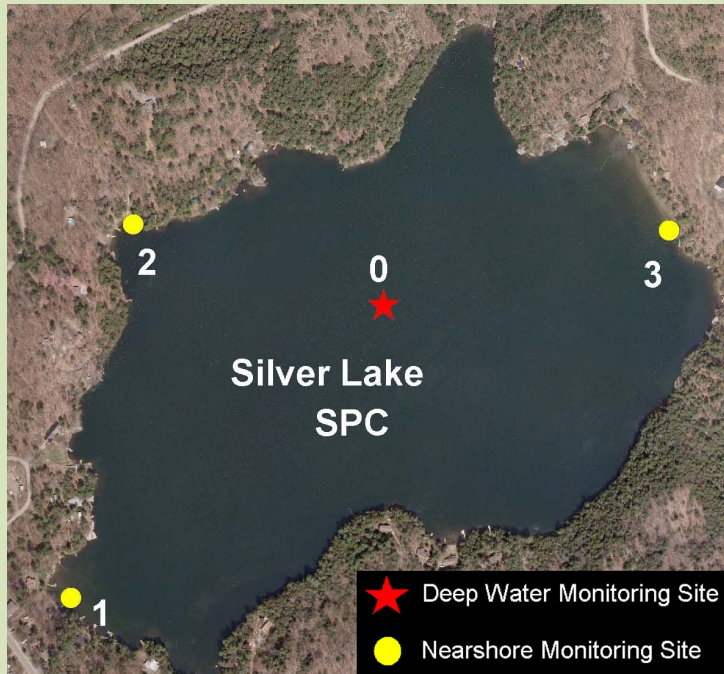
Recommendations & Comments

- Lake Rosseau North water quality is quite good and is typical of an oligotrophic or low nutrient lake.
- Coliform values are within the expected range for lakes in Muskoka, with Site 2 having the elevated values.
- Promote good shoreline stewardship on both private and commercial lands.

Trends

Monitoring of Rosseau North started in 2002. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. All spring turnover values have been over threshold, with yearly mean values considerably lower. Total coliform and *E. coli* were elevated at Site 2, above the MLA upper limit.

SILVER LAKE (SPC)

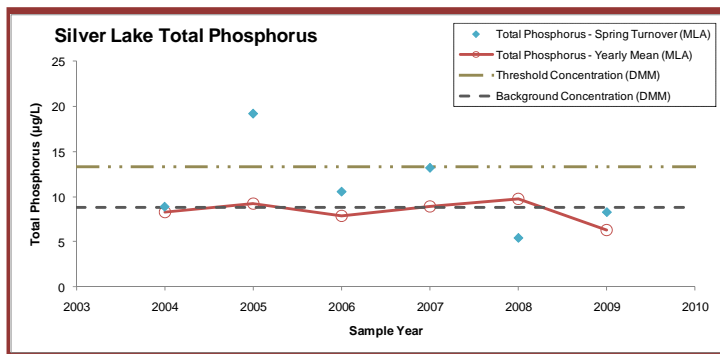


Area Description

Silver Lake immediately adjacent to Port Carling, is 0.57 km² in surface area with a maximum depth of 14 m. This lake has a moderate amount of shoreline residential development with alteration in the form of lawns and thinned forest occurring over approximately 50% of the upland area. The riparian area is well buffered with 90% of the immediate shoreline in a natural state. The southwestern portion of this lake receives drainage from part of the Port Carling urban area. There is limited flow into the lake with one identified outlet in the south. Silver Lake is classified as moderately sensitive by the DMM.

Volunteer Recognition

Silver Lake was monitored in 2009 by Perry Bowker.



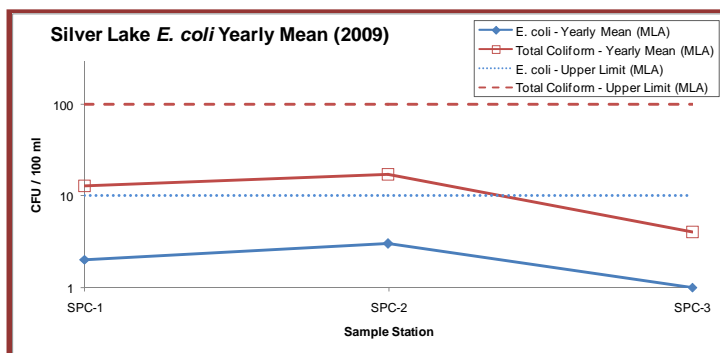
2009 Data

SPC-0: TP-Spring turnover=8.3 µg/L*
TP-Yearly mean=6.3 µg/L
Secchi=4.76 m

SPC-1: Total coliforms=13 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

SPC-2: Total coliforms=17 CFU/100 ml
Total *E. coli*=3 CFU/100 ml

SPC-3: Total coliforms=4 CFU/100 ml
Total *E. coli*=1 CFU/100 ml



Trends

Monitoring of Silver Lake started in 2004. Since that time spring turnover phosphorus has fluctuated while yearly mean values have remained steady. The lowest mean concentration of phosphorus since the start of the monitoring program was documented in 2009. Total coliform and *E. coli* were quite low at each site in 2009.

Recommendations & Comments

- Silver Lake is an oligotrophic or low nutrient lake bordering on mesotrophic, with good water quality and clarity.
- Coliform values are within the expected range for lakes in Muskoka, with Site 2 having the highest values.
- Promote good shoreline stewardship, proper forest management, and tree planting in upland areas to maintain water quality.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

STEPHEN'S BAY (STE)

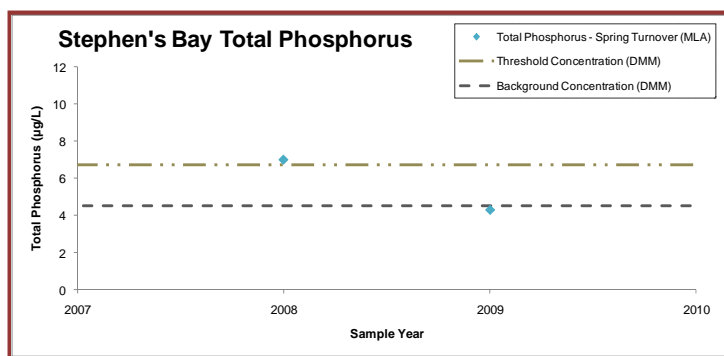


Area Description

Stephen's Bay is a large open bay in northern Lake Muskoka. This bay receives drainage from a large wetland and agricultural area in the north. The shoreline is considered moderately developed, with the upland forest maintained in a primarily natural state. One large resort area is located along the north shore of this bay. The openness of this bay would result in a large fetch in the sampling area.

Volunteer Recognition

Stephen's Bay was monitored in 2009 by Brian Yeates



2009 Data

STE-0:TP-Spring turnover=4.3 µg/L

Secchi=3.00 m

*this is a single spring sample site

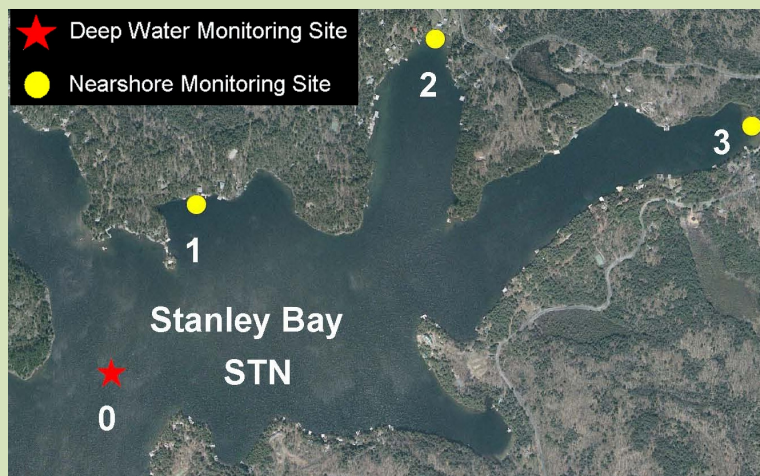
Recommendations & Comments

- Stephen's Bay in Lake Muskoka has water quality characteristic of an oligotrophic or low nutrient lake.
- Promote good shoreline stewardship to maintain water quality.

Trends

Monitoring of Stephen's Bay started in 2008. Spring turnover phosphorus concentration in 2008 and 2009 shows considerable decline. The 2009 data are comparable to background levels of phosphorus. Total coliform and *E. coli* were not monitored at this location.

STANLEY BAY (STN)

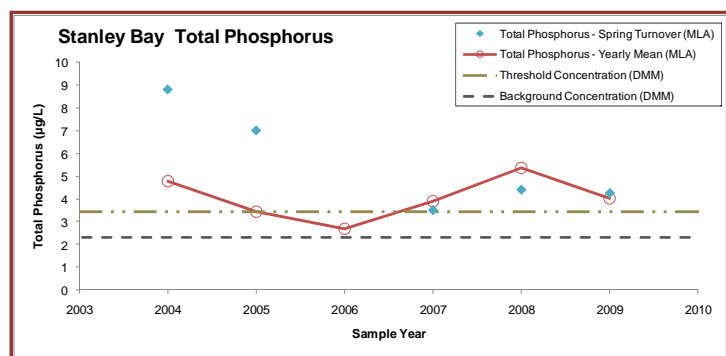


Area Description

Stanley Bay is a bay on the north-east side of Lake Joseph. This deep water bay has evenly distributed development with largely intact forest cover along the shoreline. Nearshore sample sites 2 and 3 are located in shallow, sandy areas at the base of the small bays where creeks outlet. There are several roads around this bay and a moderate level of residential development, but no marinas, large resorts, commercial or agricultural development which would negatively impact water quality. The main basin of Lake Joseph is classified as highly sensitive by the DMM.

Volunteer Recognition

Stanley Bay was monitored in 2009 by Dean Martin.



2009 Data

STN-0: TP-Spring turnover =4.3 µg/L
TP-Yearly mean =4.0 µg/L
Secchi=5.46 m

STN-1: TP-Yearly mean =4.6 µg/L

STN-2: TP-Yearly mean =4.3 µg/L

STN-3: TP-Yearly mean =7.6 µg/L

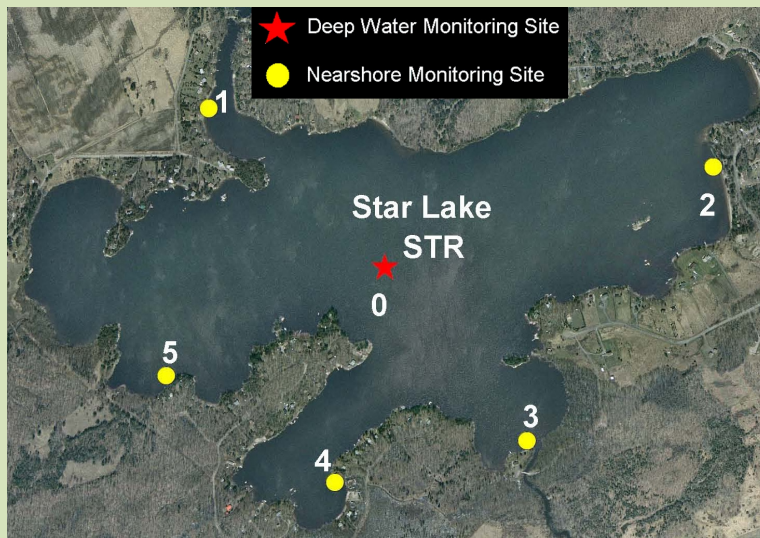
Trends

Monitoring of Stanley Bay started in 2004. Since that time spring turnover phosphorus concentrations have shown a gradual decrease, with yearly means showing some fluctuations. The spring phosphorus concentrations have remained relatively stable over the past three years. From a nutrient perspective water quality conditions appear good in the bay.

Recommendations & Comments

- Stanley Bay is a moderately developed waterfront community, with water quality conditions characteristic of oligotrophic or low nutrient lakes and good clarity.
- Promote good shoreline stewardship.
- Consider participating in the *E. coli* monitoring program.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

STAR LAKE (STR)

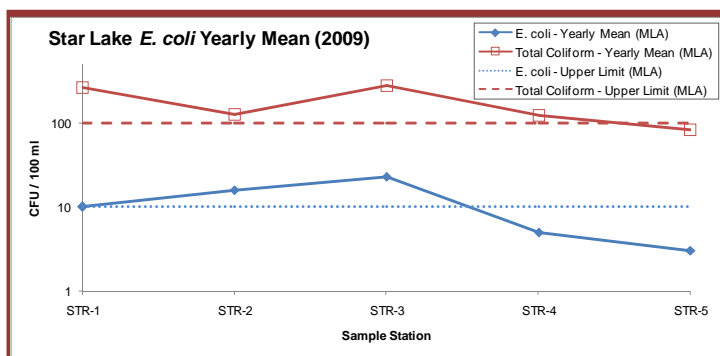
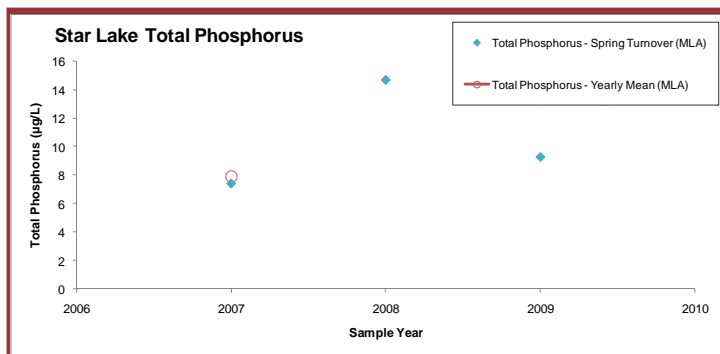


Area Description

Star Lake is located in the Township of Seguin and is approximately 158 ha in area with a maximum depth of 22.6m. This lake has a moderate to high level of shoreline development in the form of residential properties. Many of these properties maintain natural riparian vegetation along the shoreline, but some have extensive clearings and lawns. There is a large agricultural area adjacent to the northwestern shore and several roads that travel in close proximity to the lake. This lake has several inflow and outflow creeks, with limited wetland areas in the upper watershed.

Volunteer Recognition

Star Lake was monitored in 2009 by Karen Gillies, Peter Mokriy and Sara Slater.



Trends

Monitoring of Star Lake started in 2007. Since that time spring turnover phosphorus has fluctuated between 7 and 15 µg/L. The lowest spring phosphorus concentration was noted in 2007, with 2009 data only slightly higher. Total coliforms were elevated at all sites above the MLA upper limit, while *E. coli* values were below the MLA upper limit at Sites 4 and 5 in 2009.

2009 Data

STR-0: TP-Spring turnover=9.3 µg/L
Secchi=2.74 m

STR-1: Total coliforms=265 CFU/100 ml
Total *E. coli*=10 CFU/100 ml

STR-2: Total coliforms=125 CFU/100 ml
Total *E. coli*=16 CFU/100 ml

STR-3: Total coliforms=276 CFU/100 ml
Total *E. coli*=23 CFU/100 ml

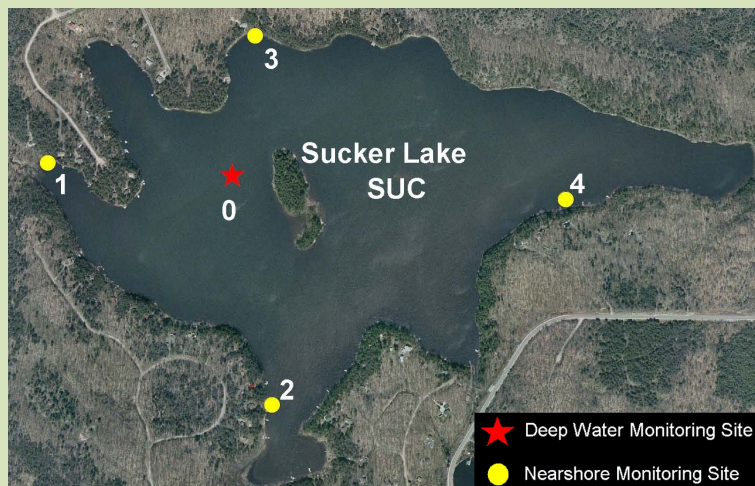
STR-4: Total coliforms=123 CFU/100 ml
Total *E. coli*=5 CFU/100 ml

STR-5: Total coliforms=83 CFU/100 ml
Total *E. coli*=3 CFU/100 ml

Recommendations & Comments

- Star Lake is an oligotrophic or low nutrient lake, with good water quality and moderate clarity.
- Coliform values are slightly elevated from the expected range for lakes in Muskoka, with Site 3 having the highest values.
- Promote good shoreline stewardship to maintain water quality and provide detailed notes on land use adjacent to all sites during 2010 sampling.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

SUCKER LAKE (SUC)

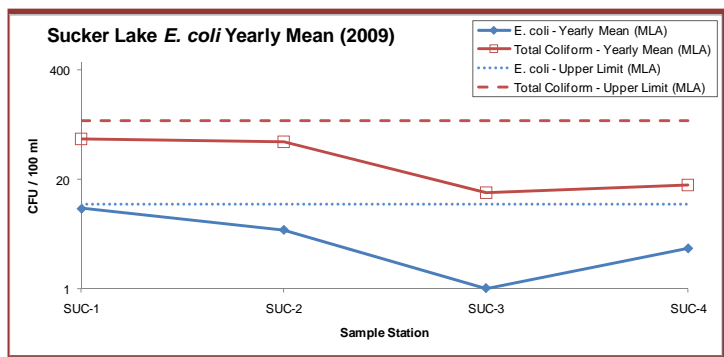
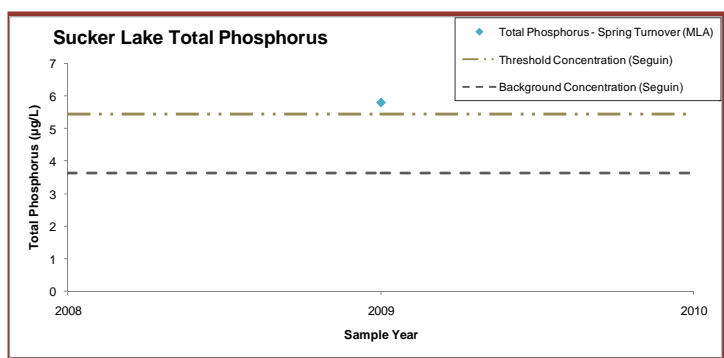


Area Description

Sucker Lake is a medium sized lake draining into Lake Rosseau, in the Township of Seguin. This lake has low shoreline development intensity, and the riparian area is well vegetated. There are several creeks that drain into the lake, including those with wetland areas. A few roads are constructed in close proximity to the shoreline, including District Road 632 connecting Rosseau and Minett.

Volunteer Recognition

Sucker Lake was monitored in 2009 by Greg Clarkson.



2009 Data

SUC-0: TP-Spring turnover=5.8 µg/L
Secchi=3.39 m

SUC-1: Total coliforms=60 CFU/100 ml
Total *E. coli*=9 CFU/100 ml

SUC-2: Total coliforms=56 CFU/100 ml
Total *E. coli*=5 CFU/100 ml

SUC-3: Total coliforms=14 CFU/100 ml
Total *E. coli*=1 CFU/100 ml

SUC-4: Total coliforms=17 CFU/100 ml
Total *E. coli*=3 CFU/100 ml

Recommendations & Comments

- Sucker Lake is an oligotrophic or low nutrient lake, with good water quality and clarity.
- Coliform values are within the expected range for lakes in Muskoka, with Site 1 having the highest values.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Site 1 during 2010 sampling.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network.

Trends

Monitoring of Sucker Lake started in 2009, with the single measurement of spring turnover phosphorus above the Township threshold value. Total coliform and *E. coli* were elevated at Site 1.

TOBIN'S ISLAND (TOB)

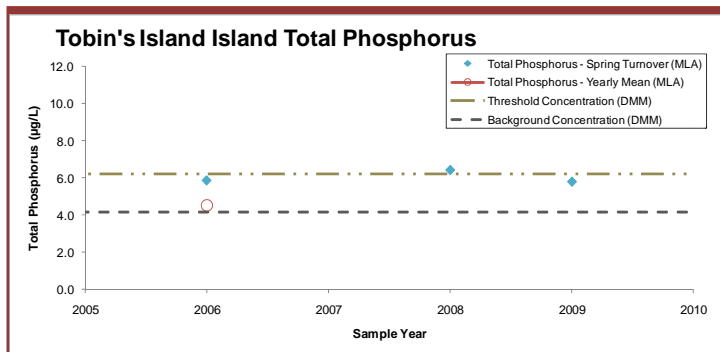


Area Description

Tobin's Island is an open bay area in the central part of Lake Rosseau. The surrounding area is moderately developed with cottage/residential properties along the shoreline, with much of the inland forest area remaining natural. Two creeks from adjacent wetland areas drain into the lake within this sampling area.

Volunteer Recognition

The sampling site at Tobin's Island was monitored in 2009 by Peter Seybold.



2009 Data

TOB-0:TP-Spring turnover=5.8 µg/L

Secchi=3.20 m

*this is a single spring sample site.

Recommendations & Comments

- Lake Rosseau at Tobin's Island has water quality characteristic of an oligotrophic or low nutrient lake.
- Promote good shoreline stewardship to maintain and improve water quality.

Trends

Monitoring of Lake Rosseau at Tobin's Island started in 2006. Since that time spring turnover phosphorus concentrations have fluctuated. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009, with values just below the DMM threshold. Total coliform and *E. coli* were not monitored at this location.

WALKER'S POINT (WAK)

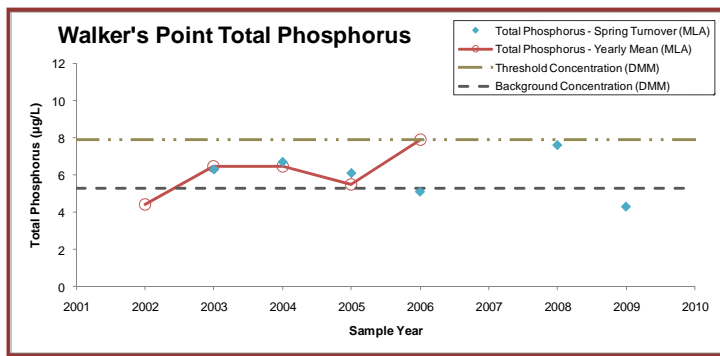


Area Description

Walker's Point is located along the eastern shoreline of central Lake Muskoka and is a very popular area of the lake. Although the area has many shoreline residences and one large resort area, riparian and upland vegetation is still primarily undisturbed. A creek that drains into the lake near Walker's Point originates from a 1.5 acre wetland.

Volunteer Recognition

The Walker's Point station was monitored in 2009 by Brian Yeates



2009 Data

WAK-0:TP-Spring turnover=4.3 µg/L

Secchi=3.40 m

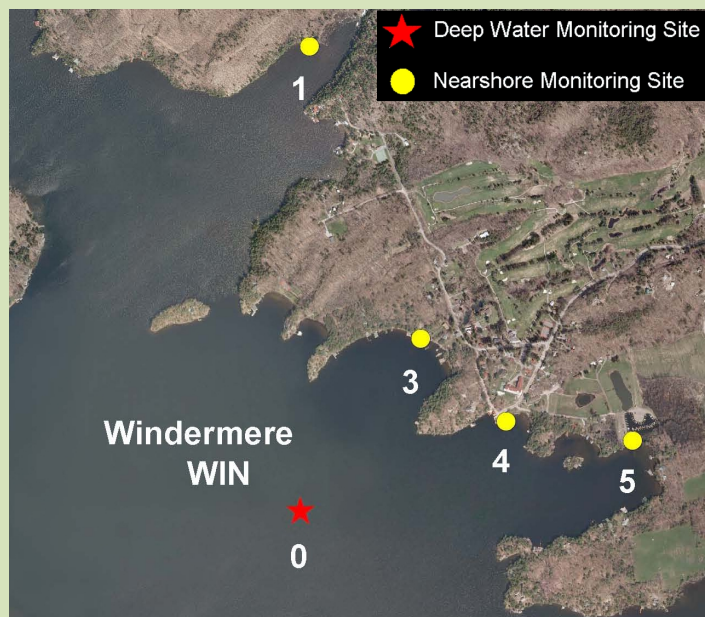
*this was a single spring sample site

Recommendations & Comments

- Lake Muskoka at Walker's Point has good water quality characteristic of an oligotrophic or low nutrient lake.
- Promote good shoreline stewardship to maintain water quality.

Trends

Monitoring of Lake Muskoka at Walker's Point started in 2002. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. The lowest concentration of spring turnover phosphorus since the start of the monitoring program was documented in 2009. Total coliform and *E. coli* were not monitored at this location.

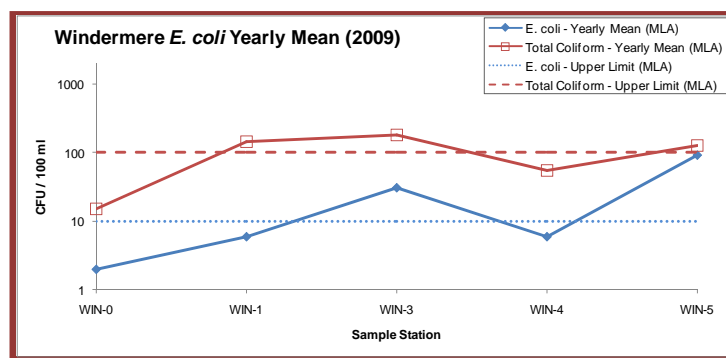
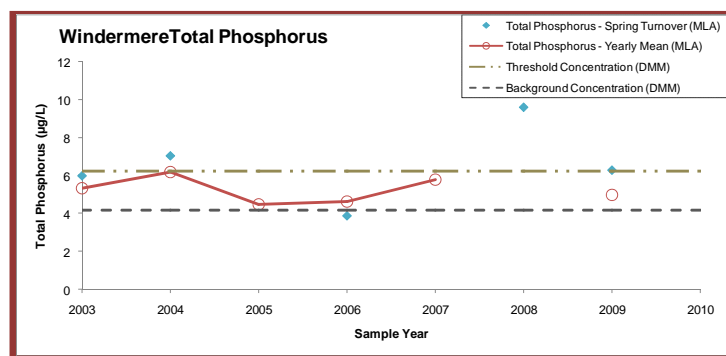


Area Description

The Windermere village area in northern Lake Rosseau is a highly developed resort and residential area. There is a large resort complex, golf course, marina, many residential properties. In addition, there is a significant amount of agricultural land near the sampling area. Several creeks outlet into this area, one which flows through farms fields, a wetland and enters the lake at the marina. WIN-1 is located away from the village in a primarily natural area at the outlet of the Dee River and Clark Pond. Main Lake Rosseau is classified as moderately sensitive by the DMM.

Volunteer Recognition

Sampling sites at Windermere were monitored in 2009 by Doug Applegath and Bev Manchee.



Trends

Monitoring of Lake Rosseau at Windermere started in 2003. Since that time both spring turnover and yearly mean phosphorus concentrations have fluctuated. Data for 2009 spring turnover were at the DMM threshold value, which is a decline from the previous year. Total coliform and *E. coli* were elevated at Sites 1, 3 and 5.

2009 Data

WIN-0: TP-Spring turnover=6.3 µg/L
TP-Yearly mean=5.2 µg/L
Secchi=4.68 m
Total coliforms=15 CFU/100 ml
Total *E. coli*=2 CFU/100 ml

WIN-1: TP-Yearly mean=17.1 µg/L
Total coliforms=142 CFU/100 ml
Total *E. coli*=6 CFU/100 ml

WIN-3: TP-Yearly mean=15.3 µg/L
Total coliforms=177 CFU/100 ml
Total *E. coli*=31 CFU/100 ml

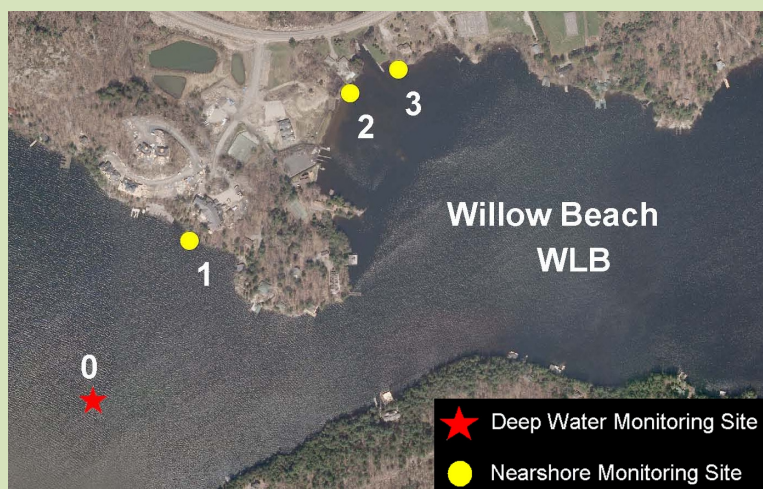
WIN-4: TP-Yearly mean=6.7 µg/L
Total coliforms=54 CFU/100 ml
Total *E. coli*=6 CFU/100 ml

WIN-5: TP-Yearly mean=25.2 µg/L
Total coliforms=126 CFU/100 ml
Total *E. coli*=92 CFU/100 ml

Recommendations & Comments

- Lake Rosseau at Windermere has good water quality characteristic of an oligotrophic or low nutrient lake.
- Coliform values are within the expected range for lakes in Muskoka, with Sites 1, 3 and 5 having elevated values.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Sites 1, 3 and 5 during 2010 sampling.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

WILLOW BEACH (WLB)

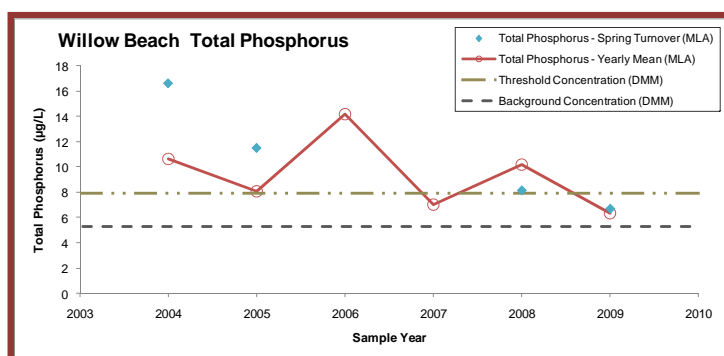


Area Description

The Willow Beach sampling area is characterized by a highly developed section of shoreline. There is the newly re-developed resort complex, a wetland with creek flow through a nine-hole golf course and several larger properties with limited retained forest cover. Highway 118 is in close proximity to the shoreline along much of this reach.

Volunteer Recognition

Willow Beach stations were monitored in 2009 by Liz Denyar



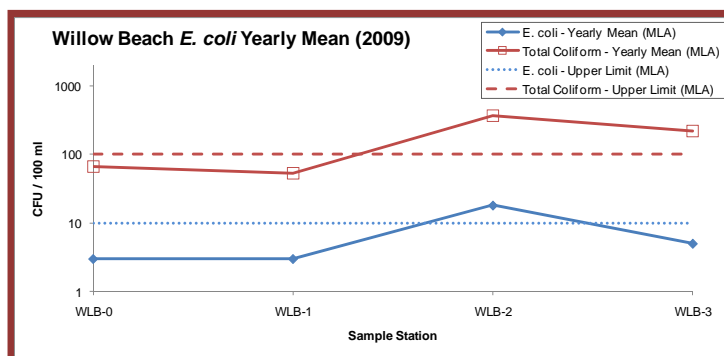
2009 Data

WLB-0: TP-Spring turnover=6.7 µg/L
TP-Yearly mean=6.4 µg/L
Secchi=2.89 m
Total coliforms=67 CFU/100 ml
Total *E. coli*=3 CFU/100 ml

WLB-1: TP-Yearly mean=11.5 µg/L
Total coliforms=52 CFU/100 ml
Total *E. coli*=3 CFU/100 ml

WLB-2: TP-Yearly mean=9.0 µg/L
Total coliforms=361 CFU/100 ml
Total *E. coli*=18 CFU/100 ml

WLB-3: TP-Yearly mean=9.2 µg/L
Total coliforms=216 CFU/100 ml
Total *E. coli*=5 CFU/100 ml



Trends

Monitoring of Willow Beach started in 2004. Since that time both spring turnover and yearly mean phosphorus concentrations have shown a declining trend. The lowest concentrations of phosphorus since the start of the monitoring program were documented in 2009. Total coliform and *E. coli* were elevated at Sites 2 and 3.

Recommendations & Comments

- Lake Muskoka at Willow Beach has good water quality characteristic of an oligotrophic or low nutrient lake.
- Coliform values are within the expected range for lakes in Muskoka, with Sites 2 and 3 having elevated values.
- Promote good shoreline stewardship, and provide detailed notes on land use adjacent to Sites 2 and 3 during 2010 sampling.
- Consider becoming involved in the Ontario Benthic Biomonitoring Network through the DMM.

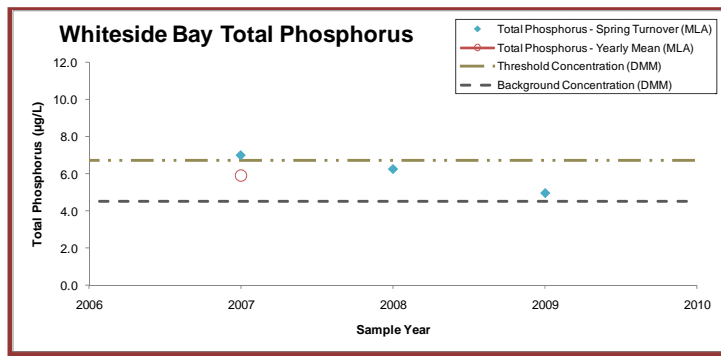


Area Description

Whiteside Bay is a partially isolated bay in the northwestern portion of Lake Muskoka. It is moderately developed with cottage/residential properties and has roadways that come in close proximity to the shoreline in several areas. Inflow into the lake comes from two creeks, one of which originates in an extensive wetland complex to the north.

Volunteer Recognition

Whiteside Bay, Lake Muskoka, was monitored in 2009 by Eleanor Lewis.



2009 Data

WTS-0:TP-Spring turnover=5.0 µg/L

Secchi=2.90 m

*this is a single spring sample site

Recommendations & Comments

- Lake Muskoka at Whiteside Bay has good water quality characteristic of an oligotrophic or low nutrient lake.
- Promote good shoreline stewardship to maintain water quality.

Trends

Monitoring of Whiteside Bay started in 2007. Since that time spring turnover phosphorus concentrations have steadily declined. The lowest concentration of phosphorus since the start of the monitoring program was documented in 2009. Total coliform and *E. coli* were not monitored at this location.