



## TOWNSHIP OF SEGUIN

**Prepared for:** Mayor & Council

**Department:** Community Services

**Agenda Date:** October 21, 2013

**File Number:** CS-FC-2013-018

### Subject

Water Quality Monitoring & Septic Re-inspection Program Report

### Recommendation

THAT Council receives the Water Quality Monitoring and Septic Re-inspection Program report for information.

### Purpose of Report

To provide the Council of the Township of Seguin a summary of key findings of the 2013 Water Quality and Septic Re-inspection Program.

### Background/Analysis

As an environment first municipality, being proactive at environmental planning initiatives and outreach helps to improve water quality and the overall health of our lakes in the future. Our Water Quality Monitoring Program and Septic Reinspection Program continue to monitor the ecological health of our lakes, maintains our septic systems and collaborates with our numerous Lake Association as part of our overall stewardship initiatives. This report will provide Council with an update for the 2013 season for both programs.

#### **Water Quality Program:**

The Seguin Lake Water Quality Monitoring Program, developed in 2008, is a field-based program that monitors approximately 120 lakes across Seguin on a rotating basis. The purpose of the Water Quality Monitoring Program is to establish a historical record of water quality parameters so that trends in water quality can be identified.

#### **The Water Quality Monitoring Program measures:**

- Spring Phosphorus concentrations (a measure of nutrient enrichment)
- Dissolved Organic Carbon
- Secchi Depth (a measure of water clarity)
- End of summer dissolved oxygen and temperature profiles

**Operation:**

The Water Quality Monitoring Program consists of two phases, one in May and the other in August. In May, dissolved oxygen testing and secchi disk readings are taken on our specified lakes and water samples are taken and transported to a lab in Dorset to be tested for phosphorous. In August, dissolved oxygen testing and secchi disk testing are completed.

In 2013, 53 lakes were chosen and tested compared to 50 lakes in 2012. The consistent increase in the number of lakes tested per year is a positive step in acquiring more historical data for the program. The data collected over time allows us to monitor future sensitivities to phosphorus or potential problems that may arise. In fact, the Ministry of the Environment recommends a minimum of two years of phosphorus data to be 95% confident of being within 20% of the mean annual concentration of a lake. For our lakes, 72 lakes now have at least two years of monitoring data compared to 56 in 2012, 47 lakes in 2011, 39 lakes in 2010 and only 28 lakes in 2009. With continued monitoring by the program approximately half of our lakes will have at least 3 years of data by 2014 when a review of the 2009 water quality model will take place.

The following summary and recommendations have been received from Hutcheson Environmental:

- A total of 73 of 128 lakes (57%) in Seguin Township have measured spring total phosphorus concentration data and at the conclusion of the 2013 spring monitoring program, and 65 lakes have a minimum of 3 years of data. There are now a sufficient number of lakes with measured phosphorus data to confidently validate the water quality model.
- We recommend that the Seguin Township monitoring program continue to monitor spring total phosphorus concentration for the existing monitoring lakes (65 lakes) on a 2-year rotation (approximately half of the lakes each year).
- Due to the complex lake shape and bathymetry of Horseshoe Lake, we continue to recommend that spring total phosphorus sampling be conducted at 3 locations in the lake in 2013 to support the possibility of multi-basin modeling of this lake in future revisions to the model.
- August monitoring of dissolved oxygen, temperature, lake depth and Secchi depth has been completed for 68 lakes. These data have been useful to flag shallow lakes, high DOC lakes and lakes that potentially undergo anoxia for refinement of the model. We recommend that monitoring in 2014 focus on lakes that have not yet been monitored, lakes that have been flagged as potentially developing anoxia in the hypolimnion and lakes that are designated as Lake Trout Lakes by the Ministry of Natural Resources.
- If additional time or funding is available, we recommend that a subset of lakes be sampled for dissolved organic carbon or phosphorus concentration at the end of summer from the hypolimnion. HESL will work with Seguin Township to select the most appropriate lakes for additional sampling if this is possible. Collection of these additional parameters, where appropriate, is recommended over sampling additional lakes for spring total phosphorus.
- There may be additional phosphorus data from LPP which could be used for the 2014 update of the model, but these data should be reviewed (bad splits, outliers, timing of sample collection, etc.) for consistency with the Seguin monitoring data.
- The three basins making up Horseshoe Lake should be considered for separate monitoring for the update of the model

For more information on the lakes tested in the 2013 year, please review the attached student "Water Quality Program 2013 Year End Report" and the "Hutcheson Environmental 2013" report.

**Septic Re-inspection Program:**

The Township of Seguin Septic Re-inspection Program is a proactive strategy on the part of the municipality and serves to compliment the Seguin Lake Water Quality Program developed in 2008. The program was implemented in the spring of 2002 and currently is in its 12th year. The program is run in partnership with the North Bay Mattawa Conservation Authority.

In many small and rural communities like Seguin, septic systems are the common method of waste disposal and treatment. If properly designed, installed and maintained, a septic system could service a home for up to twenty years. However, poorly designed, installed or un-maintained systems may pose a threat to the environment and health through inadequately treated waste.

Since the implementation of the program in 2002, our main objective has been to inspect existing sewage disposal systems for malfunction, deterioration, erosion and overall compliance with the Ontario Building Code (OBC).

The goal of the program is to encourage regular maintenance of septic systems to avoid any possible threats to the environment.

**Operation:**

Throughout June, July and August (first two weeks) our students inspect septic systems throughout Seguin and encourage regular maintenance and proper care of these systems to avoid any possible threats to the environment.

This season, the majority of selected properties were located on Lake Joseph and Lake Rosseau. Currently, nearly all of the properties on the western shorelines of Lake Rosseau and Lake Joseph have had an inspection completed. In addition, Tucker Lake was inspected this year as a precautionary measure given an out of character algae bloom that occurred on the lake in the early summer. It was found that only minor infractions were noted around the lake and therefore concluded that improper waste handling did not contribute to the bloom.

During the summer of 2012 the following was reported:

- A total of 155 properties were inspected from Lake Rosseau, Lake Joseph and Tucker Lake. Follow up inspections were completed on 27 properties.
- Of the 155 inspections
  - 22 properties were found to have deficiencies
  - 27 properties were reinspected given previous infractions and of those 18 files were able to be closed.

Overall, the Community Services Department and North Bay Mattawa Conservation Authority have been working together to streamline the Septic Re-inspection program. In the past, all records for re-inspections of Seguin properties have been determined upon the beginning of the students summer program, therefore a considerable amount of time is spent pulling files and waiting. Following the conclusion of inspections in 2013, the data has once again been submitted to our GIS coordinator who will input the data into our GIS system. Therefore, students have been able to identify and target properties to be reinspected in 2014. A request will be submitted to NBMCA to pull these files for 2014. This will streamline the program and make it more efficient.

For a the complete year end report, please see the attached "Septic Re-Inspection Program Year End Report 2013"

**Policy & Budget Implications**

N/A

**Conclusion**

In conclusion, both the Seguin Water Quality Monitoring Program and the Septic Re-inspection Program are integral components to the Stewardship of our natural resources. Continued monitoring of our lakes will provide important historical data essential to the ongoing assessment of development capacities and the health of our lakes. Generally, the program has identified a positive trend in decreasing phosphorus levels in our Seguin Lakes.

Re-inspecting septic systems throughout the municipality will provide an indication of the violations present on residential properties. More importantly, it will provide an educational tool for residents focusing on the importance of maintaining septic systems through stewardship of their own properties.

We look forward to another successful year in 2014.

**Respectfully Submitted By:**

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**Kelly Krist**                      **Director of Community Services**

**Reviewed By:**

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**Tom Stockie**                      **CAO**

**Attachments**

*Water Quality Program 2013 Year End Report  
Septic Re-Inspection Program 2013 Year End Report  
Hutcheson Environmental Water Quality Report 2013*

**Seguin Township**  
Water Quality Program  
2013 Season Report

Scott Askes & Melissa Pope



## Introduction:

Over the past six years, the Township of Seguin has been developing and carrying out a water monitoring program in an effort to evaluate the ecological health of its lakes. Over the course of the 2013 water monitoring term, a total of 73 different lakes were selected, and sampled. All of the lake sampling was carried out during the months of May-June and August-September. Of these 72 lakes; 29 had both total phosphorous (May-June) and Dissolved Oxygen (August-September) sampling completed. The Water Quality Monitoring program conducted testing on 15 lakes with no previous sampling history. See appendix A. for complete list of lakes sampled.

The list of selected lakes for sampling was produced by compiling lists provided by; HESL (Hutchinson Environmental Sciences Ltd.) and our Director of Planning (Chris Madej), with additional input from the Director of Community Services (Kelly Krist), and the returning Water Monitoring Program students (Scott Askes and Melissa Pope). The selection process took into consideration the following parameters; sensitivity to changes in total phosphorous levels, historically abnormal phosphorous levels, lakes with records of anoxic conditions, and lakes with few or no previous years of sampling. The list of lakes sampled in the later half of the season was also modified to include those lakes, which had recorded algae blooms during the 2013 sampling season.

During the months of May and June, the selected 53 lakes were tested, and all samples were refrigerated until the end of the "spring" sampling period. At that time, all of the samples were packed and sent to Dorset Environmental Science Center for laboratory analysis. Sampling included the use of a Secchi disc (black and white patterned disc) to measure water clarity, and water-sampling bottles/test tubes to harvest water in duplicate to be sent off for testing. Geographical data and qualitative observations are also recorded on site including weather description and water tint/colouring.

Sampling carried out during the months of August and September included geographical data, qualitative observations, temperature profile readings, and dissolved oxygen profile readings. All of the temperature profile and dissolved oxygen profile readings were taken at one-meter intervals using a YSI 550A portable dissolved oxygen instrument. A total of 48 lakes were tested, 10 of which had no previous years of testing.

## Analysis:

Total phosphorous sampling commenced upon the immediate arrival of the Water Monitoring Program students, as spring is the most active time for lake turnover events and provides the most accurate/uniform estimation for total phosphorous concentrations of each lake. Lake turnover events occur when the surface water begins to change states from a solid to a liquid. During this state change, the melting water reaches its most dense state (approx. 4°C) and sinks, forcing the cooler less dense water towards the surface resulting in a convection force ultimately leading to a lake

mixing. During the turnover event, the most active mixing occurs at the deepest point of the lake making this the ideal position for sampling. The samples were extracted from the lake in duplicate using composite sampling techniques. The depth of the composite sample taken was determined by the water clarity value, as determined using a Secchi disc. Upon analysis of the samples by Dorset Environmental Sciences the phosphorous concentration can be calculated and the amount of nutrients available for algae consumption can be assessed. As phosphorous is a primary nutrient for all types of algae, lakes that have higher total phosphorous concentrations run higher risks for algae blooms.

Dissolved oxygen readings were recorded at the end of the sampling term as a measure of lake productivity and health. Dissolved oxygen results can give insights into the processes, which have occurred over the course of the summer months. Otter, Sucker, and Three Legged lakes are examples of lakes that have shown oxygen concentration maxima in the metalimnetic zone (zone describing abrupt water temperature decrease), which are almost always a result of a period of over developed algae populations. Lakes can also go through anoxic (oxygen concentrations less than 3mg/l) cycles, which can be damaging to aquatic plant and wildlife. Dissolved oxygen readings were taken at one meter intervals from the surface until one meter from the lakebed, or a to a maximum depth of 30 meters. All of the collected data was sent to Hutchinson Environmental Sciences Ltd. for complete analysis.

#### Recommendations:

This being the 6<sup>th</sup> year of the water quality program, the focus was on streamlining the program so that the students can be as efficient as possible while carrying out sampling procedures. Working in close association with both Dorset Environmental Science Centre and Hutchinson Environmental Sciences Ltd. is and will continue to be a priority for the Water Quality Monitoring program, especially as Hutchinson Environmental updates and revamps the existing lake sampling model. It is recommended that those lakes, which have shown potential anoxic conditions and those experiencing high sensitivity to phosphorous concentrations, continue to be monitored. See Appendix B. for list of previously sampled lakes and number of years sampled. Additionally, it is recommended that an extra effort be made to sample lakes, which have not been sampled in the past. See Appendix C. for a table of named lakes, which have not been sampled.

#### Conclusion:

The Lake Monitoring Program is a very important environmental initiative to protect the Township of Seguin's most valuable resource. This year the Water Quality team measured 53 lakes during the spring sampling period and 48 lakes during the fall sampling period. These numbers are higher than any other year in the past, and we hope that the Water Quality Program continues to gain efficiency and valuable data. A complete report including lab analysis and further recommendations will be completed by Hutchinson Environmental Science Ltd. later in the fall.

Appendix A.

Table 1.0: Lakes Tested for Total Phosphorous Levels

3-Legged	First	Lieback	Otter	Sugar
Armishaw	Forget	Linger Long	Pender	Ten Mile
Back	Gilbank	Little Lk Joe	Portage	Third
Blackwater	Haines	Little Otter	Rankin	Trout
Brennan	Horseshoe I	Lower Fry	Roberts	Tucker
Burnt	Horseshoe II	Maple	Salmon	Turtle
Capton	Horseshoe III	Martin	Scott	Upper Fry
Clear	Isabella	McDonald	Second	Virtue
Duck	Kight	Mirror	Star	Whitefish
Dyson	Kingshott	Neville	Storm	Windfall
Fair	Lane	Oastler	Sucker	Yarrow

Table 2.0: Lakes Tested for Dissolved Oxygen Content

3-Legged	Fair	Lieback	McKenchnie	Soverign
Back	First	Lioness	McNutt	Star
Bright	Forget	Little Otter	Mirror	Stata
Burr	Gilbank	Little Whitefish	Otter	Sucker
Capton	Haines	Long	Pender	Turtle
Clear	Horseshoe I	Lower Fry	Portage	Unnamed #1
Day	Horseshoe II	McDonald	Rankin	Unnamed #2
Doley	Horseshoe III	MacLeod	Roberts	Virtue
Duck	Isabella	Manitouaba	Salmon	Whitefish
Dyson	Lane	Maple	Silver	



Appendix B.

Tables 2.0 & 2.1: Previously Sampled Lakes and Number of Times Sampled

Lake Name	Total Times Surveyed 2008-2013
Armishaw	2
Baby	3
Back	1
Blackwater	4
Blue	2
Brennan	2
Burnt	2
Capton	1
Clear	5
Cosh	4
Diamond	4
Draper	2
Duck	5
Dyson	3
Fair	2
Faris	1
First	2
Flaxman	2
Forget	4
Gilbank	4
Haines	3
Horseshoe	5
Isabella	5
Kight (Miller)	2
Kingshot	3
Lane	2
Lieback	2
Linger Long	4
Lioness	1
Little Lk Joseph	3
Little Otter	1
Little Whitefish	4
Long 1	3
Long 2	1
Lower Fry	4
MacLeod	1
Manitouwaba	1
Maple	5
Martin	2

Lake Name	Total Times Surveyed 2008-2013
McDonald	2
McGowan	2
McKechnie	2
McLeans	2
McNutt (McNaughts)	2
Mirror	3
Murdock	2
Mutton	3
Neville	2
Oastler	3
One Island	1
Otter	5
Pender	2
Portage	4
Rankin	4
Roberts	3
Salmon	3
Scime	1
Scott	4
Second	2
Silver	3
Star	5
Stata	1
Storm	3
Sucker	5
Sugar	5
Tarver	1
Ten Mile	3
Third	2
Three Legged	3
Trout	3
Tub	2
Tucker	4
Turtle	5
Upper Fry	4
Virtue	4
Whitefish	4
Windfall	3
Yarrow	2

Appendix C.

Table 3.1:Lakes with no History of Monitoring

Aikman	Cochrane	Heaslip	Loucks	Motley
Anselmi	Dainty	Hines	Lovell	Oak
Bennett	Dell	Home	McCan	Payne
Brush	Dick	Hooton	McCauley	Pickering
Carruthers	Fume	Horn	McCoy	Ponsford
Carter	Gerow	Hurst	McGruther	Richmond
Catfish	Good (informal)	Krapek	McTaggart	
Clubbe	Hamer	Lipscombe	Mohan	

# Septic Re-Inspection Report Summer 2013



**By Scott Askes & Melissa Pope**

## Introduction

This summer marks the twelfth consecutive and successful season of the Septic Re-Inspection program. The program is run by Seguin Township and the North Bay-Mattawa Conservation Authority and works with the residents of the township to preserve and maintain the quality of the lakes. As seasonal inspectors, our goal was to follow the objectives outlined by the Re-Inspection program, to inspect existing septic systems for problems. These problems may include; structural damage, maintenance problems, or systems, which have not been appropriately installed. As this year the students were returning students from last years program, they were able to start with onsite inspections immediately.

This year, the properties selected for inspection were those along the western shorelines of Lake Rosseau and Lake Joseph.

## Water Body and Inspection Statistics

This season, all of the new selected properties were located on Lake Joseph and Lake Rosseau. At this point nearly all of the properties on the western shorelines of Lake Rosseau and Lake Joseph have had a septic inspection completed. Follow up inspections were completed on a variety of properties with outstanding infractions in an effort to mediate the issue. Of these 27 properties of which follow up inspections were conducted, 18 of them had out dated information and could be closed or remediated by contacting the property owners. Additionally, Tucker Lake was inspected this year as a precautionary measure. It had been sampled in the past by the septic re-inspection program, but due of the blue-green algae bloom that occurred this summer we thought it best to complete another round of inspections to ensure that the bloom was not as a direct result of faulty waste handling. Only minor septic infractions were noted around Tucker Lake and it is thought that improper waste handling did not contribute to the algae bloom.

Table 1.1: Number of Inspections completed by lake

Breakdown of inspections by lake				
Lake Name	Rosseau	Joseph	Tucker	Total
# Of Properties	108	33	14	155

Table 1.2: Frequency of infractions found during new property inspections

Break down of infractions found							
Infraction	Showers	Passed	Gates	Overgrown	Construction	Other	Total
# Of Properties	2	133	3	9	6	2	155

Table 1.3: Number of properties where follow up inspections were completed and success rate

Re-inspections from previous years	
Conducted	Solved
27	18

## **Challenges Encountered**

This year, an attempt was made to continue improving the organization and efficiency of the program. The first nine days on site were used to clean up old paper work, close files which had not been processed properly and reorganizing files which have been filed in the past.

Additionally, a list of properties was sent off to North Bay-Mattawa Conservation so that the individuals from their office could pull the septic permits needed to complete this past season's inspections. Unfortunately, they were unable to complete this in a timely manor so this responsibility fell onto the shoulders of the Water Quality students. The majority of these septic permits were found in the records located in the municipal offices. This took up a total of 70 hours, which could have been better spent out in the field conducting inspections. Additional challenges were faced out in the field including; difficult home owners, contacting individuals in order to gain access to properties and poor weather conditions.

## **Conclusion**

Both of the water quality and septic re-inspection students agree that this has been beneficial for our education as well as the residents of Seguin Township. We would like to suggest that organization of the septic re-inspection program remains a top priority to increase efficiency. In addition we would like to thank all of the employees of Seguin Township and North Bay-Mattawa Conservation Authority, as well as the residents of Seguin Township for making this a productive and enjoyable summer.