

# *Gull Lake - Lake Plan*

*February 2015*

## **Acknowledgements**

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The following appendices provided in a separate document:

- Appendix A - Resident Workshop #1 and Summary
- Appendix B - Resident Survey and Results
- Appendix C - Preferred Water Level Assessment
- Appendix D - Water Quality Survey Data Form
- Appendix E - Research Paper by Emily Grubb
- Appendix F – Transport Canada Letter-Gull Lake Channel Speed

# Executive Summary

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## Introduction

In the spring of 2011, the Gull Lake Cottagers Association (GLCA) began a process of lake planning for Gull Lake. Lake Planning is a strategic process which engages all property owners, government and business operators to develop and implement actions to maintain or improve the natural and social qualities of our lake community. In August of 2011 a Steering Committee of 5 property owners from the lake was formed and guided the process, based on a well-established procedure originally developed for the Federation of Cottagers Associations of Ontario (FOCA), Haliburton Highlands Stewardship Council and French Planning Services Inc. Appendices are a separate document

## The Process

The process of lake planning is consultative. In June, 2012, the first lake planning workshop was held with 52 people in attendance and facilitated by Randy French of French Planning Services, a leading consultant in the field of lake planning. The purpose of this workshop was to initially identify the issues and concerns foremost in the minds of property owners. The workshop also assisted in the development of a survey questionnaire which subsequently went to all property owners on Gull Lake and Gull River between the lake and Minden. The results of Workshop #1 are contained in Appendix A.

The Survey questionnaire went to approximately 600 property owners in September, 2012. Responses were received from 218. A summary of the results is contained in Appendix B along with written comments. Analysis of the responses led to the identification of 10 priority issues and concerns which are discussed in summary below.

Commencing in late 2012 and continuing to present a group of volunteers researched these priority issues and concerns, developing background, collecting information and exploring actions which might be taken to address the concerns. In August, 2013, a second workshop was held to discuss the issues and explore actions which could be taken to address each concern. Through the winter of 2013/14, the Steering Committee collated information that was collected and developed a draft Action Plan and initial draft of a Lake Plan report with Implementation Recommendations. More importantly, some aspects of implementation have already begun.

The next steps in the process was to receive input from property owners on the draft Action Plan and to continue the implementation process.





## Priority Issues and Concerns

Through the consultation process, 10 issues have been identified and researched. Actions to address the concerns have been framed and were discussed in Workshop #2. These are presented in the following paragraphs generally in order of the priority identified in the Survey results.

### Priority 1 Water Quality

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The current and future water quality of the lake was identified as the undisputed top priority of property owners.

Researchers examined the trends of data available for a number of key indicators of lake health including total phosphorus, water clarity, pH, dissolved oxygen, e-coli, calcium and benthic communities. All of these indicators show the lake to be generally healthy with no particular trend line concerns detectable. One exception is calcium which, based on three readings between 2010 and 2012, appears to be dropping. Calcium is a necessary element in the growth of species lower in the food chain and therefore important to our overall fish population. Further investigation into the possible reasons for the reduction in Calcium levels needs to be undertaken. The dissolved oxygen (DO) data available was somewhat dated. Monitoring DO is particularly important since it is critical to the health of our lake trout population. Additional measurements were taken in the summer of 2013 which indicated DO levels at depth that would support Lake Trout. Further D.O. testing will continue in the future.



A key to the health of the lake is to restrict the nutrients entering the lake. Nutrients raise the phosphorus levels and can reduce the DO levels. Septic runoff in particular also has the potential to increase phosphorus and e-coli levels. Important actions to maintain the health of the lake are education of the lake community on what can be done to maintain water quality and an enhanced monitoring plan. These actions are reflected in the Action Plan. Further details of the water quality research are contained in Section 5.1 of the Lake Plan.

### Priority 2 Water Level Control

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Gull Lake is a “reservoir lake”, part of the Trent Watershed which is operated by the Trent Severn Waterway (TSW). TSW is an agency of Parks Canada, which is an agency of the federal Ministry of the Environment. The system is complex with a number of competing environmental, social and socioeconomic demands and constraints on operations. Typically spring runoff is stored in the Haliburton reservoir lakes to be gradually released through the summer and fall to meet the demands of lake evaporation, navigation in the Trent canal, municipal water supply and environmental needs such as fish spawning. The level of Gull Lake can vary significantly year to year as demonstrated by exceptionally high levels in the spring of 2013 and low levels in the



summer/fall of 2012. Having said this, Gull Lake is also among the lakes with the lowest average annual level fluctuation in the region.

Water level control is also critical to our fish and wildlife population. Levels should not rise above the level established in late May to protect loon nesting sites. Levels should not drop below the winter level established in early October. To do otherwise risks the trout spawn and wildlife which have established winter dens or hibernation locations.

A portion of the Residents Survey was dedicated to examining the impact of lake levels on the properties and activities of property owners. Appendix B provides an assessment of the responses to these questions. The majority of owners (73.2%) indicated they were adversely impacted by low water levels while 26.1% were impacted by high levels. The Survey established the problems with low levels began when the lake level fell to 1.75 m (as measured from the sill of the Moore Falls dam #1). A level of 2.15 m is the normal spring full level. Serious flooding problems also start to impact when the lake level exceeds 2.4 m.

At the 2013 Annual General Meeting of the GLCA, the membership passed a resolution to advise the TSW that our preferred water level range is 1.75 to 2.15 meters. This action has taken place. Further details of Gull Lake historic levels, its role in the Trent Severn watershed and actions which we can take to mitigate the impact of water level fluctuations are discussed in Section 3.5, Water Levels.

### Priority 3 **Natural Shorelines**

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A high percentage of the Survey respondents favoured the preservation of natural shorelines from an aesthetic perspective and also in recognition of the environmental protection it affords in pollution reduction and wildlife habitat. By-laws limiting the type of development which can take place in the first 30 meters back from the high water mark and restricting tree removal in this same region will go some distance to protecting our shorelines. It is up to all of us to adhere to these by-laws. Other action items such as enhancing the shoreline with native plants are included in the Action Plan.



### Priority 4 **Wildlife Habitat**

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The need to maintain and enhance wildlife and waterfowl habitat was a significant concern of many property owners. Of particular concern was our loon population. Research has shown that the loons are susceptible to water level fluctuations from mid-May through June. Water levels rising in this period flood established nests while levels decreasing substantially make it difficult for parents to access nests. The pH of the lake is also a concern. Research has shown that reproductive success of loons on larger lakes such as Gull Lake is greater when the pH is in the range of 7 to 9. Average pH of the lake varied from 6.5 to 7.5 between 2002 and 2013 with no trend apparent. Monitoring will continue, and other actions such as loon nesting identification and boater awareness are proposed as part of the Plan outlined below.



Other wildlife populations were also a concern. Generally speaking, water level control as noted above and maintenance of water quality are the key factors in the health of our wildlife community. See Section 5.3 for more information on wildlife.

#### Priority 5 **Development**

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Survey results indicate a strong bias against condo or multi-unit development on the lake. There was also a bias although not nearly as strong against a marina or new restaurant. These results will be communicated to the Township of Minden Hills. Gull Lake has been classed as ‘moderately sensitive’ to new development by the Ministry of the Environment and Natural Resources and Forestry. This means that the Township can require studies to assess the environmental impact of new development before it is permitted to proceed. The GLCA will monitor proposals and encourage the Township to require such studies and limit further development.

Also, there was a general recognition that the by-laws already in place to control waterfront development are important to maintaining the health of our lake community. The Action Plan calls on the Township to enforce these by-laws. The by-law summary and further details are discussed in Section 7.0, Land Use.

#### Priority 6 **Power Boating**

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This was a priority issue expressed in the Survey in a number of different ways – concern regarding PWCs and “big boats”, limit boat speeds in the vicinity of the shore, concern about shoreline erosion, concern about wake boats close to shore, concern about waterskiing and wakeboarding in channels and concern about fishing boats too close to shore. Comments made in the Survey call for safe, responsible boating and better boating etiquette.



Research has shown that the ability of a cottagers association to control boating in any way is limited to advising property owners of the legal requirements such as speed limits within 100 feet of shore and encouraging good “boating etiquette”. The Action Plan discussed below is oriented to these positive actions. See Section 4.2 for more information on recreational activities and boating.

#### Priority 7 **Fish Population**

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Gull Lake has a naturally reproducing population of lake trout and bass. Lake Trout were stocked in the lake up to 1978 and bass stocking stopped in 1956.

Approximately 50% of the owners surveyed engage in open water fishing and 12% in ice fishing. Having said this, the lake has also been a popular fishing destination for anglers from beyond the lake community. Based on comments contained in the Survey and anecdotal information, there is a serious concern that the lake is being overexploited particularly for lake trout in the winter.





There are various control mechanisms which the Ministry of Natural Resources can employ to manage the fishery ranging from restocking (which may have a detrimental impact on the native fish population), enhancing existing spawning areas, to further restrictions on the fishery. In order to examine these options, they require data on the current population so the Action Plan proposes an approach to collecting this information for them.

Education of all property owners and stakeholders in the Gull Lake fishery is also something we can do right away. The Action Plan proposes a proactive approach to education and monitoring both water quality and the fishery. Further details are provided in Section 5.2.

#### Priority 8 **Tranquility**

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Tranquility is very or moderately important to 95% of the respondents of the Survey. Over 70% of the respondents had a concern regarding night time noise including fireworks. Since conducting the Survey, the Township has implemented a Noise Complaint by-law which requires that there be no unnecessary noise which disturbs the “quiet, peace, rest, enjoyment and comfort” of others. The by-law also restricts the setting off of fireworks to certain periods on New Year’s Eve, Canada Day, and the weekends of Victoria Day and Labour Day.



The Action Plan focuses on the education of property owners on the new noise by-law.

#### Priority 9 **Light Pollution**

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The Survey indicated that 78% of respondents were either very or moderately concerned about the negative impact of light pollution. The type of light pollution which can occur on Gull Lake may be more appropriately called “light trespass”. These are external lights of the neighbour next door or across the lake which can spoil the enjoyment of the night sky. Various jurisdictions in Canada have looked at regulations to address this issue and others have published guides to sensible external lighting. There are various mechanisms to limit the impact of light trespass, such as motion sensor lighting and shading to limit light scatter. Education is the key Action Plan proposed.



A second category is the light pollution from cell towers and in particular the tower installed by Bell on the east side of the lake. Led by Dave Bonham, there has been considerable effort made to have this tower removed and replaced by shorter towers or to otherwise limit the impact of the lights. This effort continues. There is also recognition within Minden Hills Council that this is an important issue and careful review and public consultation must precede any new towers. Further discussion on this issue is presented in Section 4.3.2.

## Priority 10 Invasive Species

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Invasive species are non-native flora and fauna which can potentially multiply out of control if introduced into an area, restricting or eliminating the habitat of existing species. More research is needed on Gull Lake as to the prevalence of invasive species. Among the ones we must watch out for are:

- Purple loosestrife – a plant which can dominate wetlands
- Asian Longhorn Beetle, Emerald Ash borer – both tree killing insects
- Zebra Mussels – fast multiplying freshwater clam
- Rock bass – fast multiplying small fish which consumes food of larger game fish

The best means of control for these and other potential invasive species is care with what we bring into the lake environment. This means a thorough cleaning of boat hulls and bilges before launching and no firewood brought from outside the community. Education of the lake community is the key Action Plan. Further details on the subject are presented in Section 5.7.

### Action Plan

The consultative process and the research into each of the issues have led to an Action Plan which is located in Section 7.0. Recommendations and actions are identified and responsibilities for implementation are suggested.



## 1.1 What is a Lake Plan?

At the Spring 2011 Gull Lake Cottagers Association (GLCA) Annual General Meeting there was overwhelming positive response (91%) to develop a Lake Plan for Gull Lake. As a result, the GLCA formed a Steering Committee consisting of a group of four committed like-minded property owners (An additional member joined the Steering Group after the first year). The goal of the Gull Lake - Lake Plan Steering Committee is to protect the interests of all property owners on Gull Lake with a focus on preserving and maintaining the natural environment of Gull Lake by creating a public document that identifies the collective wishes of all stakeholders.

Funding was provided by the GLCA (Gull Lake Cottage Association) and an estimated 15% of funding came from personal and business donations.

Creating a separate steering group from the GLCA allowed for both autonomy and a stream-lined decision making process. Regular discussions with the GLCA Executive ensured both budget needs and transparency.

Lake planning is a strategic process that engages all people, governments and business operators to develop and implement actions to maintain or improve the natural and social qualities of life of our lake community. The process embraces the principles of other planning activities for forests, water and natural resources, plus municipal planning. The process is open and transparent engaging all stakeholders of the lake.

The purpose of the Gull Lake - Lake Plan is to engage community members to identify and protect the unique characteristics of the lake and to recommend land use policy and stewardship approaches to ensure long term protection, sustainability, maintenance and restoration of natural, social and physical features. It affords the opportunity for all of us to document the values which are important to us and create a vision of what we would like Gull Lake to be for future generations.

We are not alone in undertaking the lake planning process. The process is well defined. The Federation of Ontario Cottagers Associations (FOCA), Haliburton Highlands Stewardship Committee and French Planning Services Inc., prepared a handbook for the process with considerable reference material, including sources of information and examples of each step in the planning process. Also, number of Lake Associations in the Haliburton area have already completed their Lake Plans including both Mountain Lake, Kennisis Lakes and Big Bald Lake. We drew on these examples as we developed the lake plan for Gull Lake.



### **What drove the creation of a Lake Plan for Gull Lake?**

- Stakeholder dissatisfaction with water level fluctuations:
  - ✓ High water in spring and low levels in the fall; and
  - ✓ This was accentuated by extreme flooding in the region (Spring 2013).
- Perceived decrease of bio diversity and declining fish stocks:
  - ✓ Increased fishing pressures (tournaments);
  - ✓ Increased number of ice huts; and
  - ✓ Increased threat of invasive species (Rock bass and others).
- Threat of large real estate developments and over capacity:
  - ✓ Many lakes in the area have already had large real estate developments with mixed results;
  - ✓ Many lakes in the Haliburton area were already “At capacity” (ex. Moore Lake); and a
  - ✓ Recent erection of a communication tower near Miner’s Bay interrupted the natural profile and night sky enjoyment of the area.
- Downsizing of government budgets managing natural resources:
  - ✓ Continued challenges regarding proper water levels; and
  - ✓ Limited resources to address specific needs of Gull Lake residents (Ex. Water analysis, fish stock measurement and possible replenishment).
- FOCA (Federation of Ontario Cottager Associations) provided working documents including an outline of the subject matter making up a Lake Plan.
- Ease of access to other existing Lake Plans.
- It was evident that global warming was adversely affecting the lake evidenced anecdotally by:
  - ✓ Late freezing;
  - ✓ Increased rain fall (As opposed to snow fall); and
  - ✓ Decreased snow cover.
- Many lakes in the Haliburton County had already created their own Lake Plan in reaction to development pressures.
- A recent large fuel spill on Moore Lake highlighted the need for environmental preservation.
- Water quality issues;
  - ✓ Perceived septic tank quality issues; and
  - ✓ Concerns about the efficiency of the municipal sewage treatment plant upstream.

## **1.2 Lake Plan Development Process**

This Lake Plan is a public document used to assist/direct local governments in determining such issues as development & planning. This Lake Plan document is created with input from stakeholders on Gull Lake. Many stakeholders around the Lake had a voice and in the preparation of this Lake Plan and it is expected that it will be added to over time as new issues are brought forward and dealt with. It is a snap shot in time that is expected to change in the future.

Stakeholders include local businesses on the lake (such as lodges, restaurants and ice hut rentals) as well as property owners on the lake. This completed Lake Plan allows all voices to be heard at the local government level and is integral to regional planning. Conceived in a democratic process



that focuses on inclusion, this document gives strength to our collective voices as it represents the values of our Lake community.

This Lake Plan defines a best neighbor policy resulting in a stronger community. It is a formal document that reflects the wishes of the community and can be used as an aid in discussions between neighbours.

### **1.2.1 Step One: Planning and Consultation**

It was understood that the process could take up to three years based on the time to develop other Lake Plans.

A door to door GLCA membership (Early Summer 2011) campaign included both a map of Gull Lake, GLCA membership form, and a letter outlining why a Lake Plan for Gull Lake was important. Volunteers were requested and in late summer 2011 the nucleus of a Steering Committee was formed.

The Gull Lake Plan Steering Committee committed to the following:

- Reflect the values of the Gull Lake community;
- Two public meetings which would be required for input to the plan;
- A survey of stakeholders would be undertaken;
- An outside facilitator would be hired as an advisor and provide direction;
- Funding would come from the GLCA offset by increased association dues (\$10.00/ primary member; Voted and approved at the AGM in 2013). Initial seed money from the GLCA was secured (\$5,000; Summer, 2012);
- Additional funds would be requested through donations and business sponsorship;
- The FOCA lake plan process would be used to direct the overall Gull Lake - Lake Plan development process;
- Formal minutes would be kept;
- The Gull Lake Plan would leverage other lake plans already developed. We would reach out to others that have already created a lake plan;
- Local municipal governments would be contacted and informed as to the strategy.
- Local experts in the area would be contacted and recruited to assist in developing data. (Gull Lake had a wealth of experts in fields of biology, geology, history, and others with access to lab testing facilities); and
- A web site will be developed to communicate vision and milestones. ([www.gulllakeplan.com](http://www.gulllakeplan.com)) (The official GLCA website was under construction at this time.) More than 7,000 hits by November 2013 at the lake plan web site.

The Lake Plan Steering Committee has done much planning and discussion to ensure that all issues have been discussed including, informal discussions with stakeholders, business owners, local politicians, and the media.

### **1.2.2 Step Two: Stakeholder Involvement**

The first Gull Lake and Gull River Stewardship Plan Workshop was held at the Minden Community Centre on Saturday, June 23, 2012 at 10:00am. This workshop was to hear peoples' perspectives on what they value about both Gull Lake and Gull River and to get an idea of potential issues and action items that should be included in the lake plan. There were approximately 52 people in

attendance including local politicians. The river group was well represented and many members of the GLCA were in attendance.

The event was advertised in local papers, signage through-out the area, and direct conversations and personal invitations with businesses on the lake. Local municipal governments were informed & engaged.

The Lake Plan Steering Committee members spoke to the importance and reasons of having a lake plan. Randy French, of French Planning Services, facilitated the workshop and reviewed the workshop schedule. French Planning Services was selected to facilitate this process because of previous work with other lakes in the area and positive feedback back from these lakes and successful Lake Plan implementation.

Julia Sutton, also from French Planning Services, assisted with the facilitation and recorded the discussion. Randy provided a presentation on the lake planning process, including the following information:

- what a lake plan is and what it is not;
- the history of lake planning;
- examples of other lake plans; and
- stewardship examples and idea.

This first Workshop identified the shared concerns of those in attendance and prioritized the results. The results were compiled in a Workshop Summary prepared by French Planning which is attached for reference in Appendix A. The results of the workshop were used to develop the questionnaire for the Survey of Stakeholders which was conducted in September of 2012 (results are shown in Appendix B).



### 1.2.3 Survey

Based upon the findings at the first Workshop both an electronic and paper survey was generated based upon feedback from the workshop (Fall, 2012) to both confirm the information gleaned in the first public meeting and solicit new information on identified issues. This survey was distributed electronically to members of the GLCA (Survey Monkey). A list of addresses were procured from the municipality tax records while a hard copy of the survey was mailed to those that either had challenges working in an electronic format or who's electronic address was unknown. The goal of the survey was to confirm the thoughts and feelings of the community found during the first meeting.

A total of 218 stakeholders responded, of which 34 were located on the river.

The results of the Survey and the concerns outlined at the June 23, 2012 Workshop were tabulated and reviewed by the Steering Committee and formed the basis for Research and information gathering for the next year. The TOP 10 Issues in order of concern are illustrated on Figure 1.1.

**Figure 1.1 - Survey - Gull Lake Issues**

<b>Water Quality</b>	Preservation of good water quality is the highest priority item. Included in this category are concerns over septic leakage and the willingness to consider septic inspection, concern regarding weed growth, concern for the discharge from the Minden Hills Waste Water Treatment Plant, concern regarding the use of pesticides and fertilizers.
<b>Water Level Control</b>	Also high on the list.
<b>Natural Shorelines</b>	This concern includes control of vegetation removal, aesthetic concerns along the shore including presence of boathouses, maintaining a natural landscape including the tree line which includes a concern for cell phone towers. This topic also can encompass concerns over shoreline erosion in the lake.
<b>Wildlife Habitat</b>	This was a significant concern – the need to maintain waterfowl and wildlife habitat. The strongest expression was the value owners expressed over the loon population. There was also value placed on the herons, ducks and gulls. There were a couple of concerns expressed over the cormorants as an invasive species.
<b>Development</b>	<p>There is a relatively strong bias against further significant development on the lake in the way of a marina or multi-unit development such as a condo. As well, about 45 % of the owners did not want another store or restaurant but approximately 5 to 20% had no opinion. Other expressions of limiting development included “no Monster homes”, “no more boathouses”, “enforce the current building code”, “no mining near the lake”.</p> <p>In fairness, there were a couple of comments to permit further development on the lake. This can be seen in the votes on question 16 where roughly 33% of the respondents favoured a marina, store and restaurant while 5% favoured a condominium. There are also a few calls for sustainable development in the written responses.</p>
<b>Power Boating</b>	This was a priority issue expressed in a number of different ways – banning PWCs and “big boats”, limit boat speeds in the vicinity of the shore, concern about shoreline erosion, concern about wake boats close to shore, concern about waterskiing and wakeboarding in the channels, concern about fishing boats too close to shore, calls for safe, responsible boating and better boating etiquette.
<b>Fish Population</b>	About 50% of the owners surveyed engage in open water fishing and about 12% in ice fishing. There is a concern over the fish population of Gull Lake as expressed in Question 12 and written comments. These include calls to ban or limit ice huts, enforce fishing regulations, maintain wildlife habitat.
<b>Tranquility</b>	Tranquility is very or moderately important to 95% of the respondents to the survey. Over 70% of respondents had a concern regarding night time noise including fireworks. This was also expressed in a number of the written responses.
<b>Light Pollution (Maintain Night skies)</b>	Minimizing light pollution was a very or moderately important value to over 90% of respondents. Expressed as a negative impact, about 78% of respondents were either very or moderately concerned. In written responses it was expressed as maintenance of night skies and extreme frustration over the sudden erection of the Bell cell tower with no input from effected residents.
<b>Invasive Species</b>	About 87% of respondents considered invasive species to have a very strong or moderately strong impact.
<b>Gull River Issues</b>	<p>The following are the top three issues identified by the Gull River property owners.</p> <ul style="list-style-type: none"> <li>• Water Level Control</li> <li>• Navigability - The concerns not only relates to water level but to obstructions in the water.</li> <li>• Boat Speeds - This relates to safety, noise and shoreline erosion.</li> </ul>

#### 1.2.4 Step Three: Research and Confirmation

The results of the survey produced a list of ten core values. A weighted average was applied to these core values to reflect the relative importance of each.

Research was conducted on a number of issues identified in the survey that was done on the Issues/Values in the period October 2012 and August 2013. Initial information on Water Quality and Water Levels were reported at the 2013 AGM.

#### 1.2.5 Step Four: Action Plan

A second workshop was held in August 2013 to discuss and confirm the issues and actions to be reflected in the Lake Plan. A discussion paper "Potential Gull Lake Action Items To Be Considered" was prepared and provided to all participants at the workshop. The discussion paper provided 57 actions to be considered. Through a facilitated exercise, we were able to review each action and consider changes as well as set priorities. From this workshop the Action Plan for Gull Lake was developed (see Figure 7.1).





## 2.1 Our Vision for Gull Lake

The Lake Plan Steering Committee proposed the following Statements to reflect the Vision of the Lake Plan:

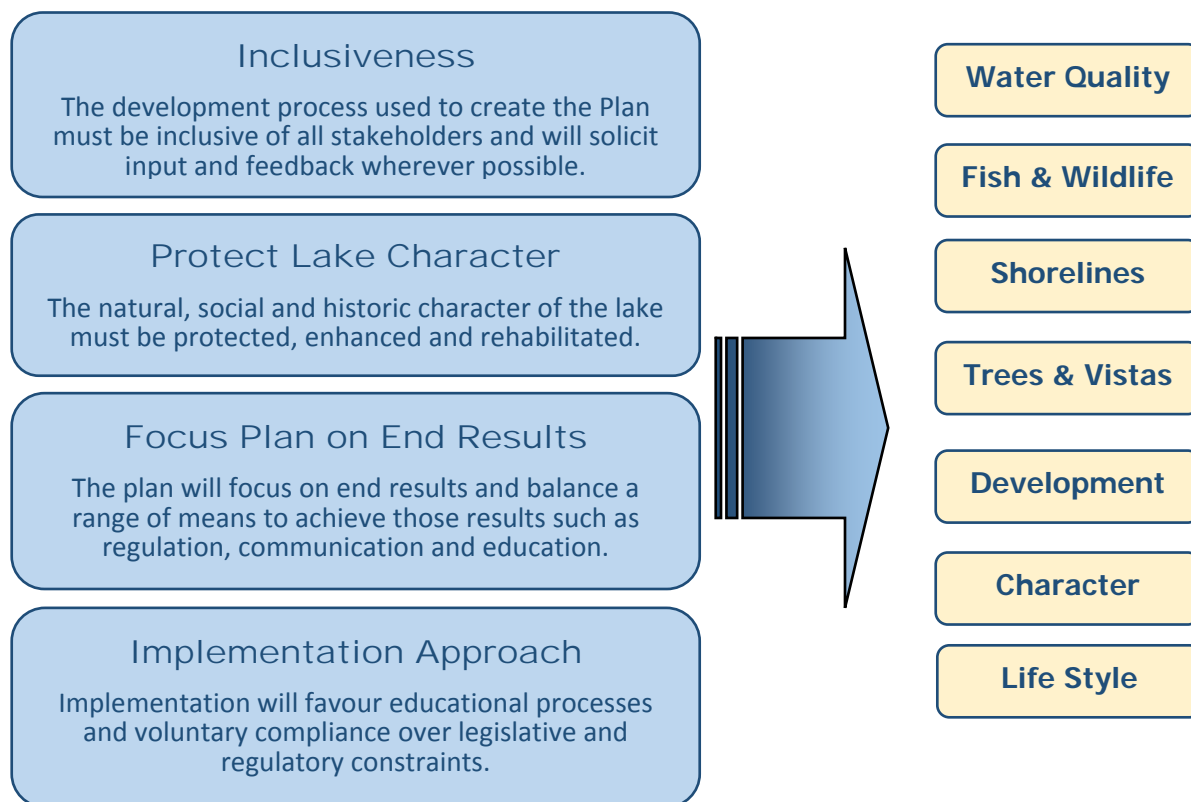
### The Gull Lake Community envisions our Lake to be a place where;

- *The quality of the water, the beauty of the landscape and the tranquility of the surroundings are protected and preserved;*
- *Wildlife, fish and plant habitat are safeguarded in a sustainable manner;*
- *The community is actively involved in balancing the preservation of the natural lake environment with the recreational uses of the Lake; and*
- *The Lake is a shared experience where respect and dignity are shown to others and expected in return.*

## 2.2 Principles and Targets

A set of 4 guiding principles was established to focus the Lake Plan on several key target areas and start the process of making the Vision a reality. Targets for each of the elements shown in Figure 2.1 are described on the following page.

**Figure 2.1 - Guiding Principles and Targets**



Targets for each key element are as follows:

**Water quality** – That the water of Gull Lake not contain contaminants in excess of the natural historic levels (i.e., the level of contaminants that would occur in nature prior to human habitation) nor in excess of current officially regulated standards;

**Fish and wildlife** – That Gull Lake supports a sustainable fish population including optimum habitat for their naturally reproducing lake trout and maintain stability in the biodiversity of wildlife species and their habitat. That the further introduction of “invading species” such as zebra mussels be prevented;

**Natural shorelines** – That the protection and rehabilitation of the lake shoreline and river banks, described as the “ribbon of life” that supports a diverse range of fish and wildlife species, be promoted to increase the amount of natural shoreline;

**Trees and vistas** – That the natural vista from Gull Lake be maintained and that buildings and structures have a minimal impact on the natural appearance of the shoreline and on the viewscape from the lake;

**Economic and property development** – That a cooperative working relationship exists between residential, recreational and commercial members of the community to ensure that proposed development and activities respect the environment and character of the watershed, as well as maintain property values;

**Historical, cultural and natural character** – That the historical, cultural and natural character of the watershed is recognized, protected and restored, where appropriate; and

**Life Style** – That a range of social and recreational activities are promoted consistent with the natural character of the Gull Lake watershed, thereby preserving the health and ambience of Gull Lake, and fostering a sense of community.



## 3.1 Historical Perspective

Native Canadians left their mark on the land with artifacts and rock etchings. As early as 1590, Jesuit priests travelling to Huronia, told of Iroquois war parties searching for Huron Indians along the Trent water system in what are now Peterborough, Victoria and Haliburton Counties. The Mississauga and Ojibwa hunted extensively in and around Algonquin Park in the amalgamated Townships of Sherborne et al. Native artifacts have been discovered around Grass, Boshkung and Kashagawigamog lakes, and burial grounds have been unearthed in the Ingoldsby and Maple Lake areas. Copper objects were discovered in 1951 in Harcourt at Farquar Lake that are estimated to be at least two thousand years old.

It is not known for sure who were the first non-native people to see Gull Lake. Early maps and reports of the Gull River system are unclear as to whether they were descriptions of the area or actual travelled routes. Explorers sought water routes to avoid the Great Lakes and possible confrontation with invading Iroquois nations. In 1615, Samuel Champlain used a map showing a route through Georgian Bay, Lake Simcoe, Balsam Lake and the Gull River to Ottawa. Later, routes were sought to avoid American soldiers. Lieutenant James P. Catty, Royal Engineer, in his 1819 report, describes a chain of small lakes joined by rivers and waterfalls, which could well have included Gull Lake. The 1827 report by Lieutenants Briscoe and Walpole name Norland, Moore's Falls and Gull Lake. But again, it is uncertain if they travelled those routes or just noted them on maps.

Over the course of time, various treks were made up the Gull River in search of a trade route from Georgian Bay to Ottawa. Several expeditions were made in search of an easily travelled highway in 1819, 1825 and 1827. It was determined that this route would be of use only after great expense and effort. Despite the lack of the simple route, other visionary settlers realized the logging, trapping and settlement potential of the area. The Peter Robinson settlement of the Peterborough area did reach as far as what is now Haliburton County. Eventually surveyors were commissioned to begin mapping the land for settlement.

The first to arrive was John Huston. In 1826, Huston studied the areas north of Harvey and Verulam townships in search of useable land, but a number of events led Huston to report that the area was unsuitable for sustainable settlement. In 1836, David Thompson, one of the greatest British surveyors travelled the areas of Sherborne and McClintock where his party caught many speckled trout and admired the stands of hardwood.

By the 1840's the need for land had become great. Scottish and Irish immigrants were arriving in Upper Canada in larger numbers. Also interested in settlement were Canadians who were the children of immigrants who had settled around the Great Lakes. In the 1850's land was being divided and sold for settlement and timber. In 1854, Michael Deane created the guide line that eventually became the Bobcaygeon Road, opened up the townships of Lutterworth, Snowdon, Anson, Hindon, Minden and Stanhope. This line opened the path for settlers to find their fortune in Haliburton. In 1854 the Canadian Land and Emigration Company purchased nine townships in Haliburton. The name Haliburton came from Thomas Chandler Haliburton, the first chairman of the Land and Emigration Company from 1861 to 1865. The historian and author who hailed from Nova Scotia, never once visited the provisional county with his namesake and eventually moved to London England where he became a Member of Parliament and a Supreme Court Judge. By 1859 there

were 25 families settled along the Stanhope and Minden township border and other groups were beginning to spread out around the area. The townships of Lutterworth, Anson and Hindon were annexed to Victoria in 1858, while Snowdon, Minden, Stanhope, Guilford, Dysart, Glamorgan, Monmouth, Dudley, Harburn, Bruton, Harcourt and Cardiff became townships of Peterborough County. This was the first of many separations and amalgamations between townships in Haliburton, Peterborough and Victoria Counties.

Through many hardships times of strife, the small settlements in the Haliburton area began to grow and evolve into communities, with a post office, stores and established government. Minutes from the Provisional County of Haliburton date back to 1874, as do many of the County's townships.

After originally being surveyed in 1858, Minden was named after a town in the North Rhine-Westphalia a federal state in Germany. The Minden community has been around since April 1, 1859, prior to which the settlement was originally called Gull River. The original settlers were drawn to the region via the Bobcaygeon Road. Minden lies on the banks of the Gull River. During the 19th and 20th centuries, loggers used this river to move timber through Gull Lake to downstream sawmills.

To provide safe marching routes for the army, away from the "American enemy", the government built roads. These colonization roads also helped to open up "the wild wastelands to the north ". One such road which helped to open up Lutterworth Township and Minden, was the Bobcaygeon Road. Construction began in 1856. The road was to run from Bobcaygeon to Lake Nipissing but it was never completed to Lake Nipissing. It did provide a major north south route for cottagers until Highway 35 was built in the early 1930's. Parts of Bobcaygeon Road still exist in Minden and along Highway 35.

The Cameron Road (Hwy 35) began in the 1860's at Balsam River connecting the Toronto and Nipissing Railway station in Coboconk to Minden. Although it is not now a travelled road, those who know where to look, can find signs of it around Sandy Bay and it is still marked on old cottage deeds. Unlike the smooth paved highways that we travel today, when built, these colonization roads, except in winter, were barely passable and described as "hazardous, bone rattling, tracks in and out among the bush, rocks, swamps and hills".

As roads and land were surveyed, the government parceled out property in 100 or 200 acre lots known as Crown land patents. Sometimes land was given away to compensate soldiers and their families, for war service. Other times, it was sold. Along with other conditions of ownership, settlers with property fronting on colonization roads were expected to also maintain the road. J.W. Fitzgerald's 1857 survey report for Minden indicates that squatters had already settled on "Moore Lake, also on Gull Lake and five miles still further up the Gull River". Lutterworth Township was surveyed by Charles Unwin in 1858/59 and the first Crown land patents were granted along the Bobcaygeon Road in 1863. The first Crown land patent granted on Gull Lake was taken up in 1866, by Mary Ross on Concession 7 lot 23. The islands were next; most were granted 1872 – 1874. The next lots granted were on the west side of the outlet at Moore's Falls (1873), Miners' Bay (1874), both sides of the river mouth including part of Sandy Bay (1874) and immediately north of the mouth on both sides (1867 & 1874).

Written records of property owners around Gull Lake, are found in the census, voter's lists, survey reports, old maps and Crown Land Patent records. Diaries written by farmers and local clergymen, and minutes of Council meetings, also provide windows into the past.



Some current cottagers have the original Crown patent papers indicating they purchased their land directly from the government and were the first owners of that piece of land. Others purchased their land from local farmers. The 1901 census reported 464 farms in Lutterworth Township but this number dropped off year by year as land was sold, sometimes to cottagers, for back taxes, since much of the land was totally unsuited for agriculture and could not sustain a family. The names of some of the early farmers who remained on their land, is followed by the date of the earliest recorded ownership of land fronting on Gull Lake/River or a neighbouring lot: Learys (1873), Hulbigs (1874), Wessels (1874), Ottos (1880 – owned 400 Acres), Harrisons (1890), Hounsells (1892), Ransons (1897), Pogues (1907), Trumbulls (1907), Windovers (1918), Gillespies (1931). Other families that owned land around 100 years ago or more, are: Brohm (1873), Ellis (1889), Valentine (1904), Hoidges (1906), Groselle (1907), Chambers (1908), Horn (1908), Tennison (1909), Willett (1910), Mundy (1911), Bickell (1912), Burns (1912), Humphreys (1914), Sparks (1915), Bennett (1919). These dates do not necessarily indicate when the family originally came to Lutterworth. Relatives of many of these families still live or cottage on Gull Lake.

Some folks living in Minden, like the Stinsons (owners of a livery, flour and grist mill) and Sowards (owners of a grocery store), came down the river to have picnics on the shores of the Lake. They liked it so much that they purchased property. Stinsons, related to the Wellstoods, Sowards, Max', Wingates, Ingals, and Rogers families, registered ownership in 1914 and were listed as merchants in 1916. Sowards built one of the first Gull Lake cottages or hunting camps. Although registered ownership is not until later, family members say it was built around 1904 on Sandy Bay. Other early cottagers took the Grand Trunk Railway train from "the city" arriving at Gelert where they were picked up by a horse drawn stage coach and taken to Minden. Later, when the roads were built through to Minden, the drive would take about 6 hours from Toronto.

The shores of Gull Lake were littered with logs that escaped from log booms owned by companies such as the Gull River and Gilmour Lumber Companies. Mossom Boyd, lumber baron whose mill was located in Bobcaygeon, sent thousands of logs down Gull Lake. Diary entries made in the summer of 1870 indicate the "boom was being sorted" at the dam in Minden on July 1, 1870; July 25, 1884 "past Minden and in Gull Lake"; July 29, 1884 "now at Moore Falls". Disagreements between those who want to cut down trees and residents and cottagers who want to protect the trees, still continue today. There were several lumber mills on Gull Lake. A shingle mill was indicated on an 1883 map of Racketty Creek. The Delamere family, related to the Bedlingtons, Earls, Lewis' and Sharpes, were granted the land around Racketty (Concession 12, lots 12 & 13) in 1878. Hounsells also had a small mill beside the present location of Kilcoo Camp. The lumber business reached its peak around 1872-73. One of the last drives down Gull Lake occurred around 1929-30 but most of the big white pine trees were gone by 1880.

David Galloway operated a store in Norland in the 1870's. In 1881 he was granted the original Crown land patent for the property where Miners' Bay Lodge is now located. He opened the first post office near Miners' Bay in 1908. At the end of WW1, Bay View Hotel, later called Miners' Bay Lodge, opened up and included a small grocery store. Early owners of the Lodge were the Hopkins brothers and the Tracys. In 1938 the Wunker family took over ownership. Pine Ridge Resort, in the next bay, was operated by a number of owners until it was shut down due to a fire in the 70's ... (Fisher, Ecclestone, Wood... Around the 1930's Welch's Grocery store in Minden, saw a business opportunity and delivered groceries to the early cottagers, some of whom remember taking orders and making deliveries from the boat. Gibling's also had a small store (registered as a summer resort in 1914) at the north end of the lake at the river mouth. Cottagers still come from all

around the lake and folks even come from Minden to get fresh spring drinking water that still runs year round sometimes flooding Sandy Bay Road.

Lutterworth post office opened in 1948 on Sandy Bay Road, with a small grocery store where milk and bread could also be ordered. Evelyn Hoidge Austin owned the store and ran the post office assisted in later years by her daughter and grandson, until it closed in 1975. The Hoidges, (registered as merchants in 1914) Evelyn's father and his brothers, bought their land on Sandy Bay, from the Harrisons, in 1906. As with many of the early cottages, building materials were brought down the river by boat. Sometimes people "squatted", as surveyor Fitzgerald noted, clearing the land and building a home, before they actually owned the property. Sometimes they owned the property for many years before they built or registered it. Some of these original cottages and outhouses still exist relatively unchanged, except perhaps for the addition of indoor plumbing and electricity.

Gas could be purchased at Miners' Bay Lodge, Evelyn Austin's or at Braeside Inn near Kilcoo Camp. The area around Braeside Inn and Kilcoo, was purchased by the Lackie family around 1910.

University of Toronto Professors Stewart and Banting, searched far and wide for property suitable to run courses in Civil Engineering. They arrived at Gull Lake in 1919 and Banting promptly bought his own property that same year. The University site was chosen partly because of its easy access to a large variety of geological formations. A three 3 week compulsory programme was created for third year students in the Civil and Mining Engineering and Applied Geology. Several of the faculty and students fell in love with Gull Lake and returned year after year as cottagers. Listed in the 1935 course guide are: Professors Stewart and Treadgold, Associate Professors Banting, Crerar, and Melson. The Bantings are related to the Crerars, and Melsons, and Metcalfes, families now on Gull Lake. William Duncan graduated from the engineering programme in 1928 and purchased property from the Bedlingtons. Spencer Jewett graduated from the engineering programme in 1932. The Mintos, long time caretakers of the U of T property, originally purchased land on Bobcaygeon Road, in 1911.

Many of the names mentioned in The History of the Settlement of Gull Lake, will be recognized by longtime residents and owners of property on Gull Lake. Names will also sound familiar to those attending the annual Gull Lake Regatta since many are donors of the prizes and cups. Even those who are more recent visitors to Gull Lake will see that many of the roads leading into Gull Lake are named after our original and early families.

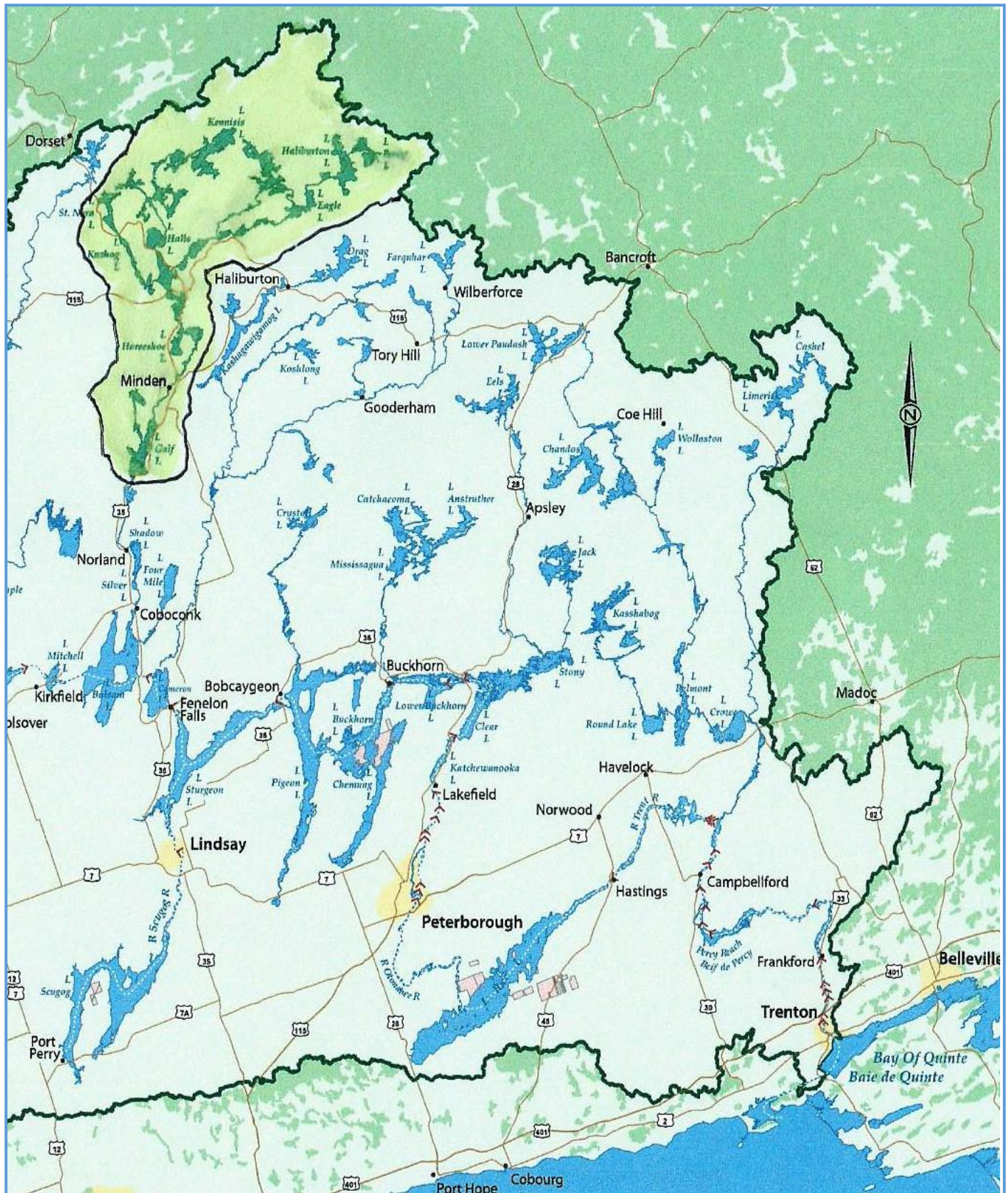
### **3.2 General Location**

The Gull Lake watershed is located in the upper reaches of the Trent River drainage basin as shown on Map 3.1 on the following page.

Significant lakes upstream of Gull are Haliburton, Redstone, Eagle, Kennisis, Halls, Boshkung, Twelve Mile and Horseshoe. Each of the upstream lakes is controlled by a stop log outlet structure which the Trent Severn Waterway (TSW) manages to control water flows in the Gull River and ultimately the Trent Canal. Gull Lake flows into Moore Lake through the twin outlet structures at Moore Falls. From here the Gull River flows south out of Moore Lake and empties into Balsam Lake. From Balsam Lake, water flows east to Lake Ontario via the Kawartha Lakes and the Otonabee and Trent Rivers. Balsam Lake is the high point in the Trent-Severn Waterway so water also flows west from this point to Georgian Bay through Lake Simcoe and the Severn River.

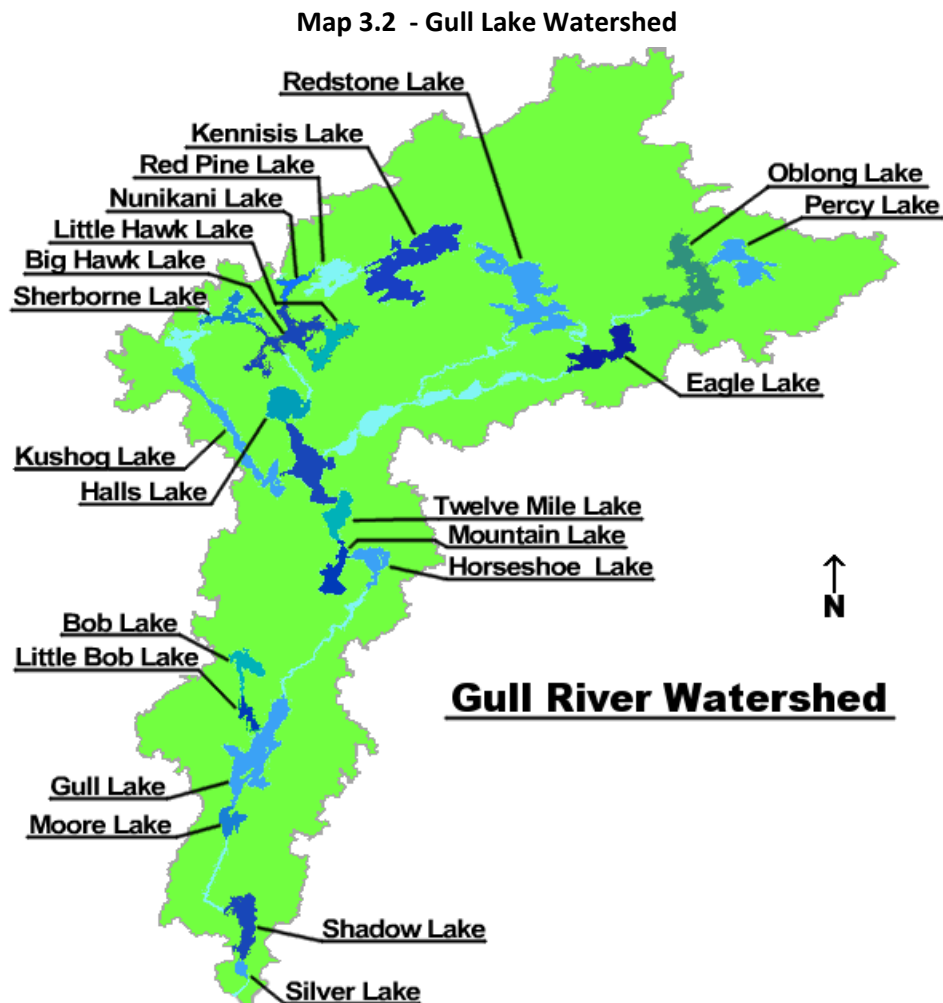


Map 3.1 - Gull Lake Watershed in the Trent River Drainage Basin



### 3.3 Gull Lake Watershed

The Gull River originates to the north-east of Gull Lake at Percy Lake (see Map 3.2). It then flows south-west through Haliburton, Eagle, Pine, Grass, Maple and Beech Lakes before discharging into Boshkung Lake. Just upstream of Maple Lake it picks up the Redstone River tributary flowing out of Little Redstone and Redstone Lakes. The stretch of river from Beech Lake to Boshkung is known locally as the Beech River. Other tributaries flowing into Boshkung are the Kennisis River which drains Kennisis, Big and Little Hawk and Halls Lakes plus the Boshkung River which is largely St Nora's and Kushog Lakes. Boshkung, Twelve Mile, Mountain and Horseshoe lakes are a chain flowing south with the Gull River commencing again just upstream of Minden. The total drainage area to the bottom end of Horseshoe Lake is 1009.4 km<sup>2</sup>. To this point in the watershed, the drainage area is largely forested with cottages surrounding the larger lakes. Once the Gull River re-forms below the Orillia Power dam and power station, it flows through the town of Minden followed by a 5 or 6 km stretch of navigable river which discharges into Gull Lake at its' north end. Other significant tributaries draining into Gull Lake is Bob Creek draining through Bob and Little Bob Lakes and then through the short Rackety Creek into the west side of the lake. Another creek also drains Devil's Lake (also called Lutterworth Lake) and part of the Queen Elizabeth II Wildlands Provincial Park, discharging into the lake at Deep Bay. The total drainage area of the lake to the Moore Falls dams is 1232.6 km<sup>2</sup>.





### 3.4 Gull Lake Characteristics

Gull Lake, like other lakes in Haliburton County, is a deep cold water lake situated on the Canadian Shield which is dominated by insoluble Precambrian granite. Map 3.3 on the following page illustrates lake depths, location of wetlands and other features. Gull Lake is located on the southern edge of the Algonquin Dome in the Canadian Shield with the southern tip merging with the Continental Shelf.

Soil depths are shallow in the Haliburton Highlands often frustrating any farming attempts. The shores of Gull Lake are predominately glacial sediment with a thin layer of silt, sand, and clay covering bedrock. Gull Lake is a glacial valley producing steep hillsides and bedrock outcroppings which vary from 0 to 25 degrees. This slope produces viewable landscapes making this one of the most beautiful lakes in the Haliburton County. The shoreline surrounding Gull Lake is private and therefore trees will less likely be commercially harvested. Forest in the surrounding area is either in a Provincial Park or on Crown land. These woods are controlled by the Bancroft Minden Forest Management Plan which follows strict sustainable forestry practices.

Key lake characteristics are presented in the following table.

**Table 3.1 - Lake Characteristics**

Drainage Area - Immediate	128.8 km <sup>2</sup>
Drainage Area - Total	1232.6 km <sup>2</sup>
Reservoir Range	1.219 m to 2.13 m
Reservoir Storage Depth	0.911 m
Lake Area	998 hectares (9.98 km <sup>2</sup> )
Maximum Storage over drawdown range	909 hectare-meters
Outlet Structure #1	7 Stop logs x 25 feet
Outlet Structure #2	Bay 1 – 2 stop logs x 25 feet Bay 2 – 2 stop logs x 25 feet
Maximum Depth	49.1 m
Mean Depth	16.5 m
Lake Perimeter	30.4 km
Elevation (above sea level)	269.7 m

### 3.5 Ownership and Access

Virtually all of the Gull Lake mainland shoreline is accessible by county, municipal and/or private road. There are shoreline residential lots on some islands in Gull Lake which must be accessed by boat in the ice free period or snowmobile in the winter. The most significant of these is Sugar Island which has 36 lots some of which are consolidated with only one cottage on the property. There are also cottages on Long, North and South Morris, St. Helena and Victoria Islands.

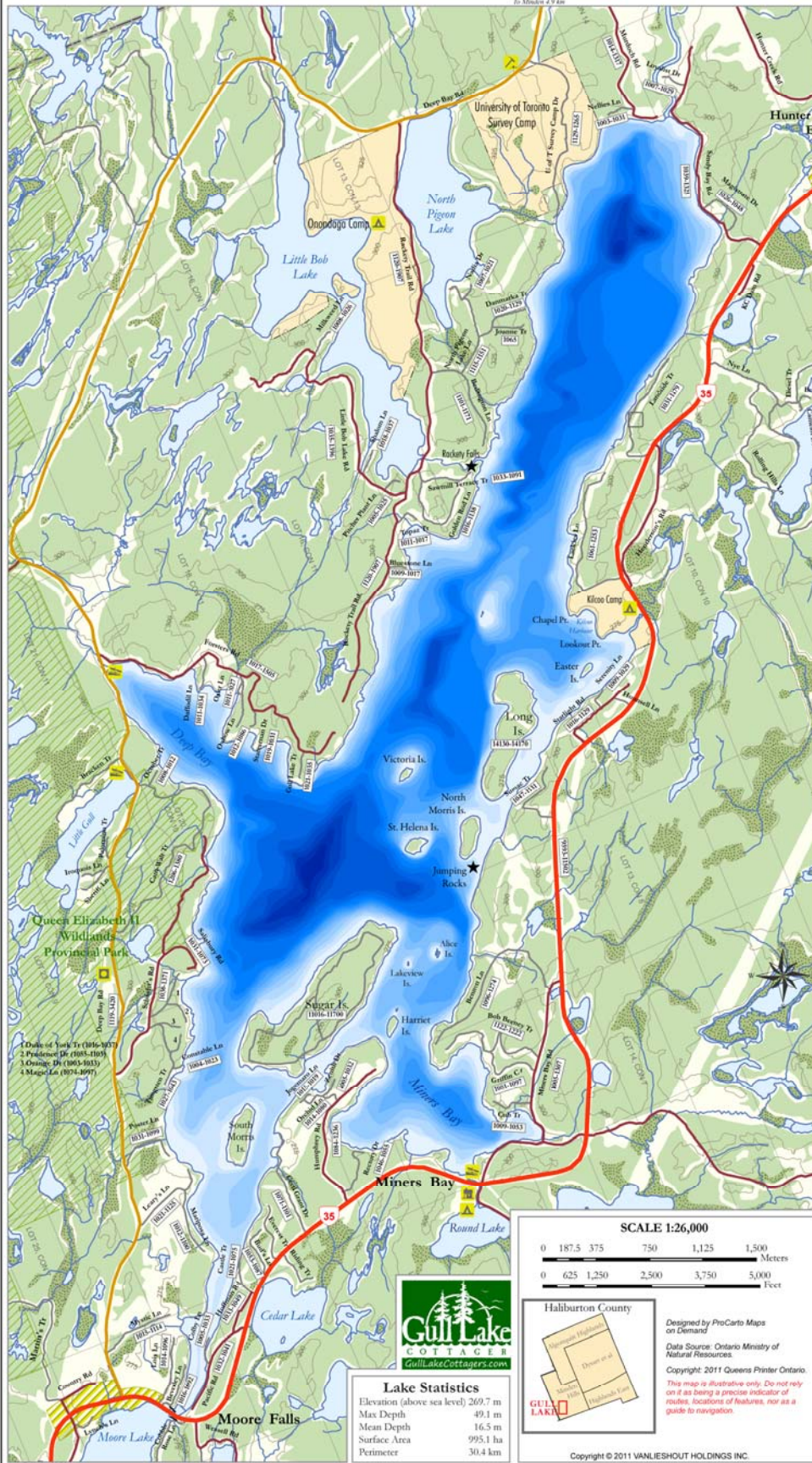
Section 6 of this report discusses existing land use and Figures 6.1 to 6.4 show the division of the shoreline of Gull Lake into lots. The total number of lots is in the range of 550 to 600 with approximately 513 owners. Most lots are zoned shoreline residential although there is a small number considered rural and three are zoned as commercial.

Two public boat launch locations are available on the lake. One is located off Miner's Bay Road at the old Pine Ridge resort into Miner's Bay and the second at the bottom of Deep Bay off Forster's Road. Other than the boat launch areas, there is no public land adjacent to Gull Lake.



Map 3.3 - Community of Gull Lake

Community of: ourGullLake.ca



Compliments of the  
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**ROYAL LEPAGE**  
 LAKES OF HALIBURTON



**LEGEND**  
 Boat Launch  
 Marina  
 Summer Camp  
 Food  
 Resort  
 Landfill  
 Quarry  
 Tent & Trailer Park  
 Commercial Area  
 Private Landing  
 Highway  
 County Road  
 Municipal Road  
 Private Road  
 Address Range by Road  
 Stream  
 Lake  
 Dam  
 Wetland, Permanent  
 Lots & Concessions  
 Elevation Contour (10 m interval)  
 Bathymetry (depth in metres)  
 Less than 1 m  
 1 - 3 m  
 3 - 6 m  
 6 - 9 m  
 9 - 12 m  
 12 - 15 m  
 15 - 18 m  
 18 - 21 m  
 21 - 24 m  
 24 - 27 m  
 27 - 30 m  
 30 - 33 m  
 33 - 37 m  
 37 - 40 m  
 40 - 43 m  
 More than 43 m

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 for  
 online map viewing  
 or change reporting

### 3.6 Geological Description

The Haliburton region is the result of geological processes. Granite bedrock has been dated round the Gull Lake area back to the Precambrian period. Geologically known as the Grenville Province, the Haliburton area is the youngest portion of the Canadian Shield. Of extreme importance to understanding the Haliburton landscape is the geological faulting that crisscrosses the bedrock of the Canadian Shield specifically in the Haliburton and Gull Lake area. A fault is where the Earth's crust has fractured and then shifted. This fracture creates zones of broken, splintered rock. Millions of years ago, when continental glaciers moved across the land, these glaciers cut deeply into these fault zones removing large portions of this shattered bedrock. This cutting and scrapping action on the bedrock removed vast amounts of rock creating the deep lakes and hills that are enjoyed by all today. The scrapped material was ultimately deposited south into the United States. What was left behind was the stunning beautiful rugged terrain of Gull Lake. The bedrock had been scraped down in places beneath the Canadian Shield revealing minerals and geological outcroppings not normally found anywhere else on the earth.

Even the County's lakes can be attributed to the dramatic actions of these glaciers. Most of the lakes in Haliburton are in places where two or more of these fault lines have intersected. Lakes are often deep, clean, and cold. The impenetrable nature of the Canadian Shield bedrock further contributes by keeping water on the surface and as a result, create over 600 lakes and countless wetlands further adding to the natural splendor of the Gull Lake area.

Gull Lake is metamorphic (rocks formed by heat and pressure) in nature, varying from west to east. The full west side of the lake finds tectonic units (as a result of converging continental plates) and mostly gneiss (rocks formed by extreme pressure such as tectonic activity). A large portion of the east side is plutonic in nature (crystallizing from magma – where magma as it cools often contains other minerals and crystals). These plutonic rocks contain marble breccias, calc-silicate granites, and granite outcrops. Driving around the lake in a boat you can often see marble breccias and granite outcroppings along the shoreline. Gull Lake was at the edge of these two worlds – a tectonic plate converging with another resulting in extreme pressures with magma being squeezed from the earth's core.

Rock structures such as folds, faults and dykes are other visible pieces of the geological puzzle of the Haliburton County. Fold structures provide graphic evidence that the rocks were at one time buried to a depth of up to 15 kilometres in glacial ice.

Haliburton's geological history has also resulted in a treasure trove of semi-precious collectable minerals right across the Haliburton County. The famous Bancroft mineral collecting area encompass a good portion of the south eastern part of Haliburton County. Between Tory Hill and Gooderham is the famous Bear Lake Diggings collecting site. Gem quality apatite has been found there along with hornblende, sphene, orthoclase, augite, biotite and calcite. These minerals were there when the earth cooled. The glacier made them accessible by scrapping away the bedrock.

These minerals and geography left behind after the last Ice Age make the Haliburton Area and Gull Lake area a special place of interest.



## 3.7 Water Levels

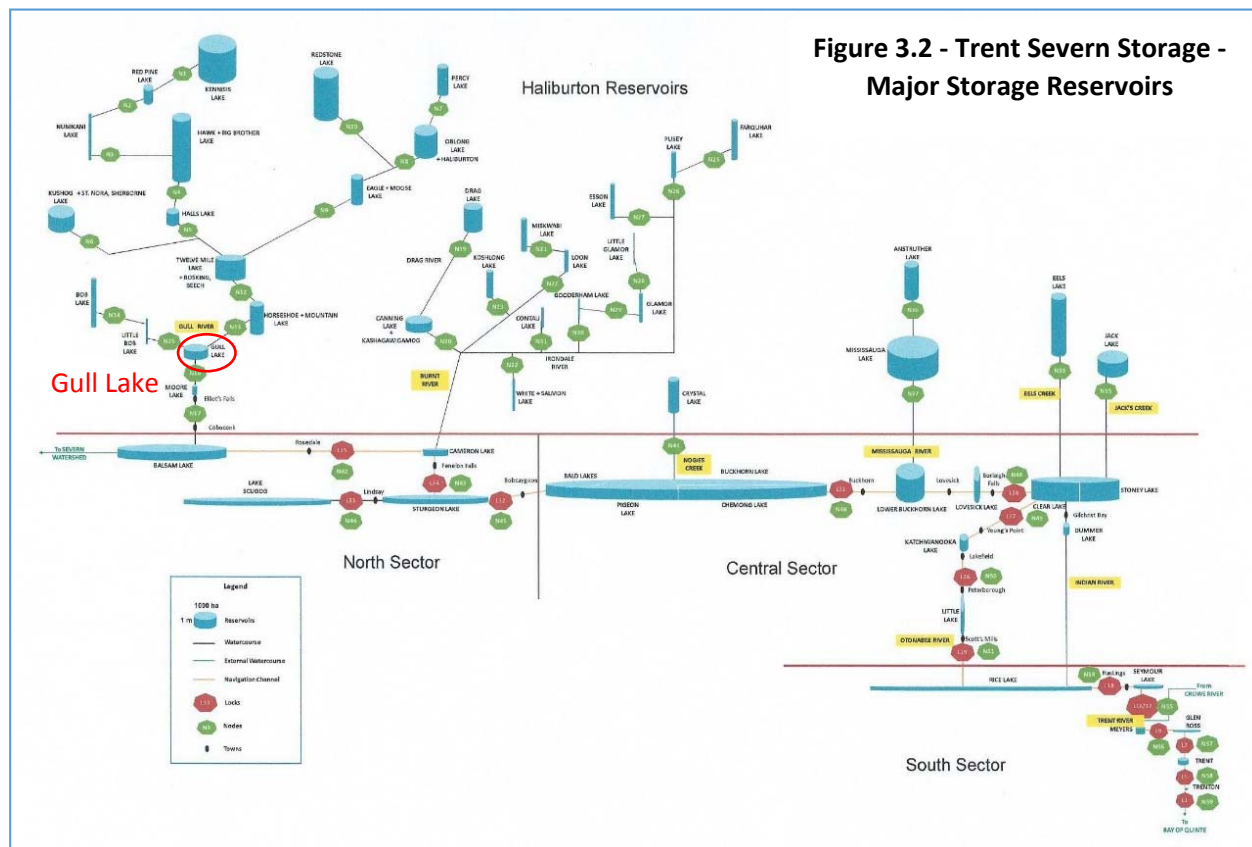
### 3.7.1 History of the Trent Severn Waterway

The fluctuations of the water levels on both Gull Lake and the Gull River are tied to the historic development of the Trent Canal. The lakes, rivers and canal are a part of the Trent Severn Waterway which was conceived as a commercial transportation route between Lake Ontario and Georgian Bay as early as 1785. First construction began in 1833 when a lock was built at Bobcaygeon. Construction of all the dams and locks to permit through navigation was completed in 1920 with the opening of the section between Lake Simcoe and Georgian Bay along the Severn River. The result was a 386 kilometre waterway comprising 42 conventional locks, two large flight locks, two hydraulic lift locks and a marine railway. It crosses two large southern Ontario watersheds following the courses of the Trent, Otonabee and Severn Rivers. Only a small portion of the waterway is a “made” system with constructed canals. Most of the waterway traverses natural lakes and rivers where navigation levels are maintained by dams associated with the locks.

While the original purpose of the waterway was for commercial navigation, the strengthening of road and rail links in the 1920's rendered the canal system inefficient for such traffic. Recreational navigation grew on both the canal and the reservoir lakes to the point that exists today.

### 3.7.2 The Trent Severn Waterway in 2012

The Trent Severn Waterway (TSW) is perhaps the most complex water resources system in Canada and among the most complex in the world. Figure 3.2 is a schematic of the lakes controlled by dams in the Trent waterway portion of the system. Gull Lake is one of 23 “reservoir lakes” along the Gull River which are controlled at their outlet feeding water to the canal lakes in the Kawarthas. In



addition to the Gull River system, the Burnt River has 13 dams controlled by the TSW. The Burnt supplies the Trent at Cameron Lake. The Nogies Creek, Mississagua River, Eels Creek and Jack Creek add 5 control structures for a total 41 in the reservoir system.

Responsibility for the operation of the waterway became vested in the Federal Government with Orders-in-Council of 1905 and 1906 which transferred the dams of the reservoir lakes from provincial to federal control. Management of the waterway fell to Parks Canada (originally Canada Parks Service) within the Ministry of the Environment in 1979. With reorganization of 2012, TSW is now part of the Ontario Waterways Unit within Parks Canada.

### 3.7.3 Broad Water Management

Altogether there are approximately 160 control structures in the watershed including those structures used to control flow in the canal and reservoir lakes. The vast majority of these dams are adjusted manually through the addition of 12-inch wooden stoplogs and with the option in some cases to add a single 6-inch metal stoplog.

The water is managed to achieve two primary objectives so long as public safety is not at risk:

1. Control of water levels in the canal lakes and channels to provide a minimum six foot navigation depth between the Victoria Day weekend and Thanksgiving.
2. To prevent flood damage through the watershed.

Once these two primary objectives have been achieved, the water is managed according to a number of additional priorities and systems constraints which include:

- Meeting water supply requirements for the City of Peterborough and other municipalities which draw their water from the Otonabee River and other parts of the Trent River.
- Making water available for hydropower generation at stations on the Trent, Otonabee, Burnt and Gull Rivers.
- Manage water levels with particular attention to the natural environment. Among the key constraints are:
  - ✓ Shoreline nesting birds, particularly the common loon and the pied-billed grebe nest from mid-May to the end of June. It is important that water levels remain relatively stable during this period to ensure adults have access to the nests they have prepared. If the water levels drop significantly in the period, loons are not able to reach their eggs. If water levels rise, nests are flooded.
  - ✓ Meeting water level constraints to maximize the spawn on lake trout lakes. This operational requirement states that lake trout lakes should not be drawn down below the level they achieve in the first half of October of each year. The trout spawn at about this time and further lake draws may expose eggs to freezing and predators.
  - ✓ October is also important for frogs and turtles as they begin hibernation in the shallow water mud. Exposure of the mud flats later in the year can cause freezing.
  - ✓ October is also the time which beaver and muskrat establish winter entrances to their lodges. Lower levels later in the winter expose the entrances to freezing.
  - ✓ There are also spring discharge requirements at certain points in the watershed to facilitate the walleye spawn. One such constraint is the minimum discharge from the Drag River into Head Lake in Haliburton. It is also believed that walleye have begun to spawn at the outlet of the Gull River to Gull Lake.

- Maintaining water levels in the reservoir lakes as high as possible during the recreation season from the Victoria Day weekend until after Labour Day.

Active water management takes place on both an annual cycle and in response to changing meteorologic conditions throughout the watershed. In the annual cycle, the lakes are drawn down in the late summer and early fall in order to accommodate fall rains and the spring freshet and avoid flooding. In the late winter and early spring the lakes are recharged from the freshet. Snowpack monitoring is undertaken during the winter to give water control staff initial guidance on the water available for the spring and the timing needed to replace stoplogs to fill the lakes. As the summer progresses, evaporation reduces levels in the whole watershed and water is drawn from the reservoir lakes to maintain navigation levels and meet other system demands and constraints as noted above. Release of water from the lakes is based on “equal percent” draw down of each lake in order to share the drawdown impact. The equal percent is based on the total available storage depth of the lake usually measured from the sill of the outlet structure (or in some cases a level above the sill) to the nominal full level. Since some lakes have a greater storage depth than others, the visual impact of the drawdown will vary significantly from lake to lake.

Water management staff use a variety of tools to assist with decision making. In the Trent system, water levels on most lakes are provided to the Peterborough Operating Centre from real time gauges every day. Discharges from all lakes are known from the relationship between water level and stoplog settings. During the winter additional data on the water content of snow on the ground is available from three (soon to be four) snow courses in the Haliburton region basin. Plans are also underway to measure soil moisture remotely. Precipitation forecast data is also being received from Atmospheric Environment Services. All of this data is used in a number of ways. In the spring, snow and soil moisture information is used to determine the rate at which to fill the reservoirs. Precipitation forecasts are being used in a flood forecast model which is currently being calibrated. Finally, a water management drawdown model is used to withdraw water from the reservoirs in the June to October period to meet demands and constraints in the system.

When there is a requirement to adjust flows and levels, staff add or remove stoplogs. During the navigation season dams in the reservoir lakes are adjusted by a Haliburton based crew that travels by vehicle and occasionally boat to reach dams spread out over a wide geographic area.

### 3.7.4 Historic Gull Lake Water Levels

Gull Lake is controlled at the outlet by the dam at Moore Falls which consists of two independent structures.

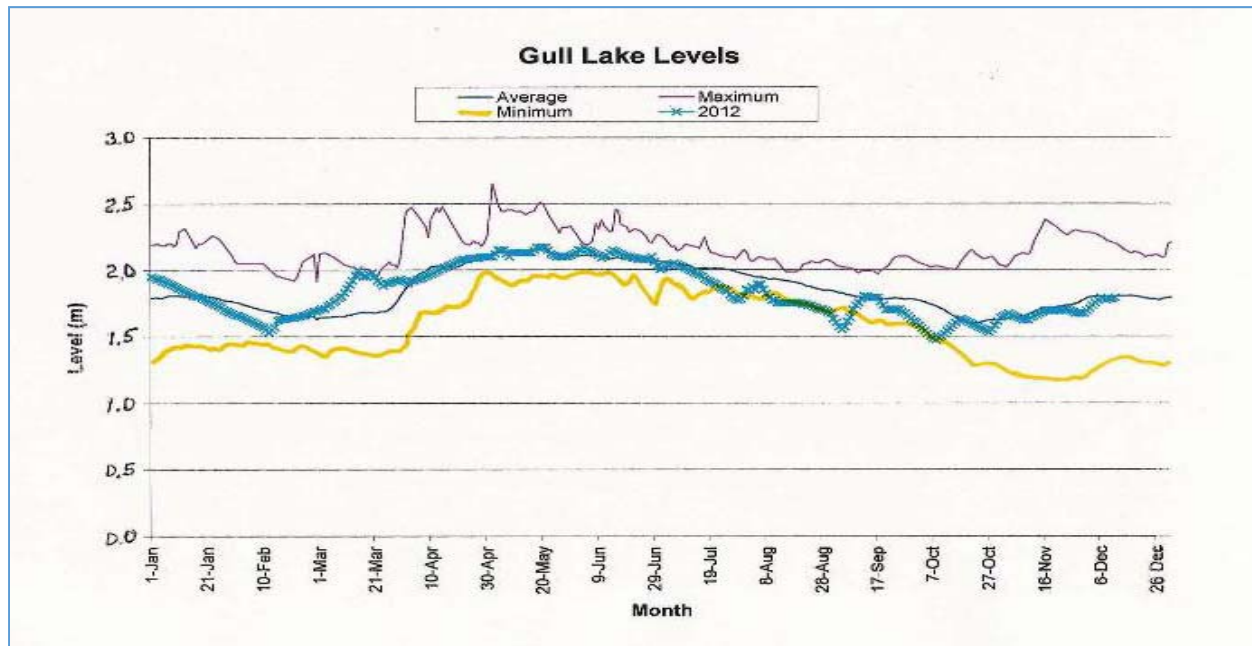
- The southerly dam (Dam 1) has a single 25 foot opening. With all seven stoplogs in place, the top of the logs is Elevation (El.) 2.13 m. The minimum lake level is nominally El. 1.22 so that the reservoir fluctuation range is 0.91 m or about 3 feet. During average years, the lake does not fluctuate this amount. The average minimum level is 1.65 m for a total drawdown of 0.48 m or 1.6 feet. Figure 3.3 below illustrates this range. In very dry years the minimum level can approach El. 1.22 m.
- The northerly dam (Dam 2) consists of two 25 foot sluiceway bays, each with two 12-inch stoplogs. This dam is typically used only to pass high flows during the spring freshet.





Figure 3.3 below shows the minimum, average and maximum water levels for the 22 year period from 1988 to 2009. The average line shows the typical water level fluctuation through the year

**Figure 3.3 – Gull Lake Levels (1988 - 2009)**



Note the following points from Figure 3.3:

- The lake typically fills from the end of March to the middle of May rising from El. 1.65 m. to about El. 2.13 m. and then remains relatively stable until mid- June.
- Gradual drawdown commences in late June or early July as a result of both evaporation and demands from the Trent canal. The average lake level reaches approximately El. 1.8 m on Labour Day weekend. This represents an approximate drawdown of 0.3 to 0.38 m (12 to 15 inches) from the spring full level.
- On average, the lake reaches El. 1.6 m near the middle of October. Fall rain usually causes the lake to rise to El. 1.8 m to early January when the precipitation accumulates as snow. From this point the lake level gradually declines until the start of the spring freshet at the end of March.

The minimum and maximum levels for each calendar day based on the 22 years of record are also shown on the graph. This data does serve to show there is considerable variability year to year.

Superimposed on the graph are the actual water levels for 2012, the year the property owner's survey was conducted for this plan. It is noteworthy that:

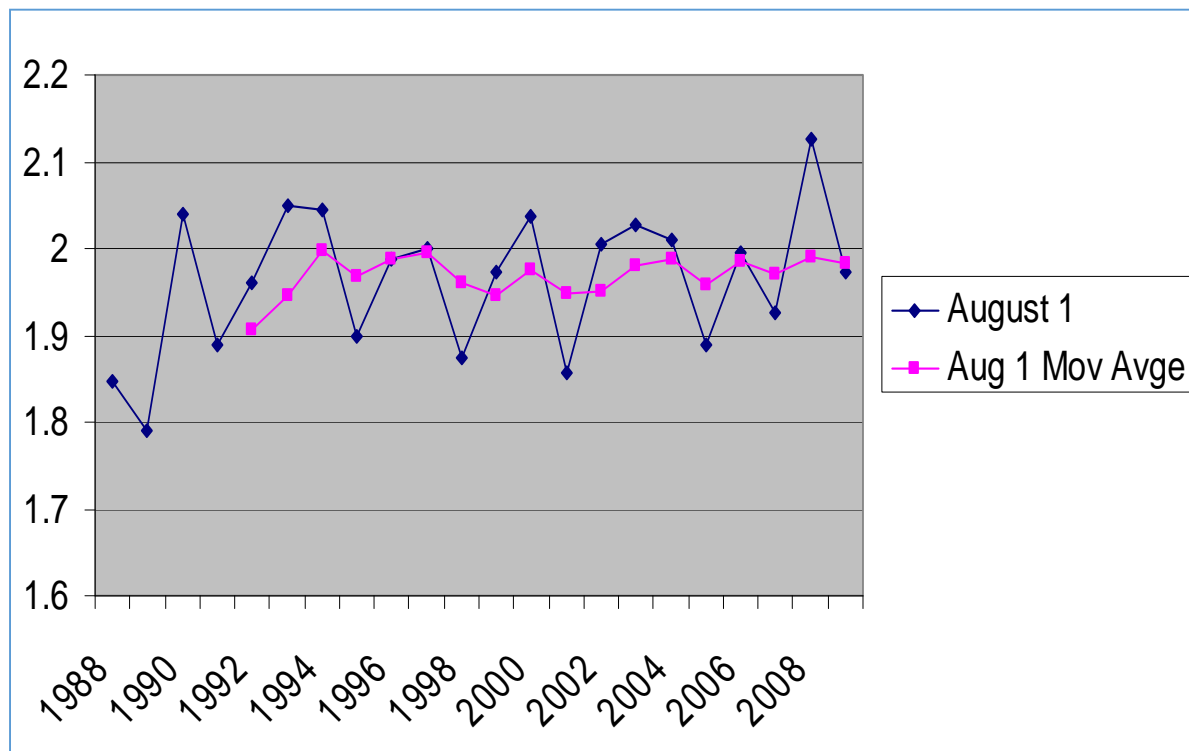
- The winter of 2011/2012 was dry with low snowpack conditions. Recognizing this, the TSW placed stoplogs in the dams early in order to capture what runoff did occur. It is noticeable that the lake level rose about one month early. If this intervention had not occurred, the low lake conditions in 2012 would have been worse. As it was, the lake began the summer at the average level of about 2.13 m.

- The lake level reached El. 1.75 m in mid-August equal to the 22-year historic minimum for that time of year.
- The lake reached El. 1.55 m by Labour Day, 0.05 m (about 2-inches) lower than the historic minimum.
- Recognizing the low lake levels in the reservoir lakes and in response to wet conditions in the Kawartha area, the TSW replaced some logs at Moore Falls and brought the water level up to about the average by mid-September. The logs were subsequently removed and the lake dropped to historic minimums again by early October.

During the course of the preparation of this lake plan, a number of property owners commented to the Steering Committee that the “water levels never used to be this way”. This comment was usually made in the context of lower than expected lake levels later in the summer season. Prior to the mid-1970’s, the operation of the TSW followed different guidelines. At that time water was drawn from the upper reservoirs in the Gull system first, progressing downstream as the summer continued. Gull being at the lower end of the reservoirs basin was drawn later in the season. The practice of equal percent drawdown on all of the reservoirs began in the 1970’s and has been practiced since.

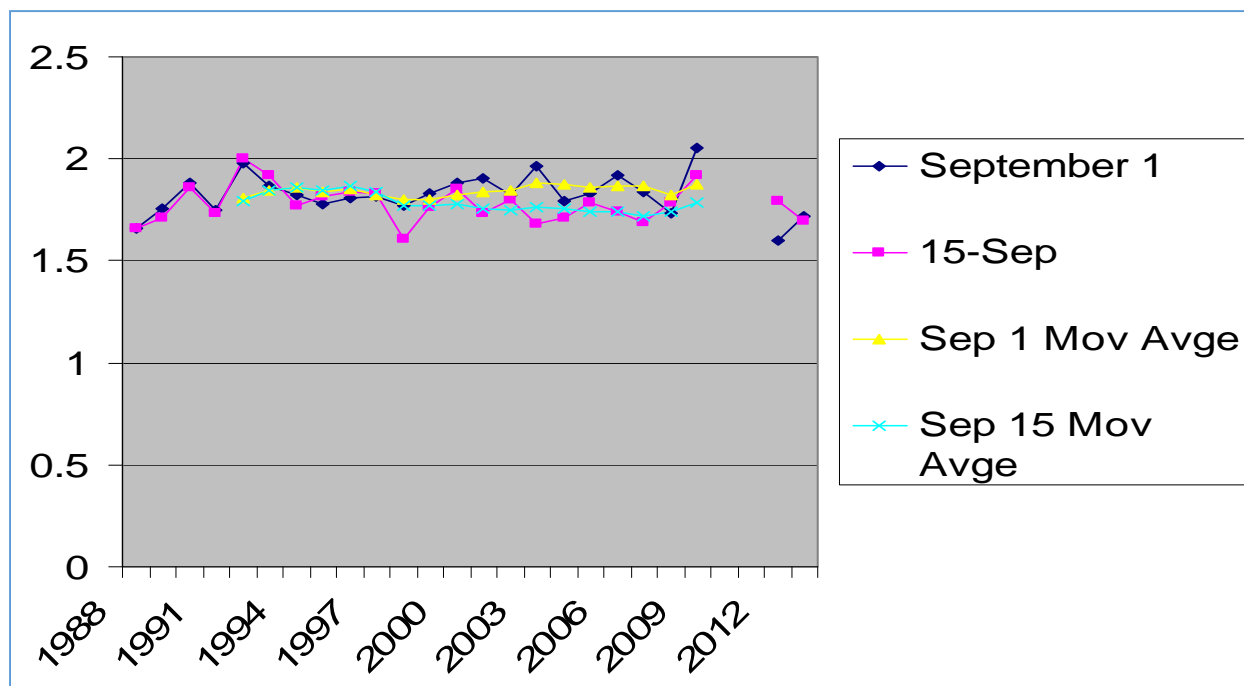
We do have access to the daily lake levels for the period 1988 to 2009. TSW is in the process of updating the data files for the missing recent years but nonetheless it is valuable to examine the 22 years of available record up to 2009. Figure 3.4 plots the water level on the lake on each August 1 from 1988 to 2009. It is apparent there is a high degree of variability with levels ranging from a low of just under 1.8 m to a high above 2.1 m. There is no noticeable trend. To remove the scatter and look for trends, a five year moving average was taken and a second line plotted which appears in pink. Again even with the variability smoothed, there is no trend in the data.

**Figure 3.4 – August 1 Levels**



This analysis was repeated for September 1 and 15 with the results shown in Figure 3.5.

**Figure 3.5 – Sept 1 and 15 Lake Levels**



The yellow plot is the 5-year moving average of the September 1 levels while the turquoise plot is the 5-year moving average for September 15 levels. Until 2009, there is no noticeable trend in the data on September 1 however there does appear to be a slight downward trend for September 15. The 5 year average ending in 1996 was 1.87 m while ending in 2007, it was 1.72 m with a trend to the lower number. This rebounded slightly in 2008 and 2009. It is possible that this is part of a strategy to get the reservoir to a lower level in mid-September to avoid the rush to evacuate the reservoirs as October approaches or it may simply be part of normal hydrologic variation. It would be valuable for CEWF to explore this on a basin wide basis and discuss the result with the TSW.

### 3.7.5 Lake Plan Survey and Preferred Gull Lake Water Levels

With the background provided in the previous sections, the Survey solicited information from property owners which can be passed on to TSW, specifically:

- What percentage of lake property owners are impacted by either high or low water levels?
- What are the high and low water levels, above and below which problems are caused? This will define a preferred range of levels.
- What is the nature of the problems caused when water levels exceed the preferred range?

#### a) General Satisfaction with Water Level Management

The first survey question asked “How satisfied are you with the TSW control of water levels on Gull Lake/Gull River? Considering the Gull Lake respondents only, 158 responded to this question, 9 skipped the question. The responses indicate a significant level of dissatisfaction with the water level control on the lake. Figure 3.6 illustrates the survey responses and about 80% of the

respondents were either 'very dissatisfied' or 'dissatisfied', and only about 14% were either 'satisfied,' or 'very satisfied' with the TSW's control of water levels.

**Figure 3. 6 - How satisfied are you with the TSW control of water levels on Gull Lake/Gull River?**

Very Dissatisfied	Dissatisfied	No Opinion	Satisfied	Very Satisfied
42.4%	38%	5.7%	12.0%	1.9%

#### b) High Water Levels

When asked if high water levels have had an impact on your use of your property, 26.1% said 'Yes' and 71.3% said 'No', indicating a minority are impacted by high levels.

Forty-one respondents reported impacts from high water levels with dock installation difficulties being the most common problem followed closely by structural damage. Island access problems, flooded boat houses and shoreline erosion were also reported. A more complete assessment of the difficulties and water level at which the problem occurred is contained in Appendix C. Although some judgment must be used in interpreting the data, it appears more of the difficulties begin above El. 2.4 m. This is approximately 0.28 m (11 inches) above the normal spring average level.

#### c) Low Water Levels

When asked if low water levels have had an impact on your use of your property, 73.2% said 'Yes' and 24.2% said 'No', indicating a majority are impacted by low levels.

One hundred and eleven reported impacts from low water levels. The greatest difficulty was the need to pull a boat from the water early due to lack of water depth or problems of accessing boats that had to be moored instead of docked. Island access problems and exposed water intakes were also reported. A more complete assessment of the difficulties and the water level at which the problems occur is contained in Appendix C. As with the high water levels some judgment must be used in interpreting the data; however it appears that the bulk of the problems begin below El. 1.75 m. with the problems becoming more severe below El. 1.65 m.

#### Options to Address Water Level Fluctuations

There are a number of proactive things which property owners and the GLCA can do to mitigate the impact of water level fluctuations.

- ✓ **Educate** - It is important for property owners to understand the complexity of the water resource system which is the Trent watershed as well as the various demands placed on the system. It is hoped that the Lake Plan will assist in this education.
- ✓ **Manage Activities with Water Level Fluctuations in Mind** - Understanding the range of water levels presented in this section of the Lake Plan should assist property owners in considering whether their existing or planned infrastructure is vulnerable to water level ranges. The average, maximum and minimum historic levels are illustrated in Figure 3.3. Consider adjusting infrastructure to recognize these levels.

- ✓ **Monitor Current and Forecast Water Levels** throughout the Navigation Season. The TSW tracks the water levels on most lakes in the watershed on an ongoing basis. Property owners can monitor the level in Gull Lake on the TSW website at: [http://www.pc.gc.ca/lhn-nhs/on/trentsevern/visit/ne-wl/trent\\_e.asp](http://www.pc.gc.ca/lhn-nhs/on/trentsevern/visit/ne-wl/trent_e.asp). This same information can be monitored from the website of the Coalition for Equitable Water Flow (CEWF) on their website at [www.cewf.ca](http://www.cewf.ca). (More on the CEWF in the paragraph below). Also, during the reservoir drawdown period which usually extends from mid-July through the balance of the navigation season, the TSW provides a two week forecast of water levels. This forecast is updated weekly and is available on the CEWF website. The forecast can be especially helpful to property owners who plan to be away from their property.
- ✓ **Participate in the CEWF Preferred Water Level Program** - The Coalition for Equitable Water Flow (CEWF) is a coalition of the some 35 lakes in the Haliburton region of the Trent watershed. The GLCA is a member. The purpose of the CEWF is to represent the interests of the reservoir and flow-through lakes of the watershed to the TSW. The activities of the CEWF are largely managed by an 8-member Executive Committee who meet with TSW water control staff and management a number of times a year.

Among a number of the initiatives of the CEWF is a preferred water level program. This program was established to advise the TSW of the range of water levels which property owners would prefer the levels stay within during the boating season from mid-May to Thanksgiving. The information going to the TSW includes the impacts to property owners of water levels above and below the preferred range. This information may not be immediately adopted, however, as TSW move towards a constraint based system of water management, the impacts of high and low water levels on Gull Lake will be known to them.

To date, a number of Haliburton Lakes have provided preferred water level information to the CEWF who have passed this on to the TSW. The preferred levels for Gull Lake were examined in preparation for the 2013 Annual General Meeting of the Gull Lake Cottagers Association. The GLCA membership passed the following resolution at that time.

- ✓ *The GLCA asks the CEWF to advise the TSW that the Preferred water level range on Gull Lake is from 2.15 m in the Spring (early June) to 1.75 m in the fall (mid-September). All levels are expressed relative to the TSW datum at Moore Falls dam.*
- ✓ *Knowing that some flood storage may be necessary in the Spring, recognize that levels above 2.15 m cause inconvenience, and above 2.4 m cause infrastructure damage*
- ✓ *Further, Levels below 1.75 m in the fall cause boat and property access problems and water supply problems. At levels below 1.65 m, these problems become substantially more severe.*

#### Recommended Actions: *Manage Water Levels*

- ✓ *Communicate Preferred Water Level resolution to Coalition for Equitable Water Flow (CEWF) (Action 2.1)*
- ✓ *Support the Coalition for Equitable Water Flow (CEWF) (Action 2.2).*
- ✓ *Increase resident awareness of water levels and level forecasts Action 2.3).*  
*Property owners to prepare properties for fluctuating water levels (Action 2.4).*



## SECTION 4 SOCIAL ELEMENTS

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Residents of Gull Lake have clearly indicated their support for maintaining the special nature of the lake. Residents and visitors value the peace and quiet that exists as well as other social amenities such as recreational activities and social events. Social elements enhance the quality of life on the lakes and it is recognized that a collective community effort is required to ensure protection and enhancement of the natural, social and historical character that are precious for future generations to enjoy.

### 4.1 Landscape and Aesthetics

Participants at the stakeholder workshop indicated that the most valued attributes of the lake are its diverse and beautiful natural shorelines, fish and wildlife and the tranquil serenity. Significant portions of the shorelines remain undeveloped, and these vegetated shorelines, bays and inlets, islands, wetlands and tree line contribute to the natural beauty of this area. High profile and high density development and resource management activities such as aggregate extraction or clear-cut forestry practices could seriously impact these values.

### 4.2 Recreational Boating

Boating is one of the most popular recreational activities on Gull Lake after swimming. Survey respondents advised that 90% participated in swimming followed by canoeing / kayaking at 76% and also power boating at 76%.

Boating related recreational activities include open water fishing at 50%, water skiing also at 50%, wakeboarding at 28% and sailing / windsurfing at 23%. Use of PWC's (personal watercraft / Seadoo's) was reported at 14%.

Of survey respondents, 47% reported using outboard engines that were 10HP or smaller, 58% use engines between 15 and 100HP, and 44% reported using engines greater than 110HP. Use of 2-stroke and 4-stroke engines was 47% and 38% respectively.

The lake is a shared resource supporting recreational and transportation activities for the Gull Lake community, and natural habitat for a variety of fish and water fowl.

#### Options to Address Recreational Boating Concerns

- ✓ **Promote and Distribute Safe Boating Guide** - The Safe Boating Guide can be obtained at most marina's or through the Transport Canada website at [www.tc.gc.ca/boatingsafety](http://www.tc.gc.ca/boatingsafety). An electronic version is available for download on the Gull Lake Association website. Boat operators must follow the Safe Boating Guide to ensure use of safe practices:
  - ✓ *Reduce Speed* – operation of a boat near shorelines or in narrow channels are a threat to swimmers, kayaks, canoes and small boats. The maximum legal speed to operate a boat within 30 metres (100 feet) of shore or in a narrow channel is 10 km /hr (6 mph). See copy of Transport Canada letter dated June 26, 2009 in Appendix F
  - ✓ *Minimize Boat Wakes* – large wakes erode natural shorelines, disturb or destroy loon and duck nesting sites, and damage parked boats and floating docks. Care to

reduce wakes is particularly important in channels, shallow water or within 30 metres (100 feet) of shore.

- ✓ *Towing Skiers, Tubes and Boards* – all craft towing a skier, tuber or boarder must have a spotter who is at least 16 years of age. PWC's that are used for towing must have seat space for the driver, spotter and individual being towed. Rules in the Safe Boating Guide regulating daytime hours for these activities, and right of way regarding small craft, or craft under sail must be followed.
- ✓ *Courteous Use* - PWC's, skiers, tubing and wakeboarding activities need to stay toward the centre of the lake and move to different areas of the lake to be courteous to those enjoying the tranquility of the lake.
- ✓ **Protect The Environment** - Avoid spillage of gas and oil when fueling boats. Absorbent pads or sponges can soak up spills before discharging bilge water into the lake. Boats and trailers must be cleaned when transporting from other lakes to prevent import of invasive species. Lake users are encouraged to phase out old 2-stroke motors in favour of environment friendly 2-stroke and 4-stroke motors.
- ✓ **Prepare Boating Code of Conduct** - Promote friendly boating with a focus on safety by publishing a code of conduct for all residents and visitors. This should be supported with a boating map, detailing sensitive marine and shoreline areas, navigation hazards, etc. This should be distributed in conjunction with the Gull Lake AGM, cottage and resort rental agreements, etc.

#### Recommended Actions *Promote Safe Boating*

- ✓ *Educate boaters about responsible boating behaviour in a balanced manner (Action 5.1).*
- ✓ *Request OPP to discuss boating safety at an AGM (Action 5.1)*
- ✓ *Consider a means of identifying areas of the lake where navigation hazards exist (Action 5.2).*

### 4.3 Noise

Survey indicated that Lake residents were concerned with the noise created by fireworks. Some wanted fireworks banned altogether and others wanted them restricted to certain times. Since the survey the Township of Minden Hills has passed a Noise By-Law that outlines the restrictions when fireworks can be set off.

The relevant Sections of the By-Law are as follows:

- Sec. 2.2 No person shall set off any Fireworks on any public street or roadway within the Township of Minden Hills at any time.
- Sec. 2.3 Consumer fireworks within the geographical Township of Minden Hills do not require a permit and are only permitted on the following:
  - (a) New Years Eve - between dusk and 1 AM;
  - (b) Canada Day - between dusk and 11 p.m. the weekend prior to Canada Day, the weekend directly following Canada Day or on the day of Canada Day.
  - (c) Victoria Day and Labour Day - between dusk and 11 p.m. on the weekend in which the holiday falls.

#### Recommended Actions *Enhance Tranquility*

- ✓ *Educate residents about the impacts of fireworks and support the township's firework by-law (Action 7.1).*
- ✓ *Educate residents on noise by-laws and lake culture ethic to promote a balance of recreational enjoyment and tranquility (Action 7.2).*
- ✓ *Promote noise abatement on boats (Action 7.3).*

## 4.4 Lighting

The quiet and darkness of the shorelines is an important social component of the enjoyment of cottagers on Gull Lake. Excessive and unnecessary lighting detracts from the natural ambiance of the lake and results in reduced visibility of the stars: Unnatural lighting also affects sensitive lake biological systems, such as disrupting feeding and breeding behaviours.

The National Geographic defines light pollution as:

*“Light pollution occurs when artificial light intrudes on the nighttime setting. This phenomenon is pronounced around urban centers, where city lights diminish the view of stars and planets. A satellite view at night shows light pollution as glowing regions around urban areas. In addition to brightened skies around cities, light pollution also refers to any outdoor light that creates glare and interferes with the natural night environment. The National Park Service (US) refers to a single source of light that intrudes on the night as “light trespass.””*

On Gull Lake the latter, “light trespass “, is more applicable to the Lake Plan. The lake is not immune to light emitted by an urban centre as there is a definite glow in the sky north of the lake that may well be light from Minden. This form of light pollution can be responsible for blocking out displays of northern lights as well as stars and planets.

The night sky over the lake is significantly different from the sky over the GTA and areas in proximity to the city. Cottagers and residents enjoy the Milky Way which extends from west to east across the sky, the enormous number of stars and constellations visible on a moonless night. To those on the west side, there is a unique beauty to a full moon rising and casting a silver path across the lake. All of this is blocked from view in an urban area. Seventy eight percent of respondents to the Gull lake Plan survey were very or moderately concerned about light pollution. Concern was also expressed in the written responses about the cell tower. The tower lights constitute a different category of light pollution/light trespass as they are not directly controllable by lake property owners. This issue will be covered separately.

Light trespass can be defined as a light or lights left on after dark that negatively impact on a next door neighbour or neighbour across the lake. Lights can range from a single exposed bulb on the side of a shed, a series of lights illuminating a pathway, a spot light aimed at a dock or waterfront, to lights from a deck aimed at the property around the dwelling. Property owners may very well not be aware of the impact such lighting can have on the enjoyment of the sky from across the lake or the “riveting effect” they have on the enjoyment of the view of the night sky. For the most part the solution is simple – turn off exterior lights when not in use. Especially turn off exterior lights when leaving the cottage at the end of the weekend. If lights are necessary for example safety reasons, there are measures that can be taken to diminish their negative impact.

Exterior lights can negatively affect the biological clock of nocturnal creatures and artificially modify their foraging time. Lights attract insects and the swarms that form and become a food source for bats. It is hard to argue against bats diminishing the mosquito population but the reality is that this process reduces biodiversity. Insects are pollinators and they constitute a food source for creatures other than bats.

### Options to Address Lighting Concerns

- ✓ **Provide Alternatives** - There are light fixtures that eliminate or diminish light trespass. The essential feature of the various neighbour friendly fixtures is they are designed to direct the

light down with no light visible horizontally or vertically. These fixtures can be referred to as full cut-off.

Motion detectors can be useful for limiting the time that lights are on. The light by your door is useful for finding your keys when returning home but it is also a waste of energy and source of pollution while you are away.

Dimmer switches can lower the intensity and energy consumption to the minimal level acceptable for the purpose of the light. Timers on exterior lights can reduce the incidents of 'forgot to turn them off'.

These are only some of the products available. The International Dark Sky Association lists fixtures that are approved as night sky (neighbour) friendly. Thoughtfulness and common sense are the essential elements in the selection of light fixtures for your cottage or home. You may not consider a dark sky as important but many of your neighbours will. To many people, light trespass is as objectionable as a neighbour's loud music in the middle of the night.

- ✓ **Regulated or voluntary compliance** - A less than exhaustive search indicates ten states have light pollution laws in place. At least two Canadian jurisdictions (Calgary and Saskatchewan) are in the background study stage for the preparation of by-laws or laws. Others listed in the Kennisis Lake Plan include places such as Muskoka, Manitoulin Island, and Bruce Peninsula. These places have voluntary initiatives in place or under development. The Muskoka Natural Heritage Program has published a "Sensible Waterfront Lighting Guide".

Education, information and voluntary compliance are vastly preferable to regulation. The GLCA should only approach the Township of Minden Hills for by-law consideration as a last resort.

- ✓ **The Cell Tower** - Dark sky initiatives undertaken by individual property owners are, in a sense, negated when a Telecom is allowed to erect a communications tower with lights that aggressively trespass over large areas of the lake.

At the beginning of an investigation into the tower it would have been easy to conclude that no level of government was responsible for the tower. In fact several Federal departments regulate the components of the tower including siting, construction and lighting systems.

The placement and erection regulations fall under the jurisdiction of Industry Canada. The process defined by Industry Canada specifies a very clear requirement for consultation with the local land use authority. This authority lies with the municipality, and/or the county with the delineating responsibility being that of the provincial department of Municipal Affairs. The Local Land Use Authority (LUA) in this case was the Building Department of Minden Hills. Public notification of the tower by the tower owner was apparently accomplished by a single advertisement in the Wednesday April 11, 2012 edition of the Minden Times. Very obviously this did not adequately inform the many seasonal property owners. The tower's impact on the environment, property values and the rights of impacted property owners has not been determined at the time of writing this section of the plan. The area MPP's office staff dismissed all issues as being Federal responsibility.

The specification of a tower lighting system is an aviation safety issue and as such comes under the auspices of Transport Canada. The defined process is:

- The tower owner applies to Transport Canada for a permit to erect a tower;
- Transport Canada assesses the tower with respect to its height above the local terrain, proximity to an airport, etc. and then assigns the tower one of six lighting configurations. Three of these configurations are considered high intensity, three are lower intensity. Configurations include white and red lights and combinations of both. The current

configuration replaced an all- white system when complaints were received by the tower owner.

There are alternatives to the installed tower. In Muskoka, after extensive and documented consultation, the cell phone and wireless internet services were provided by a series of 30m towers “disguised” as pine trees. Towers 30m and under do not require lights. There is also an approved aircraft detection system (ADS) that activates the tower warning lights and emits a VHF radio signal when an aircraft approaches the tower. This system does not require any modification to the aircraft.

The challenge to the GLCA is to pursue the replacement of the current configuration while maintaining quality cell service without the environmental impact.

#### Action

A Township policy is being developed for Minden Hills, and is being considered in terms of consultative changes being proposed by the CRTC; policies being developed by neighbouring Townships, and the Township’s Official Plan, which encourages the maintenance of dark skies in rural and shoreline areas. The Townships policy regarding cell towers is expected to be complete in the spring of 2015.



## SECTION 5 NATURAL ELEMENTS

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### 5.1 Water Quality

#### 5.1.1 General

Preservation of good water quality is of the highest priority to property owners on Gull Lake. It is the key to maintaining a beautiful resource for generations that follow to experience the enjoyment of nature that we currently have. The balance of man and nature is very delicate. Human activity, directly or indirectly is no doubt the most influential factor in the future of Gull Lake. Users of the lake must always take into account the effect of all that is done and its potential effect on water quality if lake users are serious about preserving the health and beauty of this world and in particular as it relates in this document to Gull Lake. Many changes are certain to occur in the near future as development spreads to the north. It is clear that climate change will also impact the lake in a huge way. Current knowledge and future findings will help to minimize these changes and lead to a respectful co-existence with nature. Our goal in this Gull Lake Plan is to provide the knowledge that exists now and outline what we hope to obtain through future study.

#### 5.1.2 Assessing Water Quality

Over the years, the GLCA, MNR, and MOE have gathered some baseline information on the water quality of many Ontario Lakes including Gull Lake. Over recent years the GLCA has participated in providing samples to the MOE-Lake Partners Program (sampled at the same location each year mid lake off Rackety Creek) and the GLCA has also submitted on an annual basis samples from 5 areas of the Lake to an independent Lab (Central Ontario Analytical Lab (COAL) for additional information beyond the single sample that is allowed through the Lake Partner's program.

#### 5.1.3 Lake Trophic Status and Eutrophication

The trophic status, measured as phosphorus, is considered a good indicator or measure of a lake's ecosystem health and is a lake capacity factor which can limit development. Increased phosphorus inputs resulting from development is a concern on all lakes. Lakes generally progress from oligotrophic to eutrophic as a process of natural succession.

Eutrophication is a natural process in which the nutrient levels of lakes increase from oligotrophic (nutrient poor) to eutrophic (nutrient rich). Eutrophication is caused by the accumulation of plant nutrients and organic matter within the lake. Since phosphorus is the nutrient in short supply in most fresh waters, even the slightest increase can, under the right conditions, set off a whole chain of undesirable events including accelerated plant growth, algae blooms, low dissolved oxygen, the death of certain fish, macroinvertebrates, and other aquatic organisms. It is also important to understand that lakes go through seasonal and annual cycles which can change the physical and chemical characteristics. As time goes on, dissolved minerals including plant nutrients enter the lake from surface runoff and groundwater infiltration at a rate dependent on local climate and geology. This is why it is important to monitor local changes and to better understand the natural fluctuations and human induced changes within an ecosystem. It is well known that external sources such as fertilizer use, stormwater runoff, septic system effluents, waterfowl, agriculture, and even rainfall can contribute to excess nutrients, including phosphorous, within in a lake. Cottage developed lakes receive elevated nutrient loading mainly from cottages, associated septic wastes, and other

shoreline activities. Any nutrients from the ground through runoff into the lake can cause increased phosphorous levels.

Recommended Actions ***Monitor Water Quality***

- ✓ *Conduct base line study to determine requirements for future water quality sampling program (Action 1.1).*
- ✓ *Conduct Lake Capacity Assessment based on the Provincial Model to understand the current status of water quality and development capacity (Action 1.2).*
- ✓ *Further investigate the potential to join the Coalition of Haliburton Lake Associations (CHA) lake testing project (Action 1.5).*

Aquatic plants (like other plants) need two essential nutrients to grow: nitrogen and phosphorus. In large quantities, these two nutrients can cause a major water pollution problem. Too much nitrogen and phosphorus stimulates the rapid growth of plants and algae, clogging waterways, and sometimes creating toxic blue-green algae. Excessive growth and decomposition of plants and algae can result in depletion of dissolved oxygen in the water which could result in the loss of fish life and in particular Lake Trout. Lake Trout are especially sensitive because they are a cold water species that typically inhabit the depths (an area that is already lower in oxygen due to its distance from the surface).

Recommended Actions ***Monitor Siltation and Aquatic Plants***

- ✓ *Investigate the increase of siltation and growth of aquatic plants in Gull Lake (Action 1.4).*

In a healthy lake, nutrients occur in small amounts. Phosphorus is a vital nutrient for converting sunlight into useable energy and is essential for cellular growth and reproduction. Phosphorus occurs in dissolved organic and inorganic forms or is attached to sediment particles. Phosphates in the inorganic form are preferred for plant growth (thus the reduction of phosphate-free soaps to slow the eutrophication of the Great Lakes in the 60's and 70's).

Phosphorus also builds up in the sediments on lake bottoms. While in the sediments, it is generally unavailable for use by plants however various chemical and biological processes can allow sediment phosphorus to be released back in to the water (e.g., low oxygen levels can lead to a chemical process where phosphorus is liberated from the sediments).

Recommended Actions ***Protect Water Quality through Education***

- ✓ *Educate residents regarding the impact of fertilizers, pesticides, gasoline, oil, (pollution from watercraft), household chemicals on water quality (Action 1.6).*
- ✓ *Educate residents of the importance of shoreline and near shoreline (littoral) preservation to the quality of lake water (Action 1.7).*
- ✓ *Educate residents about the impacts of disposing of yard waste (leaves, brush and trees from property) into the lake (Action 1.8)*

Other common sources of excess phosphorus reaching lakes and streams include septic systems, animal feed lots, agricultural fertilizers, run off from lawn fertilization, manure, industrial waste waters, garbage dumps and storm drainage

#### Water Quality Impacts of increased Phosphorus

- Frequent blooms of undesirable algae (some toxic and giving off poor taste and odour). Blooms are also influenced by temperature and water column stability
- Excessive growth of plants leading to the loss of open water
- Lower levels of dissolved oxygen which may lead to fish kills and affect fish diversity. When plants and algae die, they consume a large amount of dissolved oxygen as they decay

#### 5.1.4 Primary Measures of Ecosystem Health

There are three primary measures of ecosystem health; phosphorus, secchi depth and benthic community.

##### a) Phosphorus

Currently, no national environmental quality guidelines exist for phosphorus (Environment Canada, 2004). However, implications of current lake status can be interpreted through total phosphorous measurements. The MOE (1994) suggests that a high level of protection against aesthetic deterioration for lakes with total phosphorous levels of 10 ug/L or less should be considered. Based on these measurements and Table 5.1, Gull Lake can be interpreted as being Oligotrophic and exhibits the features of such a lake, 1) generally clear, deep, and free of weeds and algal blooms; 2) are low in nutrients, have low primary production, and do not support large fish populations; 3) may support Lake Trout; and 4) the watershed usually contains few wetlands. It is not surprising that Gull Lake is classified as oligotrophic as the lake has deep waters and is part of the Precambrian shield making it a naturally oligotrophic lake.

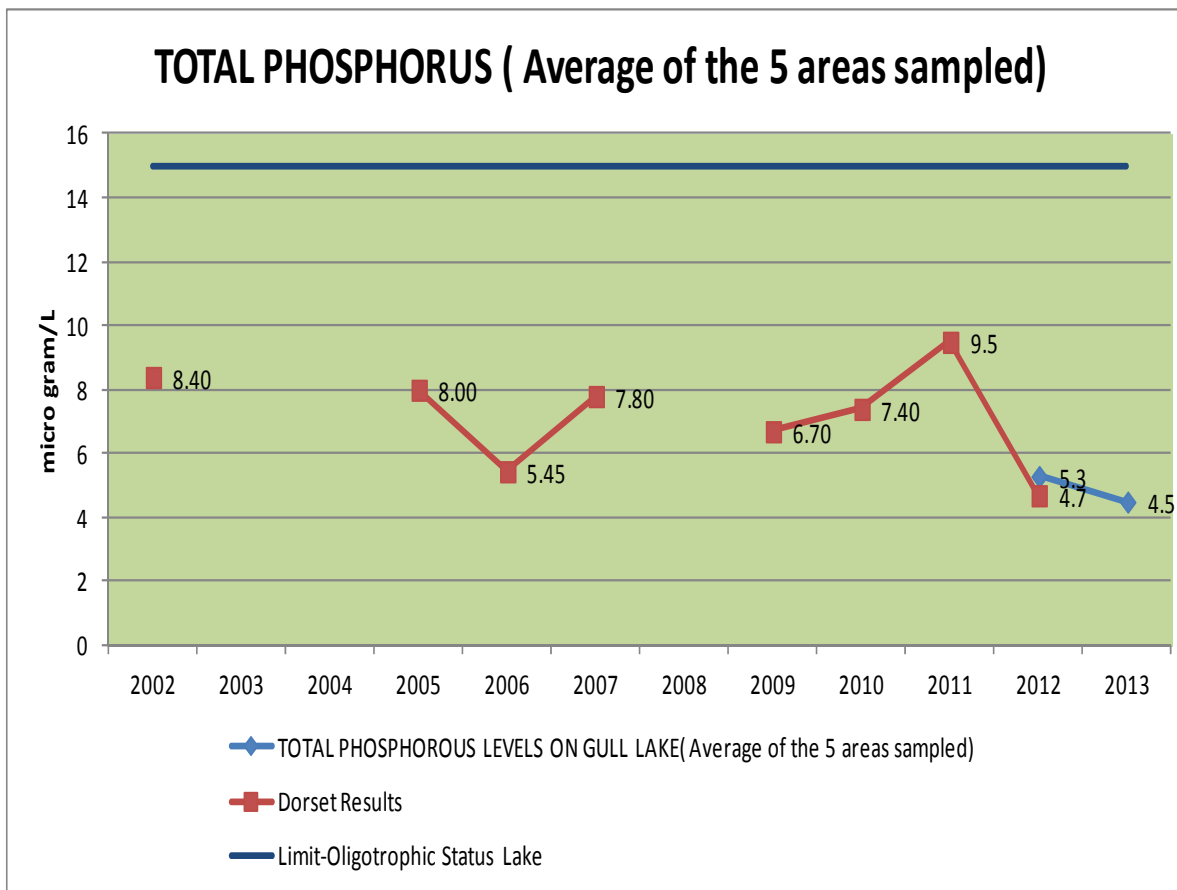
**Table 5.1 – Lake trophic status and associated nitrogen, phosphorus, chlorophyll a, and secchi depth measurements. Adapted from Bachmann et al. (1999).**

Lake Trophic Status	Secchi Depth (m)	Phosphorus (µg/L)	Total Chlorophyll a (µg/L)	Total Nitrogen (µg/L)
Oligotrophic	>4	<15	<3	<400
Mesotrophic	2.5-4	15-25	3-7	400-600
Eutrophic	1-2.5	25-100	7-40	600-1500
Hypereutrophic	<1	>100	>40	>1500

*Phosphorus Results* - Figure 5.2 illustrates the average total phosphorus levels for Gull Lake collected from 2002 to 2012. The information shows that we are solidly in the oligotrophic status. We must however not sit back and feel comfortable with this trend as other factors are at work. Although our method of sampling for total phosphorus content has not changed there are some reports that phosphorus levels may not tell the whole story. Phosphorus may also be locked up in the mud and can be released if dissolved oxygen levels drop too low. (It may be necessary to change the present sampling method in the future). Also it must be kept in mind that the lake is a source lake for the Trent Water System and subject to changing water conditions as lake water from other lakes passes through Gull Lake. Climate change will also have an effect as waters get warmer supporting

increased ice free seasons. Warmer water also promotes more plant growth and reduced oxygen levels at further depths.

**Figure 5.2 - Total Phosphorus Results -**  
An average of total phosphorous levels for Gull Lake from 2002-2012.

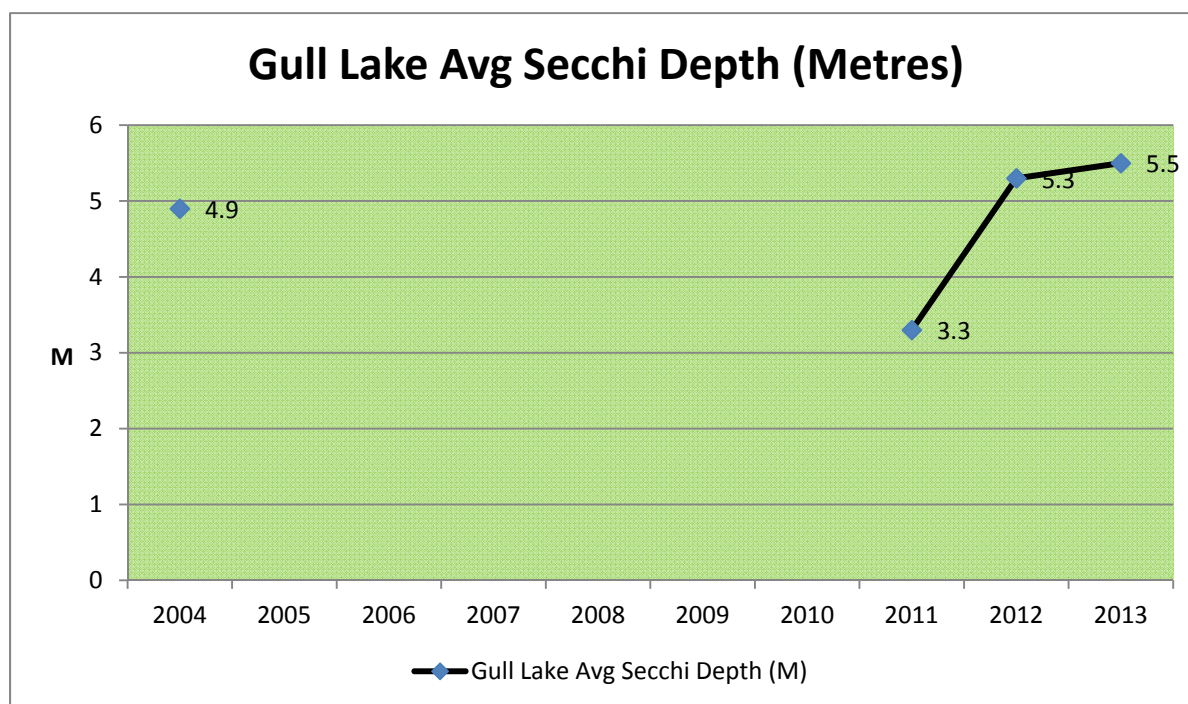


#### b) Secchi Depth

Visual clarity is an important measure of water quality, with consequences for health and safety as well as for aesthetics. Clarity is the attenuation of visual contrast and is most commonly measured as Secchi depth (the depth at which a black and white disc suspended by a rope in the water is no longer visible). Water clarity is an indirect measure of how much algae is in the water. Water clarity observations used in conjunction with phosphorus measurements can be used to determine the nutrient status of the Lake. A certain amount of algae is critical to the life of our lakes. They are the basis of the food chain and play an important role in converting nutrients to organic matter and oxygenating water. Fish production in lakes varies directly with the amount of algae the lake produces. If there were no algae, there would be no fish. However problems arise in lakes when the balance between algae and fish is upset. The introduction of pollutants and nutrients results in excess algal growth.

*Secchi Results* - Figure 5.3 illustrates the average and site specific secchi depth levels collected within Gull Lake

Figure 5.3 - Gull Lake Average Secchi Disc Depth 2004-2014



In general, the data on water clarity supports that of the phosphorus results in classifying the lake as oligotrophic (lakes with a secchi depth greater than 4 m and total phosphorus less than 10 micrograms/L). It should be noted that one low reading (2011) is not significant to the trend. Episodic events, such as wind-driven upwelling, could result in rapid changes in observed Secchi depth in the order of hours. Variability could also be caused by the experience of the observer and the light conditions, at the time of sampling and the amount of rainfall in the days preceding the observation.

### c) Benthic Community

The following is based on a research report by Emily Grubb-Environmental student-Trent University (see Appendix E).

Benthic Invertebrates inhabit the bottom substrates of aquatic habitats for at least part of their life cycle. Typically this fauna includes aquatic insects -(stoneflies, mayflies beetles etc), crustaceans-(crayfish, isopods, amphipods), molluscs -(snails, clams, mussels), annelids (e.g., leeches) and a few other groups (e.g., flatworms). Benthic invertebrates have been used extensively to assess water quality in streams and lakes. The abundance, diversity, evenness and community composition is an indicator of changing lake water quality and can be monitored along with chemical parameters over time to spot changes to the lake water that impacts upon their existence. In a way they are also canaries of the lake much as Lake Trout. Characteristics in benthic communities are highly dependent on habitat conditions.

Macro invertebrates were assessed within Gull Lake as an indicator of lake health. Fall sampling of macro invertebrates was completed on October 12<sup>th</sup> 2012. Three sites were chosen along the lake from distance end to end in order to get an understanding of the benthic community present (Figure 5.4). Site 1 was located in the upper part of the lake, specifically along the shore of Sandy Beach. Site one is not far from the Gull River mouth (lake inflow) where water flows south from Minden Lake. Site 2 is located in roughly the middle of the lake along the shore of Rackety Trail Road. This



site is not far from the mouth of Rackety Creek where water comes in from the north-west from Little Bob Lake. The third site was located at the bottom part of the lake in Miners Bay.

These sites were chosen because they are all similar in substrate, organic matter, riparian vegetative community and abundant aquatic macrophytes. Selecting sites with these similarities ensures that factors within the lake are more likely affecting the species present rather than the geological and physical differences between sites.

All 3 areas sampled exhibited similar species diversity which indicates fairly consistent water conditions in all three areas. In addition, of the 14 species found, 30% are known to be very sensitive to organic waste. In general, the composition of the benthic community suggests that we have 'fair' water quality with a fairly significant organic pollution.

(Determined using 'Simpson's Diversity Values and Hisenhoff Biotic Index – details in Emily's report-Appendix E)

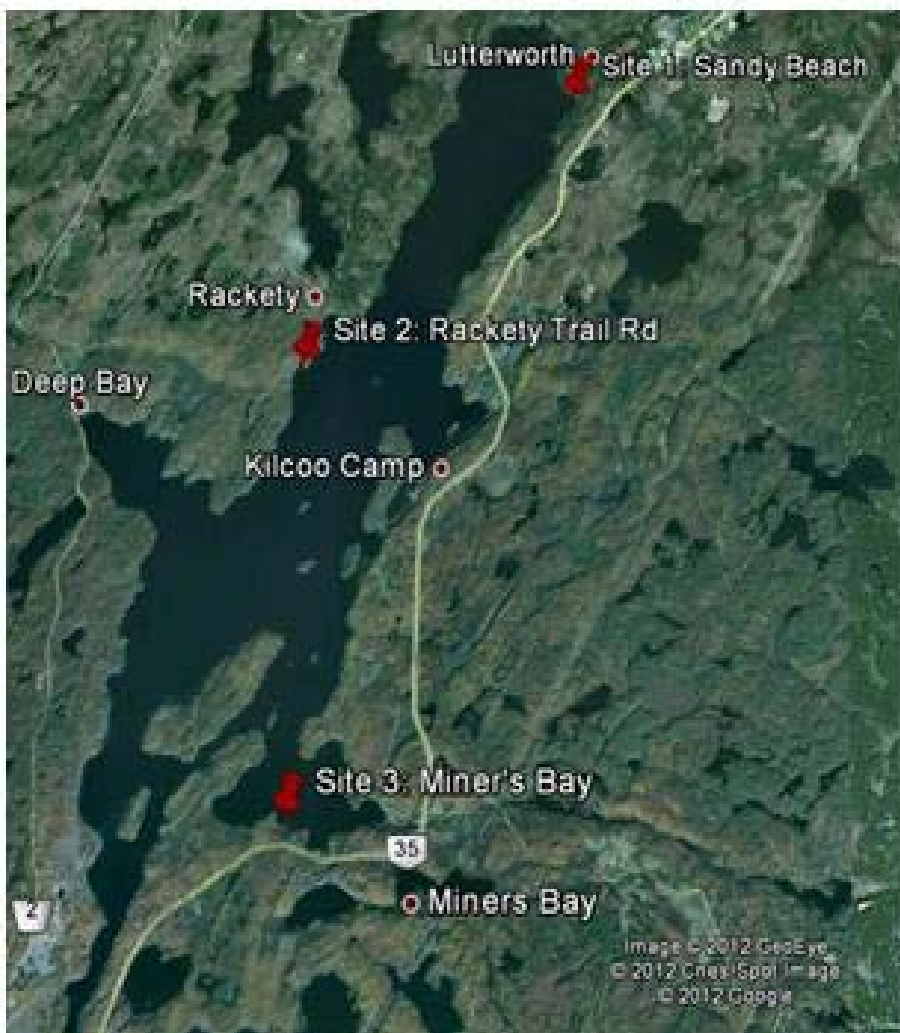
Therefore, one could make the assumption that Gull Lake is not experiencing organic pollutants in higher concentrations within any of the sites sampled. More sites would have to be sampled or areas of concern defined in order to determine where organic pollution within Gull Lake stems from.

This study done by Emily Grubb (Trent University Student-U-links) is a first step. A more intensive Benthic Study and chemical analysis of the Lake has already been done. Results are not yet available but once complete the Lake Plan will be updated along with future sampling recommendations.

### **Current Benthic Study Stage 2- In Process**

The following information is provided from a presentation given by Helga Sonnenberg (dipl. Ecotoc., M. Sc.). The next step is to undertake an aquatic baseline Biomonitoring Program for the Gull River Watershed and Gull Lake. The objectives of this program are to:

**Figure 5.4 - Macro Benthic Invertebrates Sampling Testing Sites**



- Determine the overall health of the lake (this will be done through biological (fish and benthic invertebrate data), as well as chemical data interpretation (water/sediment quality):
- Provide any upstream issues that should be monitored;
- Provide a solid baseline for future comparisons (i.e., every 5 years); and,
- Contribute to the Lake Stewardship program.

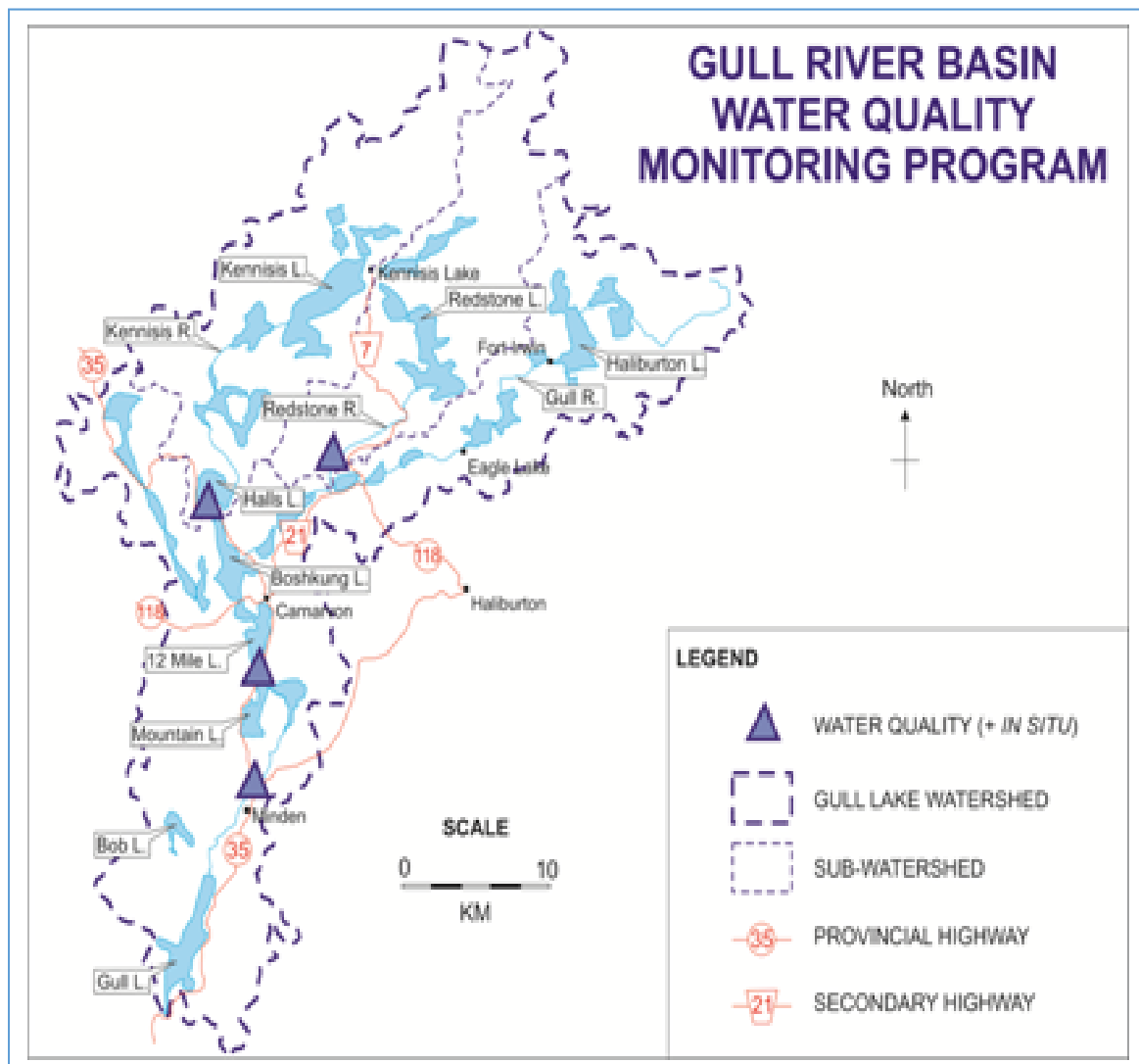
The program will consist of 2 components which involves monitoring at 2 geographical scales; the Gull River Watershed and Gull Lake.

### Watershed Monitoring

Gull Lake is at the end of a very large watershed containing several sub watersheds comprised of other large lakes. Several key water quality monitoring locations throughout the watershed are proposed to identify potential upstream issues/threats \*(see Figure 5.5).

A sampling location will be located in the creek downstream of the Minden landfill, which drains into Gull River.

**Figure 5.5 - Proposed Gull River Basin Water Quality Monitoring Program**



### Gull Lake Aquatic Biomonitoring Program

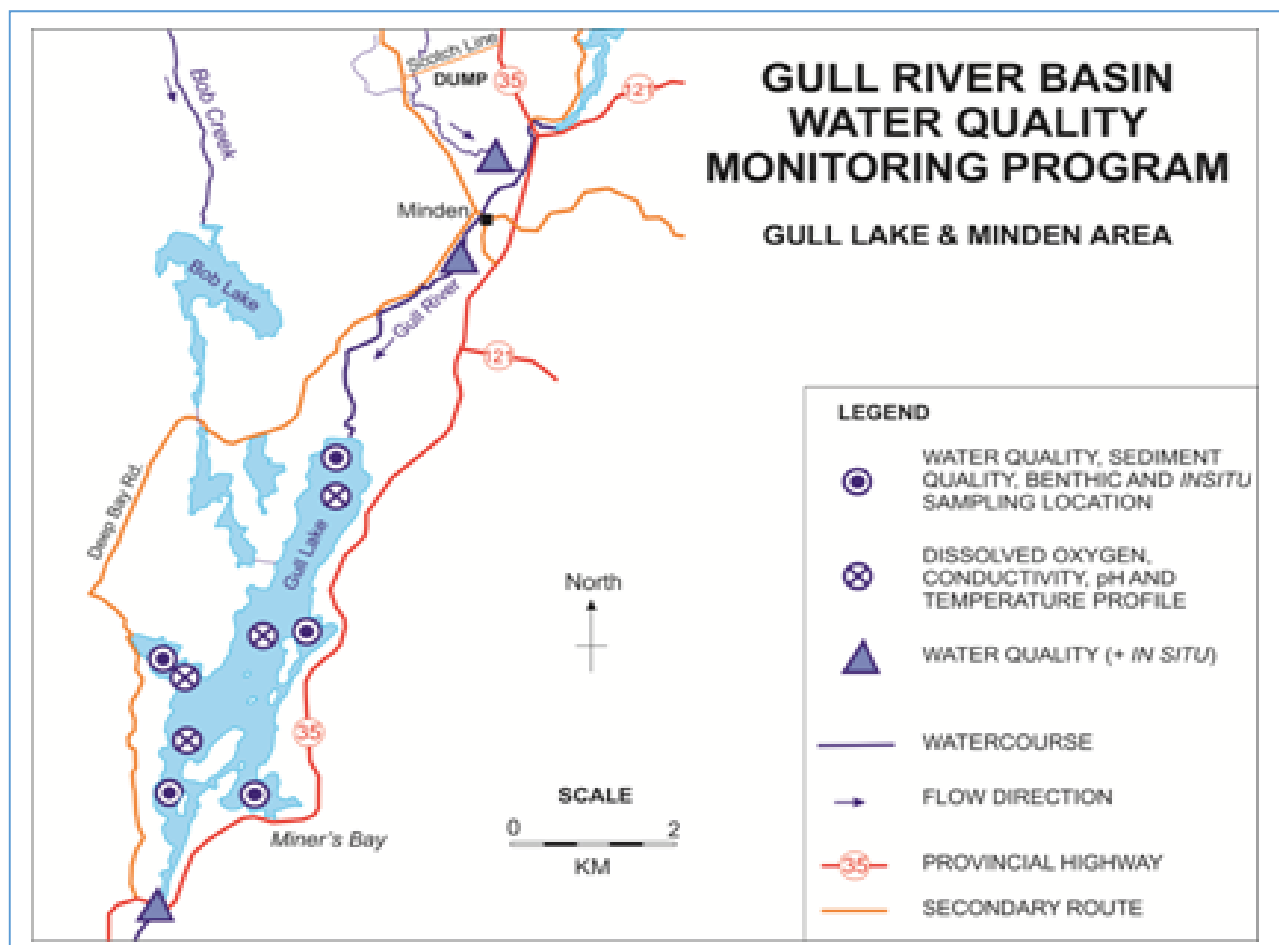
Four to five key representative biomonitoring locations will be selected and monitored to provide the following information (see Figure 5.6):

- Quantitative benthic invertebrate (bug life) sampling with detailed taxonomy performed;
- Water quality sampling; and
- Sediment quality sampling.

As well, water quality profiles will be established at 4 (or more) of the deepest locations in the lake and at all biomonitoring stations to provide information on dissolved oxygen, conductivity, pH and temperature at 1 m intervals.

This will provide data that can be used to assess the suitability of Gull Lake to support Lake Trout.

**Figure 5.6 - Proposed Gull Lake Aquatic Biomonitoring Program**



### 5.1.5 Other Water Quality Indicators

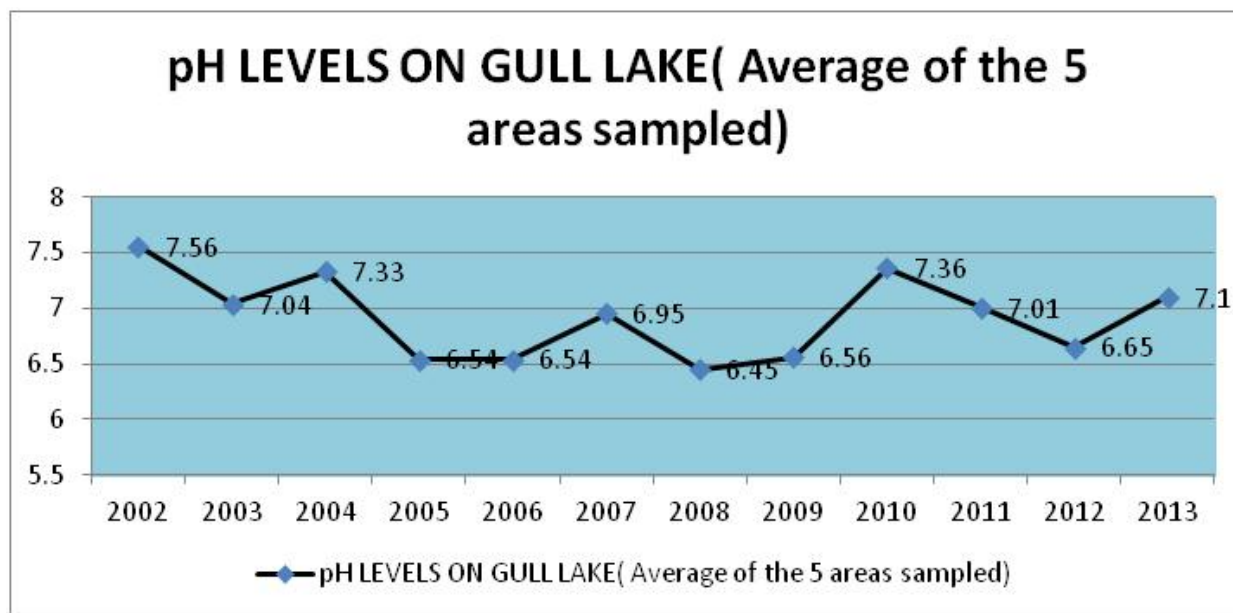
There are 5 other water quality indicators of ecosystem health: pH, temperature, dissolved oxygen, e-coli and calcium.

#### a) pH Results

pH is a term used to indicate the alkalinity or acidity of a substance as ranked on a scale from 1 to 14. All aquatic organisms are adapted to a certain pH range, usually between 6.5 and 8.0; a change in pH outside the normal range of a water body has the potential to cause a loss of species depending on their sensitivity. Human activity can influence changes in pH. Low pH can also allow toxic elements and compounds to become mobile and available for uptake by aquatic plants and animals causing conditions that are toxic to aquatic life, particularly to sensitive species like lake trout.

The average levels of pH within Gull Lake indicate that levels have remained mostly between 6.5 and 7.5 from 2002 to 2013 (see Figure 5.7). These levels primarily fall within the MOE allowable limits of pH which does not cause harm to aquatic organisms. It has also been suggested that the variability in aquatic pH is dependent upon the amount of rainfall and the effect of flow through variability in our Lake as we are a feeder lake for the TWS. pH levels are not a concern at this time but we will continue to monitor it.

**Figure 5.7 – Average pH levels measured within Gull Lake from 2002-2013.**



#### b) Temperature

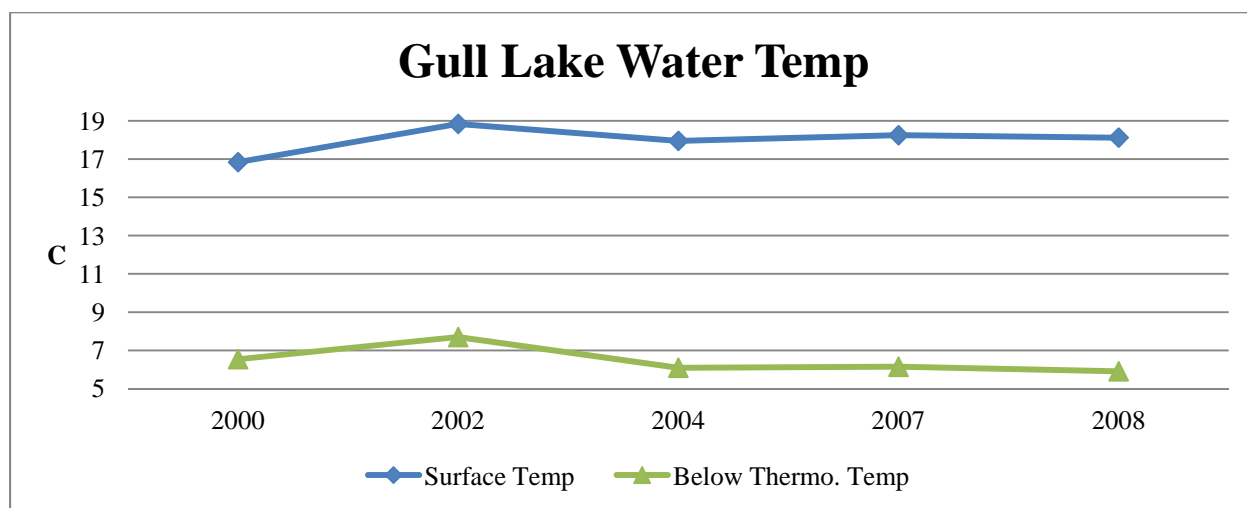
Surface temperature and temperatures below the thermocline show consistent temperature from 2000-2008 (Figure 5.8). There is a small peak in temperature from 2002 to 18.8°C at the surface and 7.7°C below the thermocline.

The duration and intensity of stratification in surface waters is one of the most major factors in determining seasonal changes in surface water quality. The interaction of several factors including the initial temperature of surface and ground water inputs to a lake, lake trophic state, the physical

geometry, and volume of the lake basin will determine the magnitude of stratification change in a specific lake, and the associated oxygen depletion that would result from increased water temperatures. It is clear that there are a number of factors to consider when assessing temperature as a parameter of ecosystem health.

Sampling times again need to be considered here. When sampling water temperature in the summer, hours and days sampled can make all the difference. It is important to know that the samples were taken in September indicating a consistent sampling period. Had these samples been taken in other months it would be more indicative of lake temperatures to categorize the samples by month or by season. Because all the samples are taken at the same time each year, it is interesting that the temperature jump 2°C in 2002.

**Figure 5.8 – Gull Lake Water Temperatures (2000 - 2008)**



It is important to note that warming of air and water temperatures have been shown to increase biological productivity and decomposition by increasing rates of metabolism, the duration of the growing season and the resultant increase in productivity can increase nutrient cycling and accelerate eutrophication in aquatic systems with sufficient nutrient and oxygen supplies. More specific to Gull Lake, the productivity from warmer temperatures may not, however, reach maximum potential levels in strongly oligotrophic or oxygen depleted waters. From the results, there are no issues derived by temperature however, the results are only compiled for five years and end in 2008. This does not give us enough information which is why this parameter needs continued monitoring and collection.

The rates of biological and chemical processes depend on temperature. Aquatic organisms from microbes to fish are dependent on certain temperature ranges for their optimal health. If temperatures are outside of an organism's optimal range for a prolonged period of time, organisms are stressed and can die.

Causes of temperature change include weather, removal of shading stream bank vegetation, impoundments (i.e., dams), urban storm water, and groundwater inflows to the lake. Temperature affects the oxygen content of the water (oxygen levels lower as temperature increases), the rate of photosynthesis by aquatic plants, the metabolic rates of aquatic organisms, and the sensitivity of organisms to toxic wastes, parasites, and diseases. It is important that temperature changes within aquatic ecosystems be monitored with the foreseen impacts of climate change.

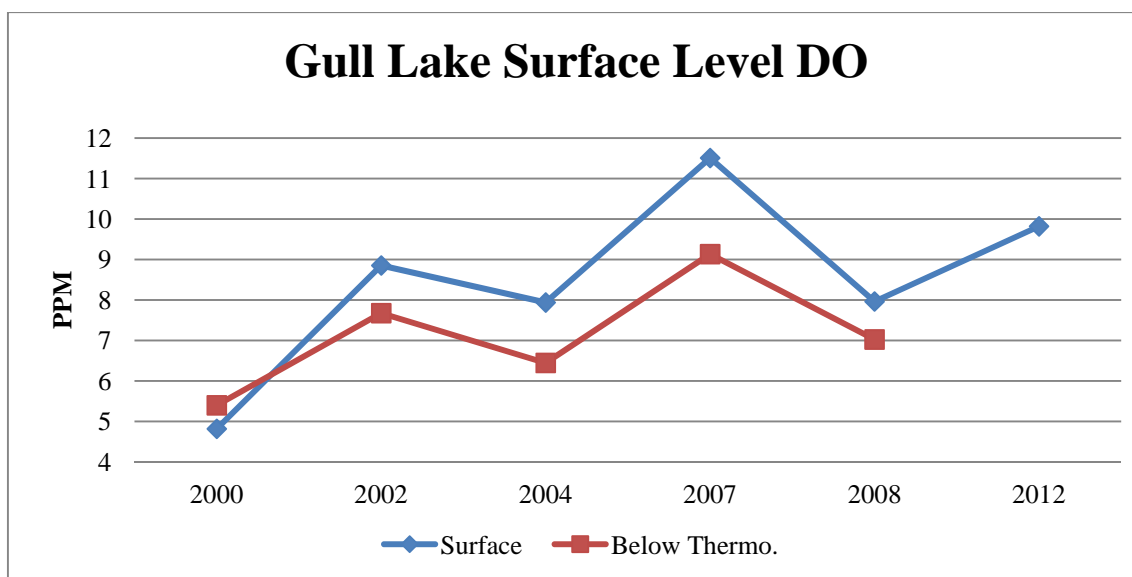


### c) Dissolved Oxygen

Oxygen within aquatic ecosystems is measured in its dissolved form as dissolved oxygen (DO); oxygen gas that is dissolved in the water and made available to aquatic life. Oxygen gets into the water by diffusion from the surrounding air, by aeration from moving water or as a product of photosynthesis. The oxygen content of natural waters varies with temperature, salinity, turbulence, photosynthetic activity of algae and plants, and atmospheric pressure. If more oxygen is consumed than is produced, dissolved oxygen levels decline and some sensitive organisms may alter their distribution, weaken, or expire.

Dissolved oxygen has been fairly inconsistent in the Gull Lake in both the surface of the water as well as below the thermocline (see Figure 5.9). Both the surface and below thermocline levels are at the lowest level in 2000 and rise or fall every couple of years. Surface temperatures for 2012 however, indicate a rise in DO after a steep decline in 2008.

**Figure 5.9 – An average of surface level dissolved oxygen (DO) and average dissolved oxygen levels below the thermocline (12m) collected along Gull Lake from 2000-2012.**



Dissolved oxygen levels are quite variable from year to year in Gull Lake, continually rising and falling – which can be associated with natural variation. It is important to understand that temperature affects the amount of dissolved oxygen that water can hold; as temperature rises, the solubility of oxygen decreases. The amount of dissolved oxygen in summer can therefore be up to half of that found during the winter because of changing water temperatures. Changes in dissolved oxygen can also be caused by higher organic matter concentrations and increased biological activity. It is important that we consider sampling times and realize that dissolved oxygen can be highly variable. It is also important to consider that according to the Canadian Water Protection Guidelines (2012), dissolved oxygen may be influenced by climatic conditions, morphology, productivity, and watershed characteristics (oxygen sources and nonpoint source loading of organic material). Because these characteristics can vary tremendously, both temporally and spatially, this again explains as to why we see the variation within Gull Lake.

A minimum dissolved oxygen concentration of 5.0 mg/L should be maintained in order to sustain good fish populations. When applying these guidelines to Gull Lake, there is only one time in 2000

when levels were well below recommended guidelines. This indicates that generally, there are no apparent issues with dissolved oxygen (remembering Gull Lake only has results up to 2008 for DO). We have however received some informal reports (U of T survey camp) that DO results in some areas were below 5.0 mg/L and also that some dead spots (no DO) have been found in other Haliburton Lakes (information from CHA - Coalition of Haliburton Cottage Associations).

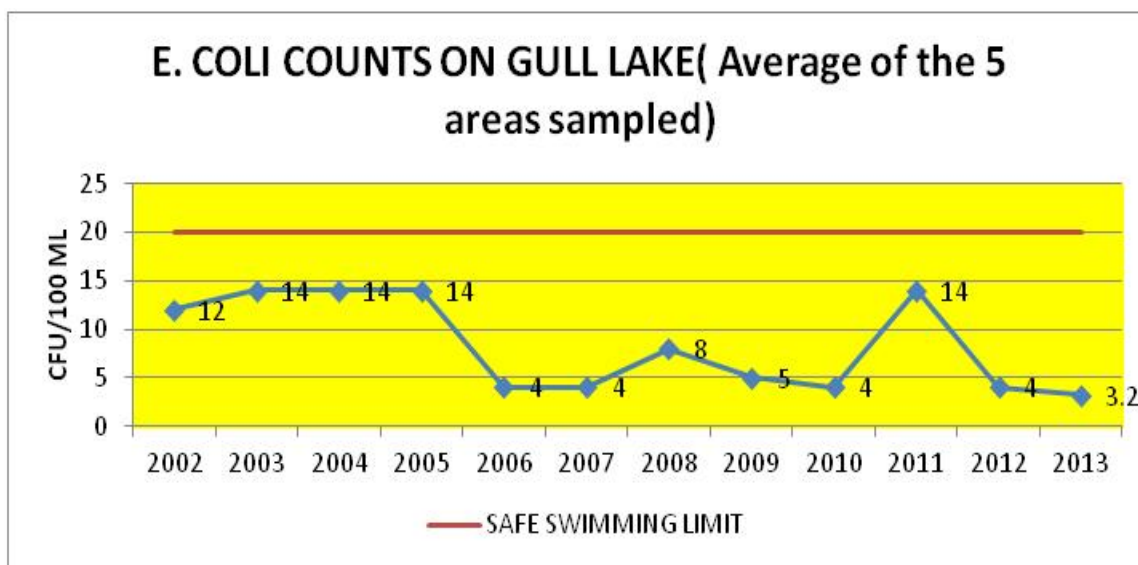
On August 4, 2013, Mike Thorne and Don Drouillard did some additional testing of dissolved oxygen and temperature levels in the Deep Bay area. It appears that the dissolved oxygen levels were at a level that would support the trout population in the depths during this particular sampling time, (It should be noted that it was a much cooler summer than the previous year which would encourage greater solubility of oxygen in colder waters). It was planned to sample the depths in 3 areas of the Lake but there was difficulty with the DO meter and had to halt further sampling. Future studies are needed (preferably on an annual basis) and readings should be taken in the beginning of September to coincide with previous MNR readings. See Appendix D August 4, 2013 D.O. Survey Results

#### d) E Coli

*E. coli* are organisms found in high numbers in the intestinal tract and faeces of humans and warm-blooded animals. Although they are generally not harmful themselves, Health Canada suggests that *E. coli* indicates the possible presence of pathogenic (disease-causing) bacteria, viruses, and protozoans that also live in human

Figure 5.10 illustrates *E. Coli* Counts taken on Gull Lake. The different spikes in *E. coli* levels at different locations and times are important to note. The North Gull River tends to experience levels much higher than lake averages or that of any other site

**Figure 5.10 E. Coli Counts on Gull Lake**



Generally, the results on *E.coli* cannot be conclusive. *E. coli* numbers can vary considerably from day to day due to the amount of rainfall and the resultant runoff from surrounding farmland. All indications from records of the waste treatment plant imply good control. It may be useful if counts are problematic to do a more frequent sampling at various points along the river before and after the

Minden Waste Water Treatment Plant WWTP. Counts can also be increased during a large presence of water fowl (Geese and Sea Gulls).

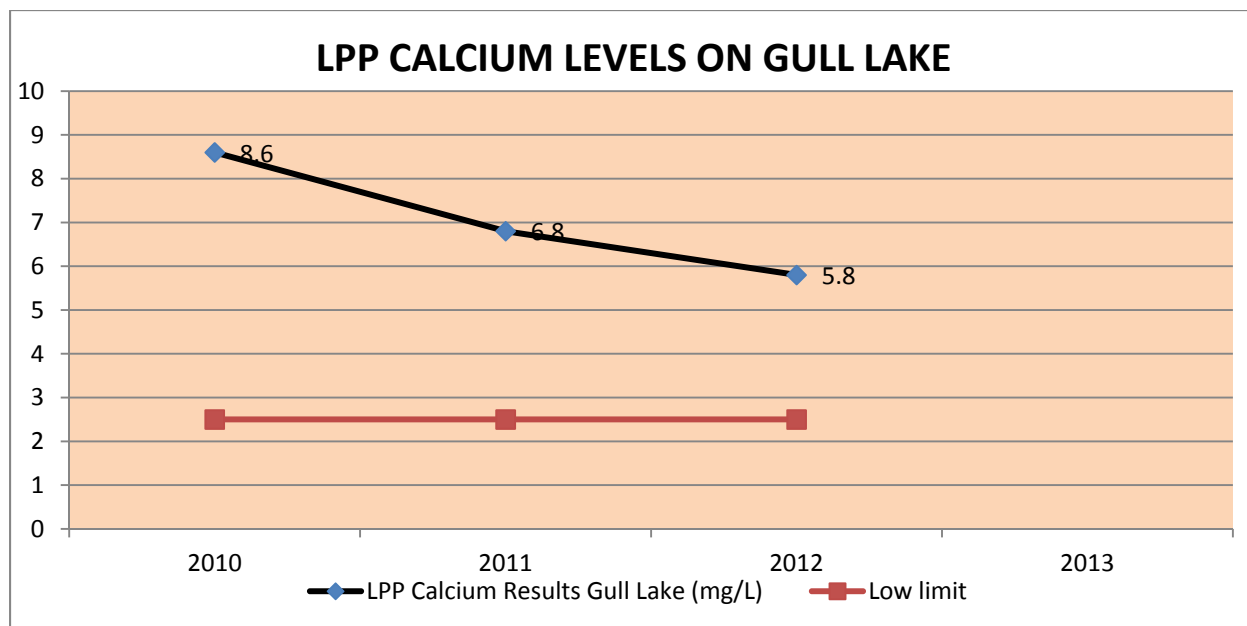
- Recommended Actions ***Minden's Waste Water Treatment Plant***
- ✓ *Continue to monitor operation of Minden's Waste Water Treatment Plant (Action 1.3)*
  - ✓ *Create an early warning system in the case of a spill from the sewage treatment plant or the highway for river and lake residents to notify them of any contaminated drinking water (Action 1.9)*

#### e) Calcium Levels

Calcium is important to the growth of daphnia and crustaceans, which are a very important parts of the food chain for fish. While it has been recognized that there is a general reduction in calcium levels in many shield lakes, Gull Lake is not in the danger zone for lower limits. The trend line as indicated in Figure 5.11 is premature but disturbing (keep in mind that it is important to have more than 3 results to make any assumptions about trend).

It has been reported that a decrease in Ca levels may reduce the growth of Daphnia and subsequently increase the growth of a jelly like substance which may have a long term impact on certain fish populations and also clog water intakes where screening is involved.

**Figure 5.11 - E. Coli Counts on Gull Lake**



#### 5.1.6 Current State of Water Quality on Gull Lake

The current interpretation of water quality overall indicates that Gull Lake is a healthy Lake based on traditional evaluation methods using Total Phosphorus and Secchi depth readings. Further benthic studies and dissolved oxygen studies are needed to confirm the health of the Lake. The GLCA is in partnership with the CHA and the Lake Partners Plan to expand upon the depth of our studies. They will become part of our annual sampling plan in the near future.

## 5.2 Fish Population

### Gull Lake – A Lake Trout Lake

Fish species present: lake trout, smallmouth bass, largemouth bass, lake whitefish, lake herring, yellow perch, pumpkinseed, rock bass, white sucker, brown bullhead, rainbow smelt, bluntnose minnow, spottail shiner, creek chub, blacknose shiner, lake chub, trout perch, pickerel. Gull lake has three basins, one of which holds the maximum depth reading of 49 metres (161 ft). The mean depth of the lake is 16.9 metres (54 ft.).

Gull Lake has a self-sustaining population of Lake Trout according to information from the MNR (2005). Lake trout are the 'Canaries of the Lake' and typically survive in pristine, cold and healthy lakes. It is very fortunate to have naturally producing Lake Trout in Gull Lake (Only 1% of Lakes in Ontario have Lake Trout) and we must take care to prevent their extinction. Having Lake Trout gives some gravitas to the Gull Lake Plan as well as a sense of measurement. A successful lake plan for Gull Lake can be measured in our ability to sustain the lake trout population.

Restocking of Lake Trout is not a viable solution because in most cases restocked trout will not reproduce (this is one of the reasons why Lake Trout are not normally restocked in lakes that have a naturally producing population). The preservation of the species is dependent largely on clean water and proper management of fishing.

Gull Lake has, for the most part, always been regarded as a lake that has good natural reproducing fish populations. However, as long ago as 1922 the Ministry of Natural Resources (MNR)—then the Department of Lands and Forests—has stocked lake trout and smallmouth bass annually from 1922 to 1978. Stocking was stopped in 1978 because the MNR made the decision based on a lake survey which showed that lake trout were naturally reproducing at an acceptable level. Today it is thought there are strong native populations of both these species in the lake. Stocking is no longer needed to sustain these populations if present regulations are followed and anglers practice good catch and release practices.

As an indicator of the number of fish stocked annually, the 1960 to 1970 portion of the stocking records is shown on Table 5.12. A quick examination of the entire table reveals several interesting facts:

- ✓ Stocking was done every year from 1922 to 1964 and less frequently thereafter;
- ✓ Far more lake trout than bass were stocked;
- ✓ As many as 30,000 lake trout were stocked in a single year in the early years with the numbers decreasing to a high of 6000 in the later years;
- ✓ In 1978, the stocking of lake trout was discontinued as the decision was made that Gull Lake trout were reproducing naturally at a satisfactory level (the stocking of bass ended in 1956); and
- ✓ Large Mouth Bass stocking was done only once during the 1922-1978 period when 300 were introduced to Gull Lake.

**Table 5.12 - Lake Trout Stocking - Gull Lake**

Year	# of Lake Trout Stocked
1960	900
1961	3600
1962	2000
1963	2400
1964	2040
1968	6000
1969	2700
1970	1300
1976	1800
1976	6000

*The entire record is available from MNR for those interested*



It is important to note that all stocking of lake trout was done before 1978 at a time when fishing pressure was considerably less than the pressure the lake has experienced since that time. Current harvest levels are indicators of overexploitation.

Gull Lake has been subject to increasing fishing pressure because of the increasing number of both cottagers and permanent residents, many of whom have retired and moved to the Gull Lake area. Many of these new permanent residents now have more time to spend fishing. In addition to these pressures there have been major developments in depth-meters, fish finders and angling gear in general, all of which have resulted in the beginnings of overexploitation.

In spite of all these pressures, Gull Lake continues to support good fishing and yet informal interviews with anglers indicated there have consistently been complaints of fewer fish being caught per hour of angling.

Lake trout have long been considered to be the “canary in the coal mine”; that is, the true indicator of the health of a lake in terms of water quality and good fishing. Therefore the lake trout should continue to be monitored and given a high degree of protection.

#### Recommended Actions ***Monitor Fish Health***

- ✓ *Collect fish population data to better understand the current lake trout population in Gull Lake (Action 6.1).*
- ✓ *Investigate winter pressure on lake trout populations and ice fishing, recognizing that ice fishing has a local economic importance (Action 6.2)*
- ✓ *Determine availability of lake trout habitat in Gull Lake, based on dissolved oxygen (Action 6.3).*

#### Options to Ensure a Healthy Fish Population

There are several ways of doing so including changing the number of fish an angler can have in his/her possession (limits), changing the length of the season, changing slot sizes, and limiting ice fishing. Any of these should be presented to the public through consultations before any arbitrary decisions are made.

Lake trout require cold, well oxygenated water to survive. Lake trout live in lakes where optimum water quality in the deep zones of the lake are crucial to the development and survival of young lake trout that use these zones as juvenile refuge areas from larger predatory fish. The productive capacity of the lake, for lake trout, is often determined by late summer water quality in these deep zones

There are other proactive measures that can be taken and that do not affect anglers directly such as enlarging existing spawning shoals and monitoring their condition regularly. There are three such shoals in Gull Lake and there is not yet a regular inspection of their conditions with repairs being made as necessary. Shoreline conditions also affect fish populations and the condition of privately-owned properties as well as publicly owned should be monitored and changes made or suggested where appropriate.

#### ***Improve Fish Habitat***

- ✓ *Identify spawning areas and where necessary, rehabilitate existing spawning areas to support lake trout reproduction (Action 6.7).*

An obvious solution to decreasing numbers of lake trout would be to restart the stocking program discontinued in 1978. However, there are several factors that militate against doing so.

- ✓ Continuous introduction of non-native trout can negatively impact the reproduction of native trout. This was part of the reasoning when stocking was terminated in 1978
- ✓ MNR budget cuts may affect the number of fish that can be produced but the decision to stock or not stock is usually based on a need to rationalize stocking with respect to the status of native populations.
- ✓ It is possible that angling pressure is reducing because of factors not directly related to fish reproduction such as the economy, climate change, weather, etc.

However, most anglers probably are not concerned whether the fish they catch are native or non-native. They simply want to catch more fish per hour spent fishing. The health of the overall fish population of Gull Lake is of course a concern but the fact remains that they want to catch more fish. Because of this fishermen, in general, are in favour of stocking and it is the MNR that receives the complaints.

In previous years the Ministry was able to conduct fish assessments on lakes and they would assign personnel and funding for a gill-net survey. Those days are gone because of reductions in their budgets. However, given sufficient and accurate data supplied by anglers they can make a solid case for a lake assessment.

#### Recommended Actions *Work with and Educate Anglers*

- ✓ *Encourage catch and release, conservation limits, and reduced season for Lake Trout in order to support their population and reproductive success (Action 6.4).*
- ✓ *Investigate the issue of ice hut transportation and the damage and debris left behind during that process (Action 6.6)*

To get the needed data the ministry would require the dedicated assistance of five or six anglers to record information about every fish they catch for a period of at least three years, summer and winter. Anglers will be asked to record details of their catches. (Note - In keeping with the age-old custom of keeping their favourite fishing spot secret the MNR does not ask the angler for the specific location; just the name of the lake) Details to record are:

- ✓ All fishing trips, even if no fish were caught;
- ✓ Time and length of the fishing trip;
- ✓ How many people fished;
- ✓ Which species were caught;
- ✓ Total length of each fish;
- ✓ Weight in grams or pounds;
- ✓ Fin clips observed (fin clips indicate stocked fish); and
- ✓ Whether kept or released.

Once the reporting period is over the MNR will analyze the data may be able to make a strong case for a complete survey of the Gull Lake fishery, if needed. After the survey, the Ministry will again do an in-depth analysis and implement any regulation changes that will aid the quality of the fishery.

In addition to these measures there are other activities that can contribute to a healthy fish population:

- ✓ **Check and rehabilitate spawning shoals** – there are three main spawning shoals in Gull Lake—and rehabilitate if necessary.
- ✓ **Encourage enforcement of current fishing regulations.** Although MNR Conservation officers are also affected by budget restrictions civilians can help by reporting incidents of poaching, exceeding catch limits and violating slot size regulations.
- ✓ **Educate residents** on the **impact of shore line alterations** on fish habitat.
- ✓ **Promote good fishing practices**, including:
  - Encourage catch and release practices and encourage the use of barbless hooks.
  - Educate resident on the importance of not dumping excess minnows in the lake. Doing so is unlawful.
  - Educate anglers on the importance of using safe procedures when launching boats.
- ✓ **Conduct rock bass derbies** to help remove the lake's worst invasive species. However, in many cases the act of disposing of unwanted rock bass in a landfill site is also unlawful. Many sectors of our society target these non-sport fish as a legitimate food source. It is unlawful to let fish spoil that are suitable for human consumption as stated under our Fish and Wildlife Conservation Act.
- ✓ **Provide volunteer services to the fish hatchery.** This is an excellent way to become more knowledgeable of fish, especially when MNR offers seminars and training courses that volunteers can attend.

Recommended Actions *Educate Residents about Natural Shorelines*

- ✓ *Educate residents on the impact of shoreline alteration to the spawning grounds for fish (Action 6.5).*

Recommended Actions *Enforce Fishing Regulations*

- ✓ *Prevent the overfishing of lake trout and bass to protect their populations and reproductive success (Action 6.8).*

## 5.3 Waterfowl and Wildlife

### 5.3.1 Common Loon

The Survey identified the loon population as one of the most important features of Gull Lake. Fish and Wildlife habitat was considered important to virtually every respondent and 92 % of respondents were in favour or somewhat in favour of taking steps to protect habitat. In addition, there were numerous written comments on the importance of the loons to the character of Gull Lake.

The critical period for loon survival is mid-May through June. Nest building close to water's edge (as close as 3 cm in elevation) occurs during this period with chicks hatching in late June or early July after an incubation of 26 to 31 days. Stable water levels at this time are important. Should water levels rise after nests are created, flooding will occur and the eggs lost. Water level decreases, although not as critical, could lead to the loss of the eggs since loons cannot walk on land. Eggs may be lost as the loons attempt to reach the nest. If the eggs are lost, the mating pair may re-nest

with the chicks hatching deeper into the summer. This can be problematic since the young may not have sufficient time to develop the strength to migrate to the eastern seaboard. (This may have occurred in 2013 due to high spring water levels as three immature loons were spotted on the lake in mid-October). Another significant danger to loon nests is the wake from boats for the same reasons mentioned. With nests very close to the water, significant boat wakes may lead to loss of the eggs.

Fluctuating water levels are not the only risk to the loons. The Canadian Lakes Loon Survey (<http://www.birdscanada.org/volunteer/clls/resources/CLLSsummary.pdf>) examined loon populations over 32 years in both eastern and western Canada. They found that pH and size of the lake were also important in reproductive success. With larger lakes (such as Gull) and higher pH (in the range of 7 to 9) success was better.

So, what can be done to preserve and enhance our loon population?

- ✓ There is insufficient information on the population. Volunteers must be recruited to identify loon nesting sites and maintain a loon count so we are annually updated on the state of the population.
- ✓ Loon nesting areas must be identified and marked and the boating public made aware that boat wakes should be kept to a minimum in the areas.
- ✓ Water levels on the lake must be monitored and the Trent Severn Waterway encouraged not to raise levels from mid-May until early July.
- ✓ Continue to monitor the pH of the lake recognizing a significant reduction will cause lower reproductive success.

Recommended Actions ***Better Understand and Protect Loons***

- ✓ *Better understand the location of loon nesting sites and educate residents to lessen impacts from boating and development (Action 4.2).*

### 5.3.2 Other Waterfowl

Gull Lake is also home to numerous other waterfowl including merganser and mallard ducks, great blue heron, osprey, seagulls and cormorants. Generally speaking, the ducks are less susceptible to water level fluctuation than the loons since the ducks can walk on land and tend to nest further from the water's edge. They also produce significantly larger brood sizes.

The double breasted cormorant is another waterfowl which has taken up residence on the lake. These birds can be most easily observed on Gull rock across from Kilcoo Camp. The population in this area is not increasing (only three or four observed in 2013, down from about 10, four years ago—perhaps we have the gulls to thank for that). However, in 2014 a cormorant count of 10 was again observed indicating the population had increased. Cormorants are voracious fish eaters and as a result a significant increase in their population would not be welcome. The population should be monitored and discussions held with MNR if further increases are observed.

Recommended Actions ***Better Understand the Impact of Cormorant***

- ✓ *Investigate the impact of waterfowl (e.g., cormorants) on fish populations to identify any potential issues (Action 4.1)*



### 5.3.3 Wildlife

The beaver population on Gull Lake is somewhat limited due to the deep water at the shore and the cottage development. In addition there is extensive habitat in the region with streams which feed into the lake. The same may be true for the muskrat population although they may be more prevalent. In both cases, the animals finalize the winter entrances to their lodges in October. Should water levels drop significantly between October and the spring, the underwater entrance to the lodges may freeze trapping the animals inside. In this regard, the need for maintaining the water levels established in early October is the same as required for a healthy lake trout spawn. The same criterion applies to hibernating frogs and turtles which bury in the mud for the winter. Significant water level decreases through the winter will cause freezing.

## 5.4 Natural Shorelines

The naturally occurring vegetation found in the water, in wetlands, on the shoreline, and on the uplands adjacent to a lake is important for maintaining the health of a lake system. For example, shoreline vegetation cover shades the littoral zone, which decreases water temperatures or maintains cool summer temperatures, filters runoff from the landscape, and provides a food source, from terrestrial insects and leaf litter, to the benthic community. In addition to providing natural beauty, vegetation is vital to the health and abundance of fish and wildlife in and around a lake.

The benefits of retaining a naturally vegetated shoreline include:

- Preventing soil erosion and loss of landmass by wind, waves and rain through vast rooting systems and foliage which contribute natural cover to anchor soils and to prevent the runoff of sediments into the lakebed, and protect spawning beds
- Preventing the fertilization of lake water and sediments by trapping the nutrient- rich precipitation and runoff
- Shading and cooling the lake water
- Preserving the ecological integrity of the ecosystem
- Increasing the beauty of the surrounding landscape.

Destructive activities that negatively impact the shoreline include: the removal of shoreline and aquatic vegetation; adding sand, rocks and retaining walls to artificial shoreline beaches; planting non-native or ornamental plant species such as Kentucky blue grass, Norway maple, purple loosestrife and Asian pondweed; and the artificial regulation of water levels, which creates an abnormal “false shoreline” along the lakeshore. When shorelines are devegetated, ecological communities change because habitat quality and quantity change. This creates conditions favourable for the introduction of invasive species and the loss of native and possibly rare ones (ELA 2004).

Natural shorelines contain three distinct zones, each with its own characteristic communities of organisms:

- Littoral Zone - The section of shoreline from the water's edge to the area of the lakebed where sunlight can penetrate to the bottom.
- Riparian Zone - Also known as the floodplain, this begins at the water's edge and ends approximately 30 metres inland.
- Upland Zone - The area of land beyond the riparian zone.

Although each of these zones contributes separate functions to the health of the lake, it should be noted that the shoreline is a natural progression of each zone, seamlessly transitioning into the next. Therefore, alteration of any zone affects the entire shoreline by diminishing the shore's ability to support life on the lake.

The expansion of urbanized development and lifestyles from city centres, water level manipulations and climate change may potentially have impacts on the biodiversity and community structure of Gull Lake's vegetation communities and shorelines for the future. Flooding, removal of shoreline vegetation, dredging of wetlands, and drier and warmer climates will reduce the biological diversity of the shoreline communities and alter forest community species composition and structure because more rare or intolerant species will be lost and be replaced by tolerant species that may not be native to the area.

#### Recommended Actions *Natural Shorelines and Nearshore Areas*

- ✓ *Participate in the Shoreline Inventory Project to identify the percentage of vegetation covering the shoreline (Action 3.1).*
- ✓ *Investigate the location of sensitive nearshore areas (littoral zone) and educate residents on their importance (Action 3.2).*
- ✓ *Educate shoreline property owners about the benefits of natural shorelines and promote awareness of Haliburton County's tree cutting by-law in order to protect natural shorelines around the lake (Action 3.3).*
- ✓ *Prepare a list of preferred species of native shoreline plants and their sources to improve access to purchasing and planting native species (Action 3.4).*
- ✓ *Investigate a potential partnership with the Centre for Sustainable Watershed (CSW) Program - Love Your Lake ([www.loveyourlake.ca](http://www.loveyourlake.ca)) (Action 3.5).*

## 5.5 Invasive Species and Species at Risk

Animals or plants which are non-native to a particular area are deemed invasive species; these can be from a different country or even just a different part of Canada. The impact of invasive species can be very unpredictable and dramatic. Because the invasive species often lack natural predators and/or native species have no built-in defense against them, can reproduce very rapidly and can resist control. Once they have been established, invasive species can be very disruptive or harmful to the local environment. They can kill some native species and squeeze out others. This has been seen this locally with the spread of purple loosestrife into wetlands; the spread of zebra mussels through the Great Lakes and Trent-Severn Water System, and rock bass in Gull Lake. Once introduced to a new area, invasive species often spread quickly and can be extremely difficult and expensive to control or eliminate when established.

What particular invasive species should be of greatest concern? Unfortunately, invasive species are more common than might be thought. Among the invasive species that people should be the most concerned about are:

**Purple loosestrife** – a very pretty purple plant that can come to dominate wetlands, overwhelming native plants. Purple loosestrife disrupts wetland ecosystems by displacing native plants and animals. Waterfowl, fur-bearing animals and birds vacate wetland habitat when they lose their food source, nesting material, and ground cover due to native vegetation

loss and replacement. Economic impacts are high in agricultural communities when irrigation systems are clogged or when wetland pastures are lost to grazing. For more information, see:

<http://www.ecy.wa.gov/programs/wq/plants/weeds/aqua009.html>)

Other invasive plant species which can cause serious problems include the **Manitoba and Norway maples, black alder, giant hogweed, garlic mustard, and the dog-strangling vine**. These are described in more detail in “A Quick Reference Guide to Invasive Plant Species” ([www.ontarioinvasiveplants.ca/files/Invasives\\_booklet\\_2.pdf](http://www.ontarioinvasiveplants.ca/files/Invasives_booklet_2.pdf)) published by the Credit Valley Conservation, and “A Landowner’s Guide to Controlling Invasive Woodland Plants” ([http://www.ontarioinvasiveplants.ca/files/LandownerGuideInvasives\\_web.pdf](http://www.ontarioinvasiveplants.ca/files/LandownerGuideInvasives_web.pdf)) and the Eurasian Water-Milfoil (<http://www.invadingspecies.com/invaders/plants-aquatic/eurasian-water-milfoil/>)

**Asian longhorn beetle (ALB) & Emerald ash borer (EAB)**– relatively recent arrivals, both species are tree killers. The EAB as the name implies only attacks ash trees while the ALB attacks many species including maples, elms, birches, poplar and ash. Often they are moved from one area to another by hitching a ride on cut logs or firewood. The beetles kill by injecting their larvae into holes in the trees and it is the growth of the larvae that subsequently kill the tree. The best treatment appears to be burning any infected trees, since insecticides must be used early and on 100% of the exposed trees to be effective – an almost impossible task given our Gull Lake environment. For more information, see:

<http://www.kenilworth.com/publications/cg/de/201311/index.html> )

**Zebra mussels** -- a small freshwater clam with a brown and cream coloured striped shell. Transported originally from Europe it has spread rapidly throughout the Great Lakes and the Trent-Severn System. They can easily travel to inland lakes in southern Ontario by hitchhiking on recreational watercrafts. Zebra mussels are highly adaptable and can survive in lakes with a wide range of conditions. Zebra mussels consume food that would otherwise be available to fish and (For more information, see:

<http://www.invadingspecies.com/invaders/invertebrates/zebra-and-quagga-mussels/> )

**Rock bass** - smaller than smallmouth bass, rock bass can squeeze out other species by consuming food that might otherwise go to smallmouth and largemouth bass, lake trout, etc. They breed prolifically and will eat almost anything (as attested by many young anglers). Another invasive species is the rusty crayfish which compete for food with fish and other crayfish but are also, apparently, more adept than our native varieties in avoiding being eaten. For more information, see:

[http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@biodiversity/documents/docume nt/stdprod\\_104408.pdf](http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@biodiversity/documents/docume nt/stdprod_104408.pdf) )

Other aquatic invasive species are described in more detail in:

[http://www.mnr.gov.on.ca/en/Business/Biodiversity/2ColumnSubPage/STDPROD\\_068689.html](http://www.mnr.gov.on.ca/en/Business/Biodiversity/2ColumnSubPage/STDPROD_068689.html)

**Jelly-Like Substance – Holopedium** - The following excerpt from a recent research paper titled ‘**The jellification of north temperate lakes**’ by Adam Jezioroski et al. has outlined a concern regarding the potential effect of declining Calcium levels in lakes such as Gull Lake.

“As Ca declines, the rise in the absolute abundance of Holopedium may also have socioeconomic consequences, because increased concentrations of pelagic jelly may impede the withdrawal of lakewater for residential, municipal and industrial uses. The costs of operating infrastructure for water users will therefore rise as Ca continues to decline and densities of filter-clogging jelly capsules increase [62]. In Ontario, 20% of government-monitored drinking water systems draw only from surface waters within landscapes containing lakes with Ca concentrations less than or equal to 3.5 mg/l

Our results show that the continued jellification of pelagic foodwebs, due to ongoing declines in lakewater Ca, and exacerbated by other environmental stressors, has the potential to negatively impact the functioning of, and services provided by, temperate lakes in eastern North America.”

The GLCA will continue to monitor the Calcium levels in the Lake to see if this species becomes a problem in the future.

### Options to Reduce Invasive Species and Protect Species at Risk

Key actions which everyone can take include:

- ✓ **Being familiar with and identifying invasive species**
- ✓ **Taking care not to introduce invasive species to our area**
  - ✓ Many invasive plants (e.g. purple loosestrife) are introduced deliberately (“Oh, that would look nice in my garden”), without appreciating how rapidly it could spread or the harm that it could cause. When gardening, only plant native species.
  - ✓ The Asian longhorn beetle and the emerald ash borer, like other insects, are moved inadvertently by travelling along with timber or firewood. Firewood and timber should not be moved from one location to another (e.g. cottage to home or cottage to campsite)
  - ✓ Many of the aquatic species like zebra mussels move via boats and trailers moved between water bodies or in bait containers that are emptied in new areas, introducing the species. Boats and trailers should be hosed off if they are being moved between water bodies and bait containers should not be emptied into the lake. Also, unwanted pets should not be released into the wild.
- ✓ Where possible, invasive species should be removed from our properties. Whether it is cutting invasive plants (taking special care for those which might be poisonous), killing asian longhorn beetles or ash borers, or fishing out rock bass (much to the kids’ delight), the lake will be a better place.
- ✓ **Promote the use of available resources** - Fortunately, the Province and other groups have made a lot of material available to assist in identifying and learning what to do regarding them. The Province’s main website for this is:  
<http://www.invadingspecies.com/>
- ✓ **People should be encouraged to report invading species** - Contact Invading Species Hotline: 1-800-563-7711 for reporting particular problems and obtaining additional information.

#### Recommended Actions ***Prevent Invasive Species***

- ✓ *Identify invasive terrestrial (plant) and aquatic species on Gull Lake to better understand impacts (Action 9.1).*
- ✓ *Educate residents on prevention of aquatic invasive species through transfer of boats and baits from lake to lake (Action 9.2).*
- ✓ *Educate residents on prevention of spreading terrestrial invasive species. (e.g. Ash beetle, through relocation of firewood and domestic plants from other areas) to prevent further introduction (action 9.3).*
- ✓ *Reduce undesirable invasive fish species that threaten the Lake Trout population (Action 9.4).*

## 5.6 Climate Change

There is little scientific debate that we're in a period of climate change. In our region it is most likely that this will be evidenced by greater volatility in our weather, from season to season and year to year. Recently we have witnessed periods of severe dryness and low water levels and others featuring flood conditions, winters with virtually no or extremely heavy snowfall, several storms with tornado-like wind and damage and the like.

What actions can be taken?

Key actions which include:

- ✓ **Maintain our forests and vegetation.** All plants convert carbon dioxide, which contributes to greenhouse warming, to breathable oxygen.
- ✓ **Be mindful of our contributions to greenhouse gases.** Travel to and from the cottage and, as much as we hate to say it, using our fireplaces and wood stoves or furnaces, produce significant greenhouse gases. Minimizing these can incrementally improve our atmosphere.
- ✓ **Prepare for challenging conditions.** Extreme weather and climate conditions create significant challenges. Building farther from the shore can reduce our exposure to high water levels. Extending a waterline farther into the lake or digging a deeper well could reduce our susceptibility to low water levels. Floating or adjustable dock systems can also mitigate some of these risks. Having backup power using solar and batteries to ensure power during potentially more frequent and longer lasting outages may become more of a “must have” or “should have” instead of being a luxury.



## SECTION 6 **LAND USE**

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### **6.1 Overview of Land Use Planning Systems in Ontario**

Land use in Ontario is governed by all levels of government, Federal, Provincial and Municipal.

At the Federal Level are the National Parks. The Federal Government is committed to ensuring Canada's historic and natural heritage is protected through its network of national parks, national historic sites and national marine conservation areas. In Ontario we have the Bruce Peninsula National Park, Georgian Bay Islands National Park, Point Pelee National Park, Pukaskwa National Park and the St. Lawrence Islands National Park.

At the Provincial Level are the Provincial Parks. There are over 270 Provincial Parks and hundreds of conservation areas in Ontario. The closest to Gull Lake is the Queen Elizabeth II Wildlands Provincial Park which is immediately to the west of Gull Lake. The park, named for Elizabeth II, Queen of Canada, is 33,505 hectares in size, making it the second largest park south of Algonquin Park (after Kawartha Highlands Provincial Park), but it has a fragmented shape as a result of many private lands within its boundary.

Also at the Provincial Level is Crown Land. Crown land is one of Ontario's greatest natural assets. It makes up about 87 per cent or 937,000 square kilometres of the province's land mass – an area the size of British Columbia or four times the size of the United Kingdom. The Ministry of Natural Resources is responsible for managing Ontario's Crown land in a way that balances social, economic and environmental interests.

The land under the beds of most navigable lakes and rivers is also Crown land.

At the Municipal level, land use is governed through Official Plans and Zoning By-Laws. The main purpose of an Official Plan is to provide a comprehensive framework for the guidance of future land use and physical development and which outlines comprehensive land use policies that are in conformity with Provincial policies. An Official Plan provides guidance to local county and municipal councils in assessing applications for development. Implementation of policies in Official Plans is achieved through a Zoning By-Law which sets out detail requirements that must be met for any construction, development or change of use.

Gull Lake and River lie within the Township of Minden Hills. The Official Plan and Zoning By-Law of The Township of Minden Hills apply to any construction, development or change of use on the lake or river.

### **6.2 Municipal Planning Regulations**

There are two documents governing development on Gull Lake and River. The Township of Minden Hills Official Plan and the Township of Minden Hills Zoning By-Law 06-10.

#### **6.2.1 Official Plan**

The main purpose of the Official Plan (OP) is to provide a comprehensive framework for the guidance of future land use and physical development in the Township of Minden Hills. It has been prepared to be in conformity with the goals of the Ontario Provincial Policy Statement and the Official

Plan for the County of Haliburton. It sets out the overall framework in which development applications and municipal initiatives will be reviewed and evaluated.

The OP is intended to:

*“encourage the preparation of ‘secondary plans’ and ‘lake plans’ that will provide for more detailed guidance for specific areas in the Township”.*

*“ensure that land use planning within the Township contributes to the protection, maintenance and enhancement of water related resources and aquatic ecosystems, on an integrated watershed management basis”.*

*“provide for the conservation of the natural environment, including wetlands, woodlands, areas of natural and scientific interest, fish and wildlife habitat, lakes rivers and streams, on an ecosystem management basis”.*

The OP recognizes that much of the population growth in the Township will occur along the shorelines in part through the year round use of traditional seasonal lots.

As an objective, the plan states “Evaluation of environmental impact will be the biggest factor in determining the suitability of any property for development”. As part of this process an Environmental Impact Study may be required in order to make an informed decision as to whether or not a proposed use will have a negative impact on the critical natural features and ecological functions of the property and adjacent properties.

The growth management policies of the OP state that “properties located on the shores of rivers, lakes and streams shall be low density residential and low intensity tourism or tourism related in nature”.

As a general policy before approving any development proposal adjacent to a lake, Council must be assured that the proposed development will not exceed the capacity of the lake to accommodate development. The Plan recognizes three factors as limiting lake capacity:

- Water quality;
- Surface capacity for recreation; and,
- Shoreline development capacity.

Lakes in Minden Hills have been categorized by the Ministries of the Environment and Natural Resources into two categories – 'highly sensitive' and 'moderately sensitive' to further development from the perspective of water quality. Gull Lake falls into this second category which means that Council may require detailed studies of the environmental impact of any proposed development prior to the approval of the development.

The Official Plan indicates strong support for sustainable development and environmental protection. It also “encourages the preparation of ‘secondary plans’ and ‘lake plans’ that will provide for more detailed guidance for specific areas in the Township”.

Additionally the Official Plan is specific about a large number of concerns applicable to Gull Lake and River. These cover matters such as the following:

- Surface capacity for recreation.
- Shoreline development capability.
- Lake trophic state. (Phosphorous levels and lake capacity).

- Servicing and access requirements.
- New lots with only water access.
- Protection of the shoreline.
- Development policies for recreation based development.
- Backlot development.
- Shoreline setbacks.
- Waterfront commercial uses.
- Reconstruction of existing boathouses (subject to site plan control).
- Open space and conservation uses.
- Waterfront landings.
- Lake plans and strategies.
- Waterfront building design.
- Waterfront landscape, natural area design and Tree preservation.
- Waterfront and adjacent development.
- Waterfront servicing.
- Waterfront development approvals.
- Watershed management.
- Disposition of Shore Road Allowance.

All of the above are described in detail in the Official Plan covering some 15 pages and too lengthy and detailed to be reproduced in this document. The Official Plan is available on-line at the Township of Minden Hills web site.

#### 6.2.2 Zoning By-Law No. 06-10 (Consolidated March 31, 2008):

While the Official Plan outlines a comprehensive framework for future land use and development, implementation of those policies has to be achieved through a Zoning By-Law, which sets out detail requirements that must be met for any construction, development or change of use.

Development or change of use on Gull Lake and the Gull River are governed by this By-Law. Pertinent provisions of the By-Law for shoreline structures (section 4.1.12 and section 5.2 and table 2) are as follows:

- Minimum lot area is 4,000 m<sup>2</sup>. (43,056 sq. ft. or 1 acre)
- Minimum lot frontage is 60 m. (197 ft.)
- Minimum dwelling unit area is 55 m<sup>2</sup>. (592 sq. ft.)
- Required setback from high water mark is minimum 30 m. (100 ft.)
- Maximum building height is 11 m. (36 ft.)
- Maximum lot coverage is 15%.
- Boathouses are not permitted.
- Maximum cumulative width of shoreline structures cannot exceed 30% of the lot frontage.
- A dock cannot project more than 15 m. (50 ft.) from the high water mark and cannot be closer than 4.5 m. (15 ft.) to the projection of a side lot line. (by-law 06-10 as amended section 4.1.12 E).
- A maximum of one sleeping cabin is permitted on a lot with the total floor area not to exceed 35 m<sup>2</sup>. (377 sq. ft.) and the height not to exceed 4.5 m., (15 ft.) and the cabin

complies with the yard and setback requirements of the Zone in which it is located and is not located to the front of the principal dwelling.

- A septic tile field must be a minimum of 30 m. (100 ft.) from the shoreline.
- An existing vacant lot in a shoreline residential zone may be used and a building erected as long as it has a minimum area of 1400 m<sup>2</sup> (15,070 sq. ft.) and a lot frontage not less than 30 m. (99 ft.) provided that it meet all other applicable provisions of the by-law.
- Where a watercourse runs through a lot no building or structure shall be erected within 15 m. (50 ft.) of the high water mark of the watercourse. (section 4.30)
- The use of any trailer for human habitation is prohibited in all zones, except where such trailer is located in a permitted camping establishment or in a trailer park. (section 4.24)
- No building or structures shall be erected nor any fill be removed or placed in any Floodway Zone.

Any proposed construction on the lake or river must conform to the provisions of the Zoning By-Law and a building permit is required. Development applications will be subject to a Site Plan Control process. The Zoning By-Law is available on-line at the Township of Minden Hills web site.

### 6.2.3 Additional Relevant Municipal By-laws

**Shoreline Tree Protection By-law (County of Haliburton)** - In 2012 the County of Haliburton passed a by-law to “conserve, prohibit, protect, restrict and regulate the protection, preservation and removal of trees on shoreline properties in the County of Haliburton”. (Shoreline Tree Preservation By-Law No. 3505)

This by-law is intended to protect trees in areas adjacent to the shorelines of lakes and rivers. It prohibits the removal or injury of trees to all lands within the County situated within 30 m. (99 ft.) of the high water mark. Pruning of trees is allowed but it must be done in accordance with good arboricultural practice.

If a waterfront landowner does not own the shore road allowance in front of his property, and it is still owned by the municipality, then he is required to obtain permission from the municipality to removing any trees on the allowance.

#### Recommended Actions *Support Tree Cutting By-law*

- ✓ *Promote enforcement of Haliburton County's tree-cutting by-law and, once approved, Haliburton County's natural shoreline by-law (Action 10.1)*

## 6.3 Existing And Future Land Use:

### 6.3.1 Existing Land Use

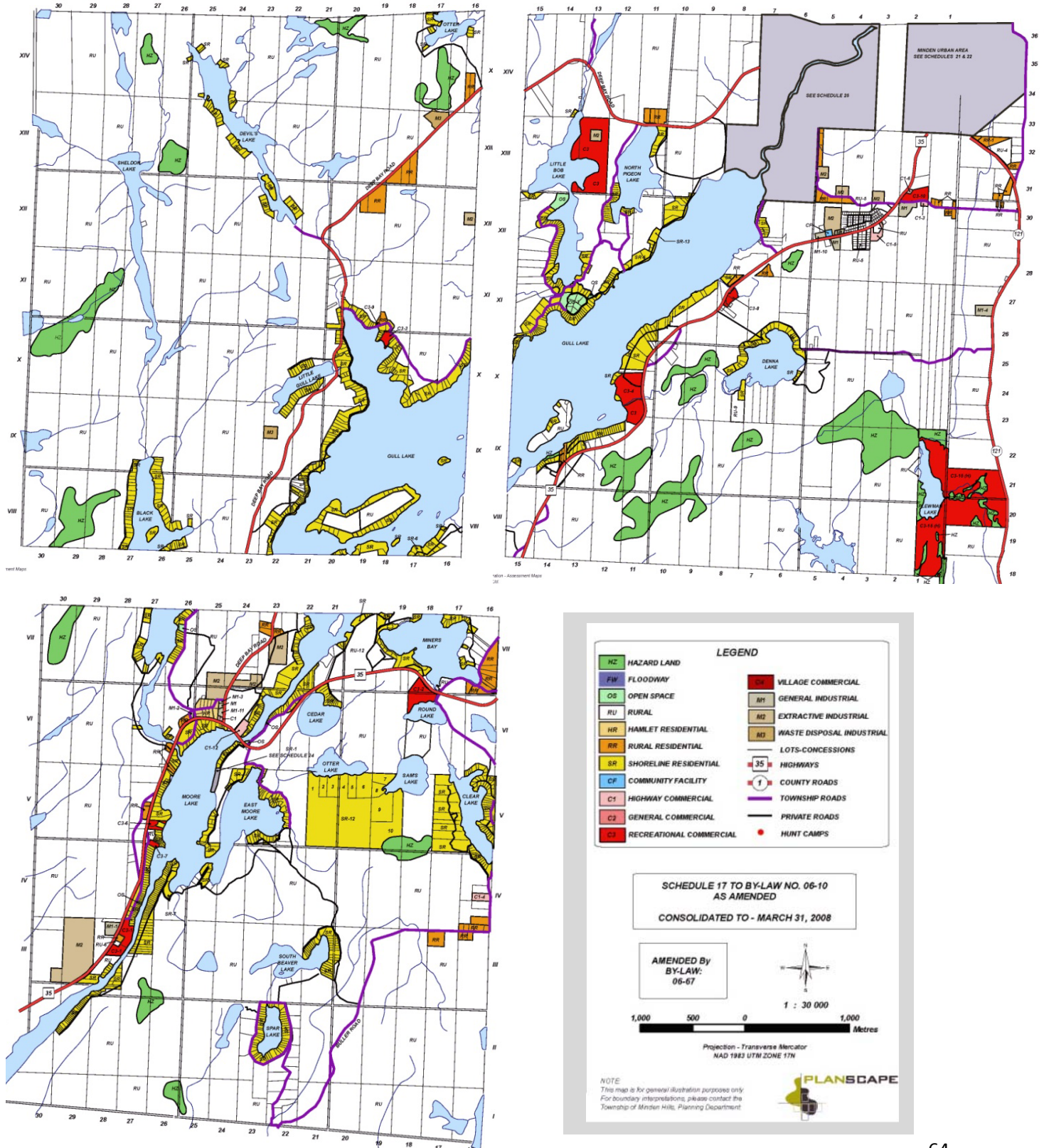
Schedules 13, 14, and 17 to the Zoning By-Law illustrate zoning categories for development on Gull Lake and Schedule 25 illustrates zone categories for the Gull River (from Minden south to Gull Lake). These maps are reproduced as Maps 6.1 to 6.5 on the following pages.

The maps also show “Floodways” which are floodlands. No Floodways are shown around Gull Lake but Floodways are shown on both sides of the Gull River along the entire river except at the lower Gull Lake end on the east side. In a floodway zone the erection of buildings or structures, or the



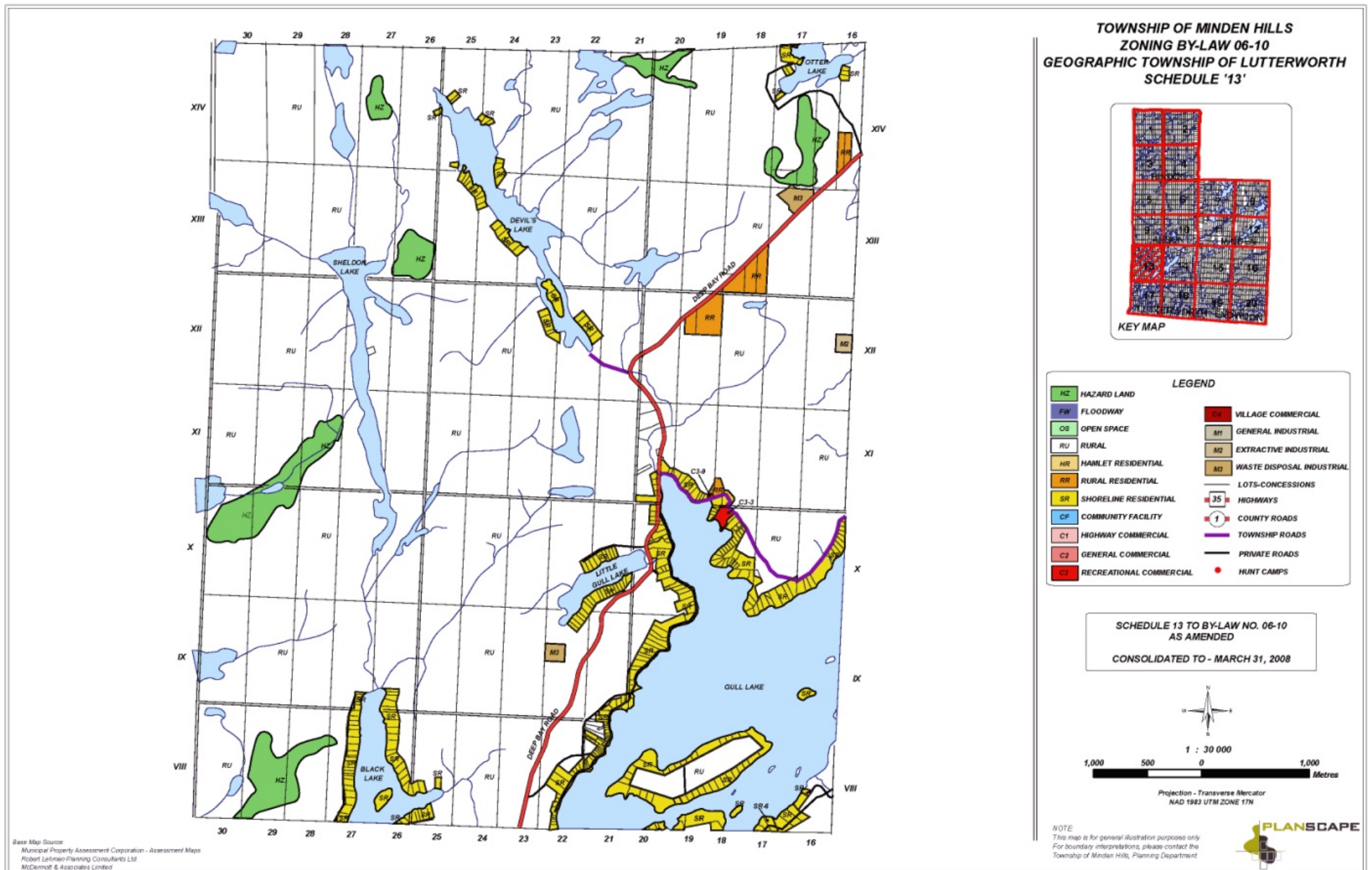
removal or placing of fill of any kind, shall be prohibited except where such buildings or structures are intended for flood or erosion control or bank stabilization. Minimal development of shoreline structures (docks) may be permitted.

**Map 6.1 - Composite of Zoning Schedules 13, 14 and 17**

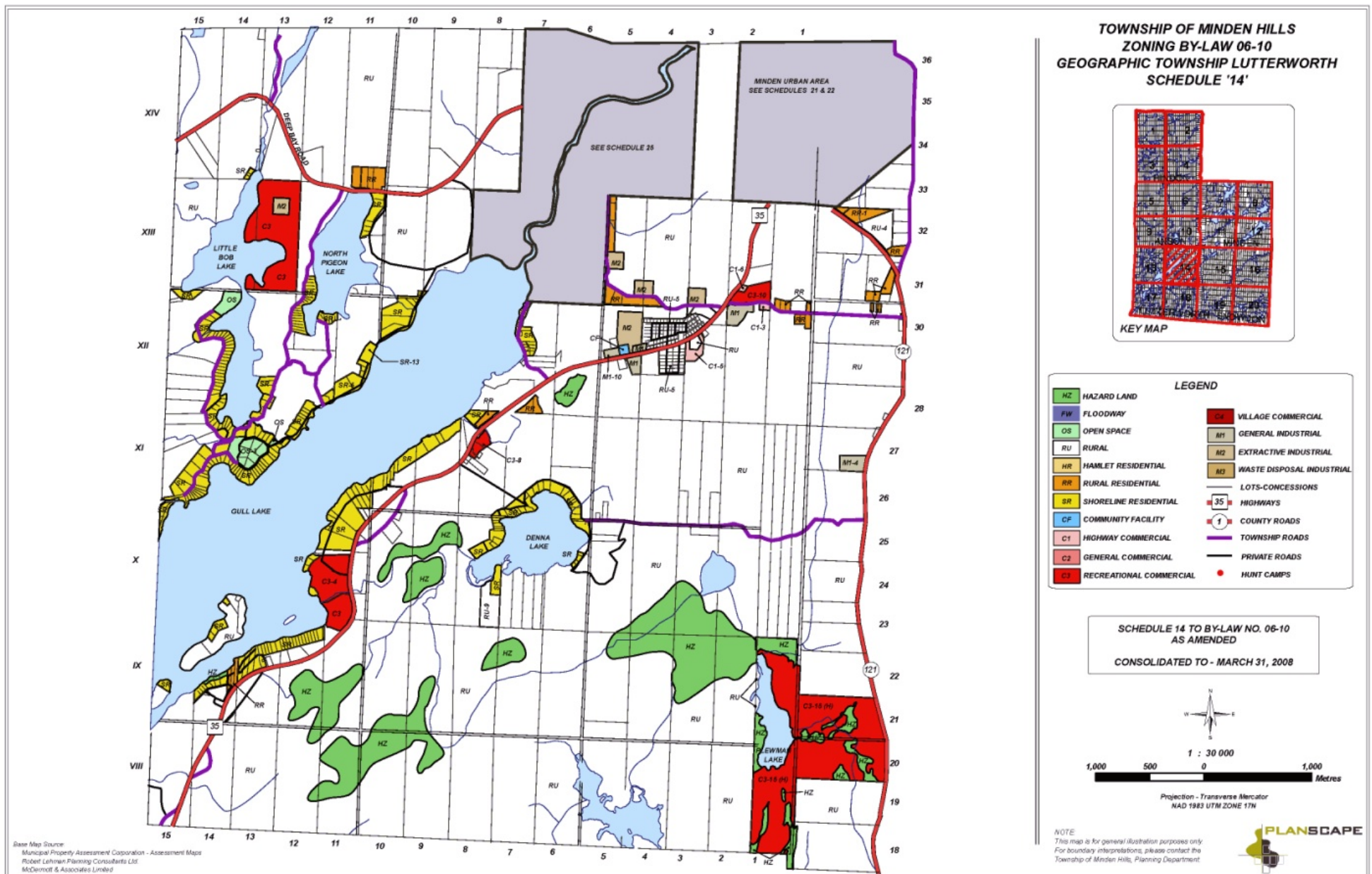




Map 6.2 - Schedule 13 - Zoning By-law - Gull Lake

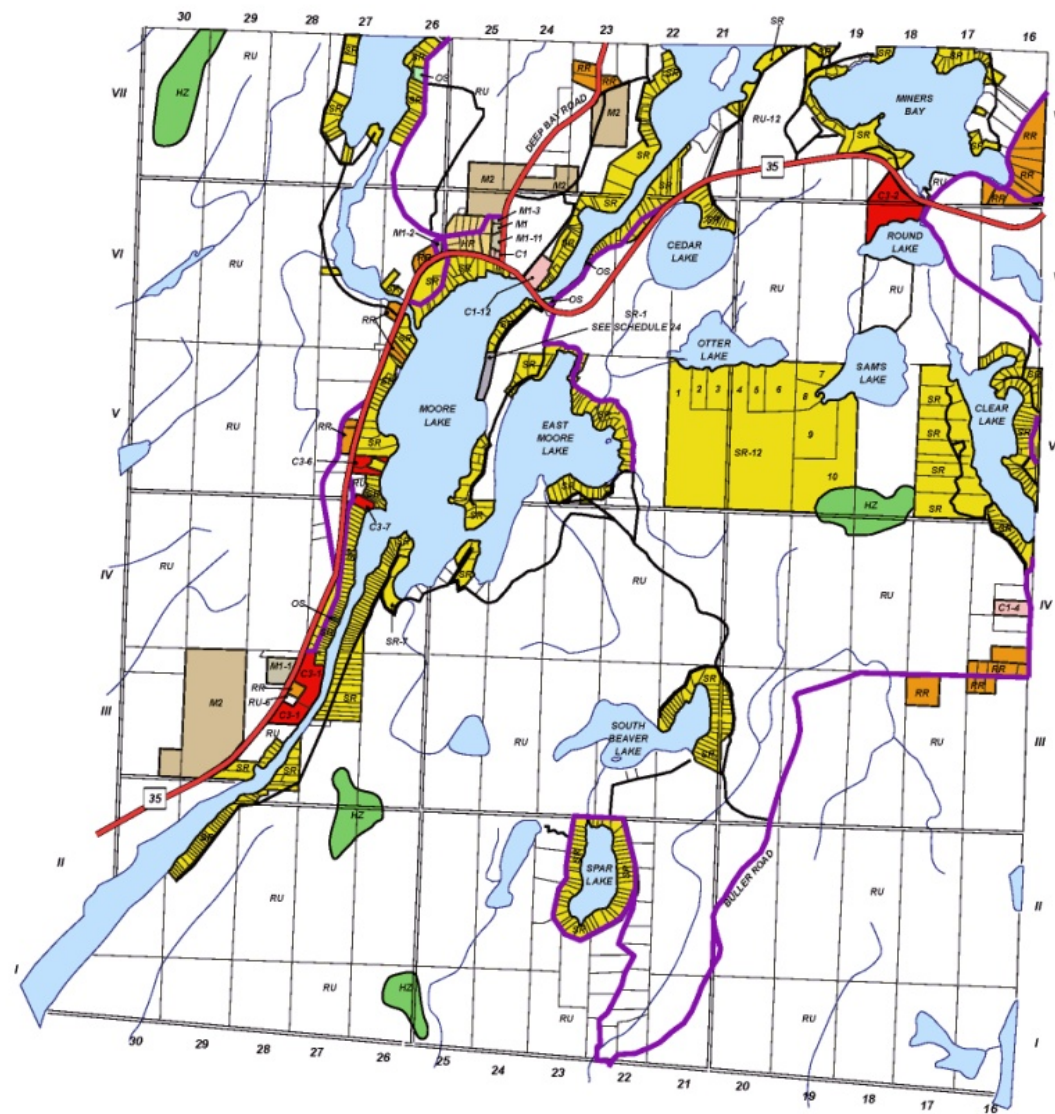


### Map 6.3 - Schedule 14 - Zoning By-law - Gull Lake

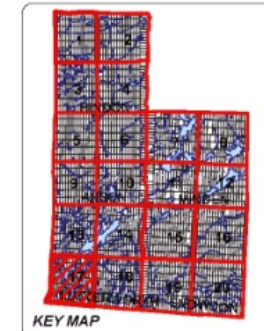




Map 6.4 - Schedule 17 - Zoning By-law - Gull Lake



**TOWNSHIP OF MINDEN HILLS  
ZONING BY-LAW 06-10  
GEOGRAPHIC TOWNSHIP OF LUTTERWORTH  
SCHEDULE '17'**



<b>LEGEND</b>	
HZ HAZARD LAND	C4 VILLAGE COMMERCIAL
FW FLOODWAY	M1 GENERAL INDUSTRIAL
OS OPEN SPACE	M2 EXTRACTIVE INDUSTRIAL
RU RURAL	M3 WASTE DISPOSAL INDUSTRIAL
HR HAMLET RESIDENTIAL	LOTS-CONCESSIONS
RR RURAL RESIDENTIAL	35 HIGHWAYS
SR SHORELINE RESIDENTIAL	1 COUNTY ROADS
CF COMMUNITY FACILITY	TOWNSHIP ROADS
C1 HIGHWAY COMMERCIAL	PRIVATE ROADS
C2 GENERAL COMMERCIAL	HUNT CAMPS
C3 RECREATIONAL COMMERCIAL	

**SCHEDULE 17 TO BY-LAW NO. 06-10  
AS AMENDED**

**CONSOLIDATED TO - MARCH 31, 2008**

**AMENDED By  
BY-LAW:  
06-67**



1 : 30 000

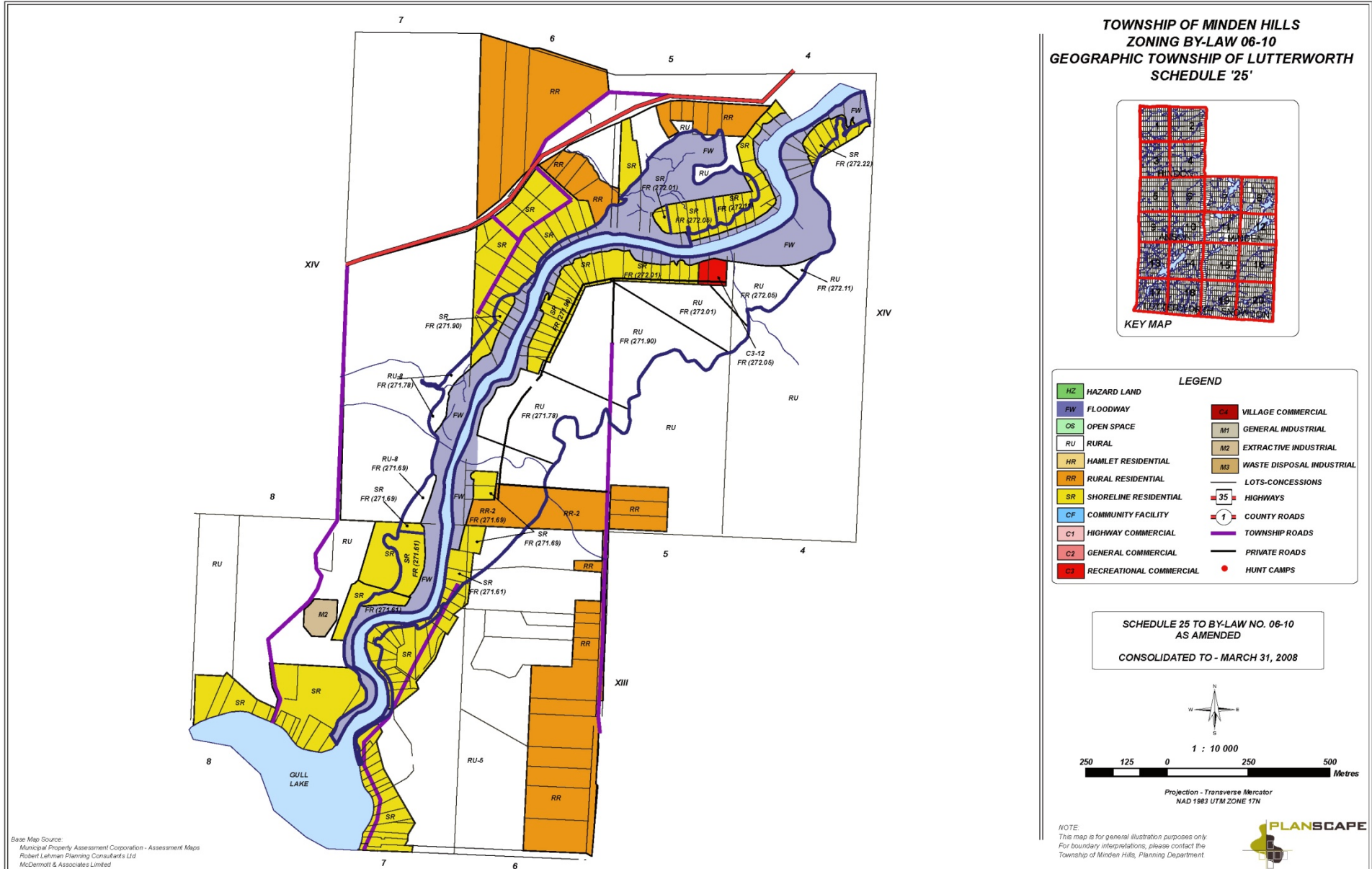
1,000 500 0 1,000  
Metres

Projection - Transverse Mercator  
NAD 1983 UTM ZONE 17N

**NOTE**  
This map is for general illustration purposes only.  
For boundary interpretations, please contact the  
Township of Minden Hills, Planning Department.



## Map 6.5 - Schedule 25 - Zoning By-law - Gull



The major land use on the lake and river consists of residential cottages, both seasonal and year-round. The Zoning By-Law for the Township of Minden Hills uses the term “Shoreline Residential” to describe this use. The Official Plan uses the term “Waterfront” to designate land fronting on lakes and rivers. The majority of cottages have been in place for many decades and predate the current Zoning By-Law. Most of the very early cottages were built on large lots with sensitivity to the environment and the preservation of the natural landscape. Later development in some areas is fairly dense owing to earlier standards permitting smaller lots than required by current zoning. The maps indicate virtually all of the Gull Lake shoreline has been severed into lots. Substantial development has occurred where the shoreline permits. The total number of lots is estimated to be in the 550 to 600 range with approximately 513 owners. This latter figure is based on the number of survey forms sent to Gull Lake owners either by e-mail or hard copy mailing.

The survey results for the lake indicate 11% are permanent residents and 74.8% are seasonal. Approximately 12% of the respondents own vacant land. Of the seasonal resident respondents 13% indicated they would eventually make Gull Lake their permanent home. Another 28% were unsure indicating a continued trend to permanent residences on the lake. The survey also collected data on the amount of time and numbers of people who occupied the cottages and homes on the lake. This data is contained in the Survey Results of Appendix B and is intended for use by the GLCA if ‘Lake Capacity’ calculations are completed.

The survey results for the Gull River show a substantially higher proportion of permanent residents, 48.7%, no doubt due to the greater proximity to Minden. Seasonal residents account for 41% with 10.3% vacant land. The Steering Committee sent 121 Survey requests to residents of the Gull River accounting for most of the owners downstream of the Bobcaygeon bridge.

There are three commercially zoned properties on Gull Lake. These include Kilcoo Camp and Miner’s Bay Lodge, both established in the early 1930’s and both family run institutions. The third is the Deep Bay Inn, operated by Pete and Kate Ecclestone. These are identified in the Zoning By-Law as “C3 - Recreational Commercial”. Also in this C3 category is the Agia Maria Inn & Resort on the east side of the Gull River south of Minden (formerly the Hunter Creek Inn). Regulations concerning this resort are covered under the C3 zoning and “Recreation Commercial Exception C3-12” which limits the maximum number of rental units to fifteen. An even older institution at the north end of the lake is the University of Toronto Survey Camp in operation since 1920. At various places on the shoreline of the lake and river are some lots zoned “Rural” including the Survey Camp. These consist of the interior of Sugar Island, parts of Long Island, North Morris Island, and South Morris Island, and some lands that extend down to the shoreline on the lake and River. The “Rural” designation (RU) differs from the designation “Rural Residential” (RR) in that residential use is not allowed. Allowed uses include farms and related activities as set out in Tables 3 & 4 of the Zoning By-Law. Development of these lands would be subject to a rezoning application.

There are two public boat launches and access points on Gull Lake, one in Miners Bay off Miners Bay Road and a second at the west end of Deep Bay off Forster’s Road. Both are maintained by the Township. It is important that these sites be maintained in a safe and functional manner.

Recommended Actions *Improve Public Access Points*

- ✓ *Repair and improve lake access points to ensure safe and responsible use (Action 11.2).*

Schedule B4 of the Official Plan does not indicate any wetland areas on the shore of Gull Lake; however there are numerous wetlands in the immediate drainage area to the lake. In addition, there is a sensitive marsh area between Long Island and the mainland which is home to a number of waterfowl. Schedule B4 also identifies three lake trout spawning areas – on the northwest corner of Long Island, around



Victoria Island and around St. Helena Island. (The source and accuracy of these locations is not currently known). Areas in and around the lake which are sensitive should be protected from incompatible development.

### 6.3.2 Survey Responses on Future Land Use

The Survey response to questions related to future development on the lake was relatively strong. Details of the Survey are contained in Appendix B, the following comments attempt to summarize the key points.

When asked in Question 14 to identify the level of negative impact on future enjoyment of the lake, 78% of respondents noted future development would have a significant or moderate impact.

The response Question 16 regarding commercial development is summarized in Figure 6.6.

**Figure 6.6 - Commercial Development**

Development	Yes	No	No Opinion	Response Count
Marina	37%	63%	11%	200
Condo (full or time share)	5%	86%	9%	201
Store	33%	48%	19%	202
Restaurant	38%	43%	19%	199

In responses to Question 32 asking respondents to list the top three actions which should be undertaken to preserve the quality of Gull Lake for future generations, “limiting future development” and “preserve the natural shoreline” were listed as #2 and #3 following “Water Quality”. These two items were mentioned by 61 and 54 of the 200 respondents respectively. It should also be noted that 2 respondents mentioned “Permit Responsible Development”.

#### Recommended Actions *Appropriate Land Use and Development*

##### *Educate*

- ✓ *Provide education on permitted uses, required setbacks and building provisions to property owners to promote appropriate land use (Action 10.3).*
- ✓ *Educate landowners on the importance of natural buffers and the impacts of fertilizers and herbicides and grassed lawns (Action 10.4).*

##### *Advocate*

- ✓ *Promote enforcement of Township Land Use By-laws to ensure lake capacity is not compromised (Action 10.2).*
- ✓ *Communicate Lake Plan development preferences to Minden Hills Council (Action 10.5).*
- ✓ *Advocate for the protection of environmentally sensitive areas in the watershed (wetlands, fish habitat) from incompatible development, recognizing the need for economic development in the area (Action 10.6).*
- ✓ *Protect sensitive areas in the watershed (wetlands, fish habitat) from incompatible development (Action 10.7).*
- ✓ *Restrict blasting of natural shorelines (e.g., within 100 ft of the lake), to protect shorelines (Action 10.8).*

##### *Research*

- ✓ *Determine how close Gull Lake is to "at capacity" (Action 10.9).*

Specific actions which the Lake Community can take in response to the strong bias towards limiting future development include:

- Promote the enforcement of the Township and County Land Use by-laws to ensure lake capacity is not compromised.
- Communicate Lake Plan development preferences to Minden Hills Council.
- Determine how close Gull Lake is to “at capacity”.
- Educate the lake community on permitted uses and by-law requirements as well as the importance of natural buffers and the impacts of fertilizers and herbicides.

## **6.4 Septic Systems**

### **6.4.1 Background**

Early cottages on the lakes and rivers usually had no electricity and no indoor plumbing. Outhouses and washing in the lake were the norm. Because there were very few cottages there was little impact on the environment. After WW2 there was a steady increase in cottage building and most had rudimentary septic systems which would be unacceptable by today's standards. Most of these have been replaced with up-to-date systems in the last decade or two. Today as more cottages are built and more seasonal cottages are converted to four season use, on-site sewage systems are required by law to meet the regulations of Part 8 of the Ontario Building Code as well as applicable parts of Municipal and County by-laws.

The administration of these regulations is carried out by the Haliburton office of the Haliburton, Kawartha, Pine Ridge District Health Unit. Information and requirements for new and replacement septic systems can be accessed by telephone at (705) 457 1391 or on-line at their website.

Pertinent requirements of the Part 8 Program are as follows:

- A building permit cannot be issued until approval for the sewage system has been received from the Health Unit.
- Minimum setback from the lake or river for a new leaching bed sewage system is 30m (100 ft).
- A replacement sewage system shall be located no closer to the lake than the existing one, provided at least a 15m (50 ft) or more setback to the lake is maintained.
- There are setback requirements to structures, wells and property lines.
- The size of the septic tank and tile bed is determined by the size of the unit being serviced and the number of users.
- All installations are subject to inspection by the Health Unit in order to get final approval.

### **6.4.2 Septic System Operation**

In a properly functioning septic system with tank and leaching bed solids will settle out in the tank. Bacteria will break down the solids and the resulting sludge will be removed with the tank is pumped, typically every two to five years depending on use. The liquid containing contaminants such as nitrogen and phosphorus, disease carrying bacteria, viruses, dissolved metals, detergents and solvents are distributed through the leaching bed which provides minimal treatment. Soils downstream of the leaching bed may bind the phosphorus and dissolved metals but may not totally remove the pollutants. Nitrates and solvents are diluted by groundwater and bacteria and viruses are filtered by the soil or die off.

The importance of properly functioning septic systems to the health of our lake is clear. If septic systems fail or are non-existent or if there is a direct connection from the septic system and lake, the pollutants will enter the lake. The increase in nutrient loading in the lake promotes weed and algae growth which reduces the dissolved oxygen in the lake with adverse effects on the fish population. Significant bacteria loading will cause health concerns.

### 6.4.3 Survey Results

Many residents of Gull Lake recognize the importance of properly functioning systems to the health of our lake. Here are some of the results of our survey.

- 89% of respondents had a significant or moderate concern regarding septic leakage.

**Figure 6.7 - Septic Tank Age**

Responses	<5 years	5-10 years	11-30 Years	>30 years	Don't Know	Totals
Percentage	20.2%	21.8%	44.7%	7.4%	5.9%	100%
Count	38	41	84	14	11	188

It is noteworthy that a relatively high percentage of the tanks are older and will bear careful monitoring. In addition it is a worry that 30 respondents to the overall survey did not answer this question.

**Figure 6.8 - Last Septic Pump Out**

Responses	< 3 Years	3-6 Years	7-20 Years	>20 Years	Don't Know	Totals
Percentage	77.8%	14.6%	3.2%	0	4.3%	99.9%
Count	144	27	6	0	8	186

It is encouraging that a very high percentage of respondents recognize the importance of maintaining their septic systems by having them pumped frequently.

Finally, when asked if they would favour regular septic inspections to protect Gull Lake, 84.7% responded they would favour or somewhat favour such action, 7.7 % had no opinion and 7.7% felt it was unnecessary.

### 6.4.4 Possible Actions

There are a number of actions which the GLCA can take to reduce pollutant loading on the Lake which would be supported by a strong majority of those having input to this Lake Plan.

- Educate residents on the use of septic systems to reduce hydraulic loading, reduce nutrient loading through the use of phosphate free products and proper maintenance of systems.
- Educate residents on the value of natural shorelines to increase nutrient uptake.
- Encourage Minden Hills Council to implement mandatory septic inspection.

#### Recommended Actions *Improve septic system use, maintenance and monitoring*

- ✓ *Educate residents about proper septic tank use and maintenance, including the role of natural shorelines (Action 1.10).*
- ✓ *Educate residents to reduce hydraulic load on septic system, in order to increase retention time and improve treatment level (Action 1.11).*
- ✓ *Improve septic tank inspection to protect water quality (Action 1.12).*

### 6.5 Use of Fertilizers

The use of fertilizers on properties next to the lake can cause an excessive nutrient loading on the lake which significantly exceeds that of a functioning septic system. As noted previously, nutrient loading in the form of phosphorus and nitrogen will promote weed and algae growth and lead to dissolved oxygen depletion. The end result is dead zones in the lake and depletion of fish stock.

## SECTION 7 ACTION PLAN

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The preparation of this lake stewardship plan has been a good opportunity to invite and engage the community. The process has allowed people to have a voice in local matters, and the contents of the plan have been built upon their concerns and suggestions. The implementation phase that follows the plan will bring new opportunities to engage and revitalize the community.

This Action Plan identifies individual actions, responsibilities and levels of priority. Its implementation will require a dedication from the lake community and organizations over the foreseeable future. Implementation would also benefit from a continuation in some form of the steering committee that guided development of the plan.

The Action Plan is provided on the following pages in Figure 7.1 and the actions are grouped by the type of implementation approach: monitor, educate, enforce, advocate and communicate

The Plan's activities should be reviewed annually and the plan updated on an as needed basis.

The Action Plan was presented to the 2014 AGM on June 1, at Kilcoo Camp and was unanimously adopted by the members along with the following recommendations:

- 1) Move adoption of the Gull Lake Plan Summary and proceed with an Implementation Plan**
- 2) Move that a position of Lake Plan Steward be created as part of the GLCA Executive to implement the Actions outlined in the Gull Lake Plan**

At the end of the meeting Richard Newman, GLCA Vice President volunteered to be the Lake Plan Steward.

**Figure 7.1 - Gull Lake Action Plan**

RECOMMENDATION	ACTION SUGGESTED/TAKEN	Responsibility	Priority
<b>1.0 Water Quality</b>			
<b>Monitor</b>			
1.1 Conduct base line study to determine requirements for future water quality sampling program.	<ul style="list-style-type: none"> <li>Perform base quality analysis of Gull Lake, headwaters, and incoming streams to include benthic studies, dissolved oxygen levels, temperature, total phosphorus, calcium levels, possible toxicology analysis.</li> </ul>	Lake Steward	1
1.2 Conduct Lake Capacity Assessment based on the Provincial Model to understand the current status of water quality and development capacity.	<ul style="list-style-type: none"> <li>Encourage MNR to perform another Lake Capacity Assessment (also see proposed action 10.7).</li> <li>Use information gathered in the above study (Action 1.1) to help make a case for a Lake Capacity Assessment.</li> </ul>	Lake Steward	2
1.3 Continue to monitor operation of Minden's Sewage Treatment Plant.	<ul style="list-style-type: none"> <li>Continue to liaise with Minden Hills regarding the performance of the Sewage Treatment Plant and compare e-coli results upstream and downstream of the Sewage Treatment Plant .</li> <li>Report findings at the GLCA AGM.</li> <li>Note: Sampling done by Ontario Clean Water Agency as part of operating requirements for Minden Hills Sewage Plant</li> </ul>	Lake Steward	2
1.4 Investigate the increase of siltation and growth of aquatic plants in Gull Lake.	<ul style="list-style-type: none"> <li>Contact MNR to discuss the issue and set up a potential monitoring program.</li> </ul>	GLCA	3
1.5 Further investigate the potential to join the Coalition of Haliburton Lake Associations (CHA) lake testing project.	<ul style="list-style-type: none"> <li>Assess the benefits of this program to Gull Lake.</li> <li>Investigate the costs and implications of the program.</li> <li>Report to the AGM on the findings and make a recommendation to the 2014 AGM on whether to collaborate with CHA.</li> </ul>	Lake Steward (Currently under investigation)	3
<b>Educate</b>			
1.6 Educate residents regarding the impact of fertilizers, pesticides, gasoline, oil, (pollution from watercraft), household chemicals on water quality.	<ul style="list-style-type: none"> <li>Prepare or borrow material and provide to residents through website communications, GLCA AGM and newsletters.</li> </ul>	Lake Steward	1
1.7 Educate residents of the importance of shoreline and near shoreline (littoral) preservation to the quality of lake water.	<ul style="list-style-type: none"> <li>Prepare or borrow material and provide to residents through website communications, GLCA AGM and newsletters.</li> </ul>	Lake Steward	1
1.8 Educate residents about the impacts of disposing of yard waste (leaves, brush and trees from property) into the lake.	<ul style="list-style-type: none"> <li>Prepare or borrow material and provide to residents through website communications, GLCA AGM and newsletters.</li> </ul>	Lake Steward	1
1.9 Create an early warning system in the case of a spill from the sewage treatment plant or the highway for river and lake residents to notify them of any contaminated drinking water.	<ul style="list-style-type: none"> <li>Discuss and arrange the communication pathway between the Township and MOE Spills Action Centre. Already in place as an MOE spills requirement</li> </ul>	GLCA	Done
1.10 Educate residents about proper septic tank use and maintenance, including the role of natural shorelines.	<ul style="list-style-type: none"> <li>Invite a knowledgeable person to speak at AGM.</li> <li>Through website communications, GLCA AGM and newsletters educate residents about: <ul style="list-style-type: none"> <li>proper septic use and maintenance,</li> </ul> </li> </ul>	GLCA	2



RECOMMENDATION	ACTION SUGGESTED/TAKEN	Responsibility	Priority
	<ul style="list-style-type: none"> <li>the impact of household chemicals, water softeners, dishwashers etc. on performance of septic systems, and</li> <li>the benefits of natural shoreline areas to increase nutrient uptake.</li> </ul> <ul style="list-style-type: none"> <li>Create a list of products that are appropriate for septic systems and promote their use.</li> <li>Post the video by Rob Davis on the GLCA website and make a link to his company's website and products (EcoEthic).</li> </ul>		
<b>1.11 Educate residents to reduce hydraulic load on septic system, in order to increase retention time and improve treatment level.</b>	<ul style="list-style-type: none"> <li>Encourage residents to minimize water use through website communications, GLCA AGM and newsletters .</li> </ul>	Lake Steward	1
<b>Enforce</b>			
<b>1.12 Improve septic tank inspection to protect water quality.</b>	<ul style="list-style-type: none"> <li>Send a letter from the GLCA to Minden Hills Council in support of their Official Plan Amendment that introduces mandatory septic inspection.</li> </ul>	GLCA Minden Hills	1
<b>2.0 Water Levels</b>			
<b>Communicate and Work with Others</b>			
<b>2.1 Communicate Preferred Water Level resolution to Coalition for Equitable Water Flow (CEWF).</b>	<ul style="list-style-type: none"> <li>GLCA to endorse recommended levels and send to CEWF (<i>Done February 2011</i>).</li> </ul>	GLCA	Done
<b>2.2 Support the Coalition for Equitable Water Flow (CEWF).</b>	<ul style="list-style-type: none"> <li>GLCA to recommend a member to be the CEWF Liaison person. Done. Bruce McClennan named.</li> </ul>	GLCA	Done
<b>Educate</b>			
<b>2.3 Increase resident awareness of water levels and level forecasts.</b>	<ul style="list-style-type: none"> <li>Educate residents on website location of Water Level forecasts.</li> </ul>	GLCA Members	1
<b>2.4 Property owners to prepare properties for fluctuating water levels.</b>	<ul style="list-style-type: none"> <li>Educate residents on actions they can take to prepare for extreme water levels (low and high).</li> </ul>	GLCA Members	2
<b>3.0 Natural Shorelines and Nearshore Areas</b>			
<b>Monitor</b>			
<b>3.1 Participate in the Shoreline Inventory Project to identify the percentage of vegetation covering the shoreline.</b>	<ul style="list-style-type: none"> <li>Respond to P. MacInnes of CHA request to see if Gull Lake wants to participate in the Haliburton Shoreline Inventory program.</li> </ul>	Lake Steward	2
<b>3.2 Investigate the location of sensitive near shore areas littoral zone) and educate residents on their importance.</b>	<ul style="list-style-type: none"> <li>Contact MNR for existing maps and data.</li> <li>Prepare shoreline mapping showing wetlands, streams, spawning and other sensitive areas.</li> <li>Prepare and distribute information.</li> <li>Note sensitive areas on Boating Navigation Map.</li> </ul>	GLCA	1
<b>Educate</b>			
<b>3.3 Educate shoreline property owners about the benefits of natural shorelines and promote awareness of Haliburton County's tree cutting by-law in order to protect natural shorelines around the lake.</b>	<ul style="list-style-type: none"> <li>Educate residents through website communications, GLCA AGM and newsletters.</li> <li>Prepare/distribute a pamphlet (including good/bad examples and information on bioengineering).</li> <li>Provide a link to Haliburton County's tree cutting by-law on the GLCA website.</li> <li>Support Minden Hill Council in their Official Plan amendment to include natural shoreline protection. (done)</li> <li>Emphasize importance of natural shorelines to property values.</li> </ul>	GLCA	1

RECOMMENDATION		ACTION SUGGESTED/TAKEN	Responsibility	Priority
		<ul style="list-style-type: none"> <li>Recognize there are certain areas where erosion structures have been put in place (retaining walls, etc.) and encourage shoreline naturalization around those structures.</li> </ul>		
3.4 Prepare a list of preferred species of native shoreline plants and their sources to improve access to purchasing and planting native species.		<ul style="list-style-type: none"> <li>Prepare/distribute pamphlet and post on the website.</li> </ul>	GLCA	2
3.5 Investigate a potential partnership with the Centre for Sustainable Watershed (CSW) Program - Love Your Lake ( <a href="http://www.loveyourlake.ca">www.loveyourlake.ca</a> ).		<ul style="list-style-type: none"> <li>Contact CSW to find out what is involved and how to implement.</li> </ul>	GLCA Volunteer(s)	3
<b>4.0 Wildlife Habitat</b>				
<b>Monitor</b>				
4.1 Investigate the impact of waterfowl (e.g., cormorants) on fish populations to identify any potential issues.		<ul style="list-style-type: none"> <li>Contact MNR to discuss impacts and potential control measures.</li> </ul>	Lake Steward	3
<b>Educate</b>				
4.2 Better understand the location of loon nesting sites and educate residents to lessen impacts from boating and development.		<ul style="list-style-type: none"> <li>Identify and mark loon nesting sites and educate boaters about wake impacts on loon nests.</li> <li>Promote the importance of loon nesting habitat and use a tag line such as 'Love Our Loons'.</li> <li>Recruit volunteers to participate in Loon Watch and research and locate nests.</li> <li>Prepare material on loon sustainability and provide to residents through website communications, GLCA AGM and newsletters.</li> </ul>	GLCA Volunteer(s)	1
<b>5.0 Power Boating</b>				
<b>Educate</b>				
5.1 Educate boaters about responsible boating behaviour in a balanced manner.		<ul style="list-style-type: none"> <li>Develop a list of good boating etiquette (e.g., low wake areas, speed limits near shore, awareness of swimmers) for lake users and publish in newsletter/launching sites etc.</li> <li>Consult with authorities regarding the installation of no wake/speed limit signs in appropriate areas, including locations where speed limits change.</li> <li>Request OPP to discuss boating safety at an AGM meeting.</li> </ul>	GLCA	1
5.2 Identify areas of the lake where Navigation Hazards exist		<ul style="list-style-type: none"> <li>Investigate where shoals or other hazards exist and educate lake users on the hazards.</li> </ul>	GLCA	3
<b>6.0 Fish Population</b>				
<b>Monitor</b>				
6.1 Collect fish population data to better understand the current lake trout population in Gull Lake.		<ul style="list-style-type: none"> <li>Contact MNR and work with them to collect any background data to identify a baseline for the existing fishing activities.</li> <li>Request ice hut rental owner to ask renters to record their catch during ice fishing season.</li> </ul>	GLCA	1
6.2 Investigate winter pressure on lake trout populations and ice fishing,		<ul style="list-style-type: none"> <li>Work with lake trout anglers to begin research on the actual lake trout population in Gull Lake, in partnership with the MNR.</li> </ul>	GLCA and GLCA	1

<i>RECOMMENDATION</i>	<i>ACTION SUGGESTED/TAKEN</i>	<i>Responsibility</i>	<i>Priority</i>
recognizing that ice fishing has a local economic importance.	• Find volunteers and support MNR efforts in doing creel surveys over the winter.	members	
<b>6.3 Determine availability of lake trout habitat in Gull Lake, based on dissolved oxygen.</b>	• Collect dissolved oxygen readings periodically (every 2-3 years) and report findings on GLCA website and at the GLCA AGM and provide results to MNR/MOE.	GLCA	1
<b>Educate</b>			
<b>6.4 Encourage catch and release, conservation limits, and reduced season for Lake Trout in order to support their population and reproductive success.</b>	• Join with other Lake Associations and volunteers to request MNR to reduce Lake Trout season.	GLCA	2
<b>6.5 Educate residents on the impact of shoreline alteration to the spawning grounds for fish.</b>	• Through Dock Talk, encourage restoration of natural shoreline habitat.	GLCA and GLCA members	3
<b>6.6 Investigate the issue of ice hut transportation and the damage and debris left behind during that process.</b>	• Research Best Management Practices on transporting ice huts on and off the ice and prepare educational material and provide to fish hut operators.	GLCA	3
<b>Stewardship</b>			
<b>6.7 Identify spawning areas and where necessary, rehabilitate existing spawning areas to support lake trout reproduction.</b>	• Contact MNR to collect any background data and investigate options for rehabilitating lake trout spawning areas.	GLCA	1
<b>Enforce</b>			
<b>6.8 Prevent the overfishing of lake trout and bass to protect their populations and reproductive success.</b>	• Encourage MNR to increase enforcement. • Encourage people to report incidents of poaching and exceeding catch limits through the website and articles in the newsletter.	GLCA	1
<b>7.0 Tranquility</b>			
<b>Educate</b>			
<b>7.1 Educate residents about the impacts of fireworks and support the township's firework by-law.</b>	• Educate members on the impact of fireworks noise after 10:30 pm • Encourage residents to report any violations to the fireworks by-law on the municipality's online reporting system and provide a link to it on the GLCA website	GLCA	2
<b>7.2 Educate residents on noise by-laws and lake culture ethic to promote a balance of recreational enjoyment and tranquility.</b>	• Provide information through website communications, GLCA AGM and newsletters.	GLCA	2
<b>7.3 Promote noise abatement on boats.</b>	• Include noise abatement in the Boat Etiquette Brochure.	GLCA and Lake Plan	2
<b>8.0 Light Pollution</b>			
<b>Educate</b>			
<b>8.1 Educate residents on the impacts of bright lights on the enjoyment of night skies.</b>	• Establish a protocol to outline the impact bright lights have on neighbours' enjoyment of night skies and publish in newsletter. • Through the newsletter, encourage residents to use timers on outdoor lights and provide a list of 'dark sky friendly' lights and retailers.	GLCA	2
<b>Enforce</b>			

<i>RECOMMENDATION</i>	<i>ACTION SUGGESTED/TAKEN</i>	<i>Responsibility</i>	<i>Priority</i>
<b>8.2 Reduce use of bright flashing lights on telecommunication towers by using alternate warning system.</b>	<ul style="list-style-type: none"> <li>Petition tower owner and Council to ensure owner uses lowest light aircraft warning intensity to reduce impact on residents' enjoyment of night skies (currently underway).</li> </ul>	GLCA Township	2
<b>9.0 Invasive Species</b>			
<b>Educate</b>			
<b>9.1 Identify invasive terrestrial (plant) and aquatic species on Gull Lake to better understand impacts.</b>	<ul style="list-style-type: none"> <li>Conduct research to prepare list of invasive species that exist on Gull Lake and those that are emerging threats.</li> </ul>	GLCA	2
<b>9.2 Educate residents on prevention of aquatic invasive species through transfer of boats and baits from lake to lake.</b>	<ul style="list-style-type: none"> <li>Post signs at boat launch, on website, AGM, newsletter etc.</li> <li>Emphasize the importance of flush kits for boats prior to changing water bodies.</li> <li>Provide link to OFAH Invading Species website on GLCA website.</li> </ul>	GLCA	1
<b>9.3 Educate residents on prevention of spreading terrestrial invasive species. (e.g. Ash beetle, through relocation of firewood and domestic plants from other areas) to prevent further introduction.</b>	<ul style="list-style-type: none"> <li>Work with the Ontario Invading Species Awareness Program to educate people on how to identify and control invading species.</li> <li>Provide communications through the website, AGM, newsletter.</li> <li>Provide link to Ontario Federation of Anglers and Hunters Invading Species website on GLCA website.</li> </ul>	GLCA	2
<b>Stewardship Action</b>			
<b>9.4 Reduce undesirable invasive fish species that threaten the Lake Trout population.</b>	<ul style="list-style-type: none"> <li>Establish an annual rock bass derby - currently underway.</li> </ul>	GLCA	2
<b>10.0 Land Use</b>			
<b>Monitor</b>			
<b>10.1 Promote enforcement of Haliburton County's tree-cutting by-law and, once approved, Haliburton County's natural shoreline by-law.</b>	<ul style="list-style-type: none"> <li>Contact Haliburton County for further information and post link to tree-cutting by-law on the GLCA website.</li> <li>Support approval of Haliburton County's natural shoreline by-law and post link to by-law after approval .</li> </ul>	GLCA	2
<b>10.2 Promote enforcement of Township Land Use By-laws to ensure lake capacity is not compromised .</b>	<ul style="list-style-type: none"> <li>Request the Township to circulate all major shoreline development (not building permits) applications to the GLCA.</li> <li>Arrange GLCA rep to be present at all shoreline development hearings (e.g., lot creation, zoning amendments) for Gull Lake.</li> </ul>	GLCA	1
<b>Educate</b>			
<b>10.3 Provide education on permitted uses, required setbacks and building provisions to property owners to promote appropriate land use.</b>	<ul style="list-style-type: none"> <li>Work with the Township to prepare a pamphlet and distribute through website or other means.</li> </ul>	GLCA Minden Hills	3
<b>10.4 Educate landowners on the importance of natural buffers and the impacts of fertilizers and herbicides and grassed lawns.</b>	<ul style="list-style-type: none"> <li>Gather information and prepare pamphlet to distribute through website or other means.</li> </ul>	GLCA	1
<b>Advocate - Advisory</b>			
<b>10.5 Communicate Lake Plan development preferences to Minden Hills Council.</b>	<ul style="list-style-type: none"> <li>Provide Lake Plan to Council and ensure Lake Plan is addressed by Official Plan.</li> </ul>	GLCA	1

RECOMMENDATION	ACTION SUGGESTED/TAKEN	Responsibility	Priority
<b>10.6 Advocate for the protection of environmentally sensitive areas in the watershed (wetlands, fish habitat) from incompatible development, recognizing the need for economic development in the area.</b>	<ul style="list-style-type: none"> <li>Research local official plan and zoning by-laws regarding protection of sensitive areas.</li> </ul>	GLCA	1
<b>10.7 Protect sensitive areas in the watershed (wetlands, fish habitat) from incompatible development.</b>	<ul style="list-style-type: none"> <li>Contact municipality and township to ensure that the local official plan and zoning by-law protects sensitive areas.</li> </ul>	GLCA Township	1
<b>10.8 Restrict blasting of natural shorelines (e.g., within 100 ft of the lake), to protect shorelines.</b>	<ul style="list-style-type: none"> <li>Work with the Township to implement a by-law to restrict blasting in these areas, recognizing that certain construction processes may require limited blasting because many cottages were built within 100 ft. of the shoreline .</li> </ul>	GLCA Township	3
<b>Research</b>			
<b>10.9 Determine how close Gull Lake is to "at capacity".</b>	<ul style="list-style-type: none"> <li>Contact MNR/MOE to request a Lake Capacity study.</li> </ul>	GLCA	2
<b>11.0 Other</b>			
<b>Improve Public Access Points - Boat Access</b>			
<b>11.1 Repair and improve lake access points to ensure safe and responsible use.</b>	<ul style="list-style-type: none"> <li>Request the Township to inspect all public access locations annually and conduct repairs if needed.</li> <li>Request that proper road signage for public access points be provided.</li> </ul>	Township	3



