"Muskoka's Changing Shorelines: the Need for Long-term Monitoring of Shoreline Development"

Major Research Paper

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"*One of the great mistakes is to judge policies and programs by their intentions rather than their results*".

- Milton Friedman

Source: Klessig, Sorge, Korth. Dresen, & Bode (2004).

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Acronyms

ACF	Advocacy Coalition Framework
CA	Conservation Authority
CEAA	Canadian Environmental Assessment Act
DPS	Development Permit System
EIA(s)	Environmental Impact Assessment(s)
GGH	Greater Golden Horseshoe
ICZM	Integrated Coastal Zone Management
LSEMS	Lake Simcoe Environmental Management Strategy
LSPP	Lake Simcoe Protection Plan
LYLP	Love Your Lake Program
MOECC	Ministry of the Environment and Climate Change
MWC	Muskoka Watershed Council
MWW	Muskoka Water Web
NGO(s)	Non-governmental organization(s)
OMNRF	Ontario Ministry of Natural Resources and Forestry
OP(s)	Official Plan(s)
OPPI	Ontario Professional Planners Institute
OTF	Ontario Trillium Foundation
PLA	Peninsula Lake Association
PPS	Provincial Policy Statement
SMP(s)	Shoreline Management Plan(s)
ZBL(s)	Zoning By-Law(s)

Abstract

The District of Muskoka has been a popular tourist destination for summer recreation for several decades. The region's infamous reputation is accredited by its picturesque characteristics such as lush forests, pristine lakes, and rocky shorelines. Due to its popularity, Muskoka is now home to a considerable amount of permanent and seasonal luxury recreational properties – and this trend of developing large summer homes along natural shorelines is multiplying. Planning tools to control shoreline development are currently in place, however, these tools are only effective for pre-construction and during development. Once construction is complete, control measures are lifted and developed shoreline properties are not normally visited by planners again. Therefore, post-construction monitoring is not present in current policies. In essence, development on shorelines and the state of shoreline properties where development has occurred are currently not being monitored for the long-term. This paper investigates current land use policies in Muskoka through a case study analysis and comprehensive literature review. This research will demonstrate the need to integrate long-term shoreline monitoring policies into Official Plans. The Researcher will conclude with potential monitoring frameworks to implement within the District in order to maintain the area's unique features and natural landscapes.

1.0 CONTEXT

1.1 Introduction

Many rural communities have the benefit of lakes and rivers that attract the establishment of cottages, homes and commercial development. The quality and sustainability of this shoreline development impacts rural municipalities in many different ways. While municipalities carefully review a proposed development when planning approvals are sought, long-term monitoring of the impacts of development does not tend to occur. This research paper explores the topic of long-term shoreline monitoring and the necessity of policy reform specifically within the District of Muskoka by examining past and current research as well as strategies. Research objectives will be achieved by first introducing the issue at hand followed by a statement of goals and objectives. Next, utilized research methods will be outlined before a background description of the District of Muskoka is presented. Background information on the District will include the area's history, economy, regional growth patterns and growth strategy goals. Following this, a background and history will be presented on the concept of monitoring to include local and international examples. This section will delve into the importance of long-term monitoring while identifying five key themes in current research. The section will review current long-term monitoring initiatives in Muskoka which will revolve around two trends. The two trends recognized include the link between public participation and decision-making, and the validation of a collective awareness towards the lack of monitoring plans in local policy documents.

Afterwards, the Researcher will set out current shoreline and monitoring policies in place in the district through a case study of two Muskoka Townships and one Muskoka Town: Lake of Bays, Muskoka Lakes and Gravenhurst. Official Plan (OP) and Zoning-By Law (ZBL) policies will be compared with district and provincial policies. In addition, different shoreline protection and stewardship initiatives of each Township/Town will be discussed. Moreover, commentary from the Researcher and Municipal Representative interviews from the three municipalities' planning departments will be included in this discussion. The Researcher will then provide further discussion and analysis on research findings and key trends. Finally, the Researcher will conclude with a summary of issues and recommendations with five potential solutions on how to permanently implement long-term shoreline monitoring in Muskoka through policy and collaborative management strategies.

Municipal Representative = a Planner within the Planning Department at the Townships of Lake of Bays, Muskoka Lakes and/or Town of Gravenhurst.

1.2 Problem Statement

The concept of monitoring and evaluation has been gaining notoriety over the past decade. Shoreline monitoring is a pertinent issue in the District of Muskoka. In Muskoka's upper and lower tier Official Plans (OP), there is an absence of long-term monitoring policies regarding shoreline development. Official plans for the area include general site plan agreements and by-laws to control development, however, no monitoring policies exist to follow-up on the compliance of these agreements and shoreline development policies. So far, the only way municipalities gain knowledge of non-compliance of these agreements is through a complaint-driven process. Therefore, municipalities have no control of a property once development is complete. Shorelines can face numerous impacts due to non-compliance. Examples of these impacts include loss of vegetation, increase in sedimentation, decrease in water quality and loss of wildlife habitat (Fahner & Janas, 2013). Negative impacts on shorelines are occurring due to a steady increase in development on natural shorelines in Muskoka. The importance of compliance of site plan agreements and shoreline development control is critical to preserving Muskoka's natural landscape. Long-time residents, the Muskoka community, planners, and conservation groups are among the many affected by increased development and the repercussions of disobedience of site plan agreements and the lack of follow-up. Ultimately planning departments do not have the resources to follow-up on compliance agreements alone. Therefore, tactics must be developed in order to (a) increase compliance of site plan agreements on shoreline properties and (b) introduce monitoring policies for shoreline properties into legislation for the long-term.

Municipal Representative = a Planner within the Planning Department at the Townships of Lake of Bays, Muskoka Lakes and/or Town of Gravenhurst.

1.3 Goals and Objectives

This major research paper delivers an insight into the concept of long-term monitoring, specifically in the context of shoreline properties on inland lakes. This is achieved through a comprehensive literature review on monitoring and a case study of two Muskoka Townships and one Muskoka Town. The goal of this research is to demonstrate the importance of long-term monitoring and how shoreline monitoring can be implemented into policy documents in Ontario. There are five main objectives of this research:

i. To understand the increasing importance of long-term monitoring
ii. To examine federal, provincial, and local policy documents in Muskoka for long-term monitoring policies
iii. To determine why long-term monitoring policies do not exist
iv. To explore the impacts of human activity on Muskoka's shorelines without long-term monitoring policies in place
v. To identify and analyze best practices of long-term monitoring on shoreline properties in Muskoka

In addition, as long-term monitoring is a growing field, this research will contribute to the knowledge pool of the strengths, weaknesses, challenges, and opportunities monitoring can bestow on municipal plans and local communities. It is hoped that planners, specifically planners in the Muskoka District, will be able to use this research to substantiate the need for long-term monitoring as a key practice for a tourist-based region.

1.4 Methodology

This major research paper explores the quickly evolving shoreline properties within the Muskoka region through an analysis of case studies in the Township of Lake of Bays, Township of Muskoka Lakes, and Town of Gravenhurst. Data required for this proposal includes academic and professional knowledge on shorelines and development, monitoring policies, past compliance reviews, site plan agreements, and visual impact assessments. Through researching academic literature reviews on similar projects, three methods have been chosen to acquire this type of data: **a)** qualitative techniques such as key informant semi-structured interviews to professionals/experts (Municipal Representatives), **b)** continuing to observe similar case studies or research in the area, and **c)** extensive document reviews (policies).

Prior to research and field work in Muskoka, a review of academic literature on long-term shoreline monitoring was conducted to provide an overview of the concept of monitoring. The literature reviews showed that there has been limited research documented on monitoring in general. A discussion on available research in this paper will focus on long-term shoreline monitoring strategies throughout the world and major themes found respectively. The Researcher will then demonstrate current long-term shoreline monitoring initiatives in Muskoka as a comparison. This research was supported by interviews, a case study and a review of policy documents in Muskoka.

a) Interviewing is a common method of data collection. It is a focused conversation between an interviewer and interviewee (in this case between the Researcher and Municipal Representatives). Interviewers require special skills in drawing out reliable data (Cummings, 2014). The informal interviews in this research were structured to include qualitative open-ended responses. In qualitative methods, the major focus is on discovering the context and action strategies. Interviews were conducted of Municipal Representatives from planning departments of the townships/towns previously stated. Due to the nature of the interviews of local Municipal Representatives, key informant interviews were conducted. Key informant interviews (KIIs) entail open-ended questions that trigger in-depth responses about people's experiences, perceptions, opinions, feelings, and knowledge. The qualitative interviews conducted were semi structured in nature meaning that background information in the form of a questionnaire was obtained but there was also room for general conversation on the topic (Cummings, 2014). This allowed for the Researcher to gain an in-depth explanation of site plan agreements and opinions on shoreline monitoring strategies in each township with sufficient description of the context. The open-ended questions included in the questionnaire consisted of worded answers and invited the Municipal Representative to answer the questions freely, while also offering a chance for explanation along with their answer. The data gathered from this method of research confirmed current shoreline monitoring approaches in the region, identified strengths and weaknesses of these approaches, explored current strategies to address shoreline monitoring issues, and questioned if long-term monitoring is being adequately addressed in Muskoka.

b) Case studies in a local context were chosen to further broaden research conducted on general monitoring frameworks. Site visits in the townships and town were conducted

with the assistance of a Municipal Representative from each planning department. This allowed the Researcher to perform visual impact assessments of shoreline properties in comparison to site plan agreements in order to verify compliance of agreements and the need for long-term monitoring. This research reinforced findings in the literature reviews and interview responses for each of the townships/towns. As part of the case studies, local policy documents were also reviewed.

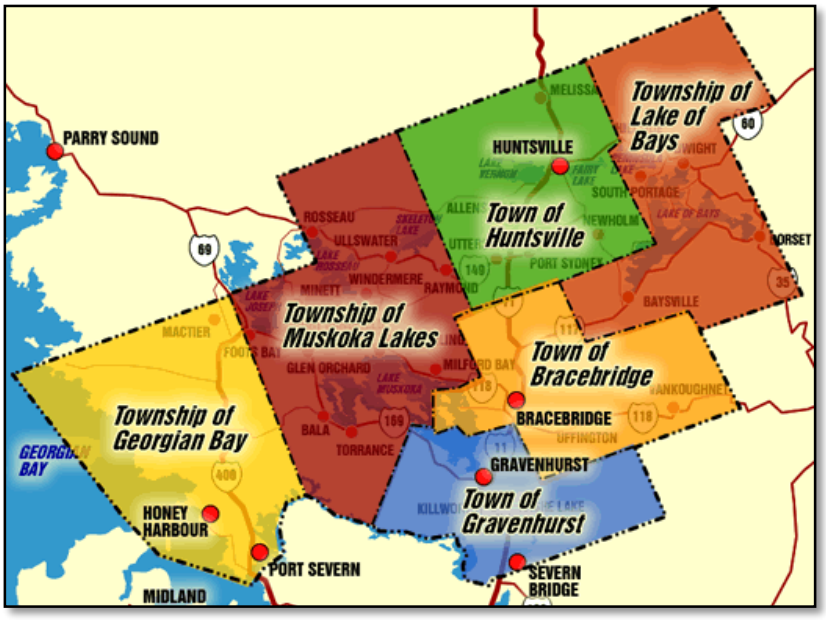
c) The analysis of documents during this research included provincial and local documents. Such documents included the Provincial Policy Statement, Official Plans, Zoning By-laws, site plan agreements, official reports (such as compliance audits), and the Ontario Planning Journal supplied by the Ontario Professional Planners Institute (OPPI).

Expected outcomes from this research include: explanations of existing trends and shoreline monitoring strategies (and lack thereof), suggestions to address shoreline monitoring issues, correlations and gaps within existing literature, descriptions of current monitoring processes, and a conceptual framework towards policy guidance.

2.0 BACKGROUND: THE DISTRICT OF MUSKOKA

The District of Muskoka was established by provincial legislation on January 1st, 1971 (The District Municipality of Muskoka, 2014a). It is located in Ontario, Canada just two hours north of the City of Toronto. The District acts as a two-tier system as the District is considered upper-tier which is made up of six lower-tier municipalities and towns: the Townships of Muskoka Lakes, Lake of Bays, Georgian Bay, and the Towns of Huntsville, Gravenhurst and Bracebridge (see **Map 1**) (TDMM, 2014a). The District is accountable for regional matters and the six lower-tier municipalities are accountable for jurisdictional matters. The District of Muskoka covers from the shores of Georgian Bay in the west to Algonquin Park in the east; north past the Town of Huntsville and south to the Trent-Severn waterway. It includes 4,761 square kilometres of land with over six hundred inland lakes (TDMM, 2014d, p.4).

Map 1: Map of the District of Muskoka



Source: https://homesofmuskoka.ca/Muskoka/township-muskoka-lakes

Muskoka has gained renowned status as a holiday destination or even as a permanent residence due to its vast forests, an abundance of beautiful lakes and natural shorelines. As part of the Canadian Shield, Muskoka's rocky terrain dates as far back as 1.5 billion years and is rich in mineral deposits. The large forests in Muskoka include an array of types of trees such as jack pine, poplar, white birch, black and white spruce and balsam. Again, these features make Muskoka one of the most popular tourist destinations in the province. The natural setting of the region is combined with small to mid-sized communities and rural and waterfront development. Though beneficial for economic development, it is evident that increased demand

for recreational properties in Muskoka is creating an adverse impact on its shorelines. Since Muskoka has such a high quantity of seasonal residents, the area can offer amenities similar to a larger metropolitan city as well as the desirable small community lifestyle complete with beautifully natural landscapes and limited crime (Muskoka Water Web, 2015). It's no wonder individuals and families continue to settle here.

2.1 History

Settlement history in Muskoka goes back to the 1800s. Through the popularity of cruises came the birth of luxury wilderness resorts in Muskoka offering accommodations and activities year round. The Muskoka Navigation Company, being one of the largest companies in Canada in the early 1900s, was one of the first big pulls to the area for settlers. The company aimed to bring steam navigation to the area in an effort to explore Muskoka's scenic beauty and thus a lock was built in Port Carling to join two of Muskoka's most popular and largest lakes, Muskoka and Rosseau, together.

The Free Grant and Homesteads Act of the 1860s was the second big pull to the area for settlers. Between the offering of navigation and available farmland from the government to settlers, commerce in Muskoka began to boom. Lumber camps were established in Muskoka in the 1800s and pioneers experiencing hardship on the farm resorted to logging. It was during the late 1800s that Americans began to visit Muskoka's shorelines for the purpose of recreation. After the Civil War, Muskoka became known as the 'Sportsman's Paradise' in which visitors (predominantly men) came to the area to hunt, fish, and camp. Soon thereafter, the first hotel was built in Muskoka on Lake Rosseau (Visual Heritage, 2008).

The Muskoka Club was also established on Lake Joseph which led to the first built cottage on Chief's Island. Shortly after, other visitors followed suit and the railway was extended to the region stopping at Gravenhurst. More than seventy-five resorts were established on Muskoka's inland lakes by 1910 as populations were fleeing smog-filled industrial cities for fresh air and a relaxing environment. It wasn't long before the elite started to migrate to Muskoka, hence the birth of its reputation as Ontario's most popular tourist destination. The Group of Seven furthered the popularity of the North with their picturesque paintings of nature. Once the highway reached Muskoka in the 1930s, automobiles to the area dramatically increased and the development of cottages became standard.

Today, one of the original steamships (The Segwun) is still running in Muskoka which is overseen by the Muskoka Steamship and Historical Society. Boat cruises in Muskoka are now a

popular tourist activity for scenic and romantic cruises around the local inland lakes. As more and more people attended Muskoka for vacation, personal watercraft traffic increased on the waters and cottage real estate transitioned into a booming market (Visual Heritage, 2008).

2.2 Muskoka's Economy

The District's economy mostly consists of the tourism and service sector, construction and real estate sector, public service sector and international manufacturing firms. Since the area is a major tourist destination, the tourism and service sector significantly contributes to the local economy and nearly one third of its labour force is employed in this sector. For example, in 2008 Muskoka welcomed 2,400,000 visitors, generating over $472,000,000 in annual visitor expenditures (TDMM, 2014a, p.24). The following chart (**Table 1**) outlines properties zoned for tourist accommodation use. In total, Muskoka is home to eighty-nine tourist resort commercial accommodation properties of which the Township of Muskoka Lakes is comprised of almost half (42%) at thirty-seven commercial resorts (TDMM, 2014a, p.24). This is due to the fact that the Township is home to three of the largest lakes in the region which will be further discussed in the case study section of this paper. Lake of Bays has sixteen commercial resorts offering accommodation within its Township and Gravenhurst has a total of eleven.

In 2008 Muskoka's economy was reasonably affected by the 2008 global financial crisis. Recently, the area has been showing signs of recovery and tourism numbers have remained steady and are projected to continue based on projected growth levels.

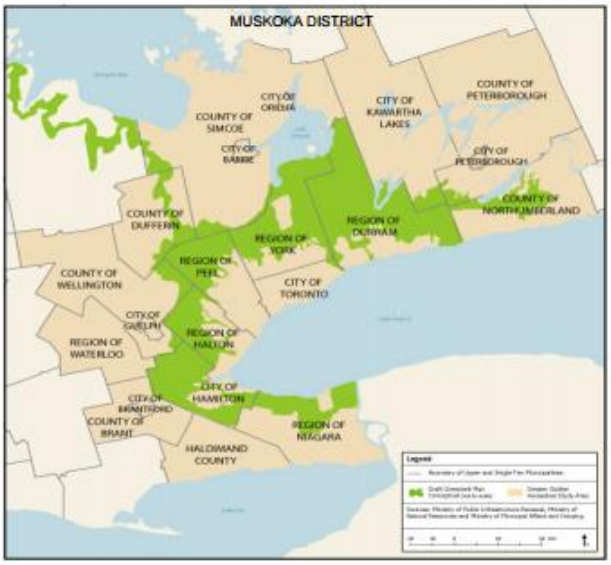
Table 1: Number of Tourist Resort Properties by Municipality

Municipality	Number of Tourist Resort Commercial Accommodation Properties	%
Bracebridge	4	4
Georgian Bay	6	7
Gravenhurst	11	12
Huntsville	15	17
Lake of Bays	16	18
Muskoka Lakes	37	42
Muskoka (total)	89	100

Source: The District Municipality of Muskoka (2014a)

2.3 Regional Growth

Map 2: Greater Golden Horseshoe (GGH)



Source: http://www.regionalplans.org/wp-content/uploads/2011/09/Map-of-GGH2.jpg

Recent growth in Muskoka could very well be attributed to the fact that the region is located just to the north of the Greater Golden Horseshoe (GGH) in southern Ontario which is home to 64% of the province's population (see **Map 2** for a map of the GGH) (DTMM, 2014e, p.4-2). As such, the District forecasts population projections every five years to establish an appropriate growth strategy. It has been found that continued population growth in the GGH will be the main cause of permanent and seasonal housing demand in the District, similar to current trends. The District of Muskoka has had a permanent household growth rate of 1.9% from 1981-2011 while the province as a whole has had an annual growth rate of 1.7% in the same time frame, as displayed in **Table 3** (next page).Currently there is a strong demand for seasonal housing in Muskoka from the thirty-five to seventy-four year age group and this is expected to continue up until the year 2012 (TDMM, 2014e, 6). Increased intensification in the GGH will also put additional pressure on recreationally-oriented properties in the District and nearby areas. Since there is an increasing demand for recreational housing, additional development pressure will be directed to waterfront and other recreational properties (Township of Lake of Bays, 2015, p.25). **Table 2** (next page) displays population projections for permanent residents of Muskoka to the year 2041. As can be seen, it is estimated that the permanent population will rise by 22,000 persons by 2041 (TDMM, 2014e, p.7). **Table 3** displays the seasonal population rising by 13,200 people by 2041 (TDMM, 2014e, p.8). These trends confirm the expected rising population and seasonal housing demand for the region.

Table 2: Permanent Population Projections to 2041

Municipality	2011 Permanent Population	2041 Permanent Population	Permanent Population Growth 2011-2041
Town of Bracebridge	16,100	23,100	7,000
Township of Georgian Bay	2,600	4,500	1,900
Town of Gravenhurst	12,700	17,300	4,600
Town of Huntsville	20,000	26,400	6,400
Township of Lake of Bays	3,700	4,400	700
Township of Muskoka Lakes	7,000	8,600	1,600
District of Muskoka	62,000	84,000	22,000

Table 3: Seasonal Population Projections to 2041

Municipality	2011 Seasonal Population	2041 Seasonal Population	Seasonal Population Growth 2011-2041
Town of Bracebridge	7,400	8,100	700
Township of Georgian Bay	15,600	17,600	2,000
Town of Gravenhurst	11,900	13,600	1,700
Town of Huntsville	6,000	6,800	800
Township of Lake of Bays	12,500	13,900	1,400
Township of Muskoka Lakes	27,400	33,600	6,200
District of Muskoka	80,800	94,000	13,200

Table 4: Permanent Household Growth Rate by Municipality 1981-2011

Municipality	Average Annual Growth Rate							
	81-86	86-91	91-96	96-01	01-06	06-11	81-11	81-11 (Excluding 86-91)
Township of Lake of Bays	2.5%	4.3%	1.6%	1.0%	4.4%	-0.3%	2.2%	1.8%
Town of Bracebridge	2.3%	4.6%	2.0%	1.2%	3.3%	0.2%	2.3%	1.8%
Town of Huntsville	1.8%	4.9%	1.5%	1.9%	1.6%	1.1%	2.1%	1.6%
Town of Gravenhurst	1.1%	3.1%	1.2%	1.2%	1.1%	1.8%	1.6%	1.3%
Township of Muskoka Lakes	0.6%	2.4%	2.3%	0.2%	2.1%	0.7%	1.4%	1.2%
Township of Georgian Bay	0.8%	1.3%	2.5%	-1.7%	3.9%	1.4%	1.4%	1.4%
District of Muskoka	**1.6%**	**3.9%**	**1.7%**	**1.1%**	**2.3%**	**0.9%**	**1.9%**	**1.5%**
Province of Ontario (000's)	1.6%	2.5%	1.6%	1.4%	1.5%	1.4%	1.7%	1.5%

Source: 1981 to 2011 Census

Source for Tables 2, 3, 4 & 5: The District Municipality of Muskoka Growth Strategy Report (2014e)

2.4 Growth Strategy Goals

Table 5: Seasonal Residential Building Permits

Municipality	1998-2002	2003-2007	2008-2012	1998-2012	Average Annual 1998 - 2012
Muskoka Lakes	370	506	159	1,035	69
Georgian Bay	176	187	123	486	32
Lake of Bays	153	170	73	396	26
Huntsville	85	161	97	343	23
Gravenhurst	127	139	77	343	23
Bracebridge	60	84	80	224	15
Muskoka District	971	1,247	609	2,827	188

The annual new housing construction for both permanent and seasonal residents from 2006-2011 is expected to be higher than historical averages for the six municipalities in Muskoka. In the District's growth strategy report published in 2013, it is recommended that local municipalities improve OP policies specific to waterfront development which are now only influenced by lake-based carrying capacity thresholds but no other factors. The growth strategy is to be used as the District-wide and local municipal studies to create tools to control long-term population and employment trends. The strategy report emphasizes the major challenge of balancing growth with environmental responsibility and sustainability and stresses that the focus of the strategy lies in long-term planning and management of the District's rural and waterfront land supply (TDMM, 2014e).

3.0 LITERATURE REVIEW

In order to provide a comprehensive literature review, this section is divided into seven sections: background and history of monitoring, the importance of long-term shoreline monitoring, works published to date, major themes of current research, long-term shoreline monitoring research in Muskoka, collaborative management, and the significance of this research.

3.1 Background and History

Monitoring is defined as "maintaining regular surveillance by making measurements at regular time intervals over an indefinite, but usually longer period of time" (Vaughan, Bridges, Fenech & Lumb, 2001, p.5). There are two primary purposes of monitoring. The first being to establish a baseline to represent the current state of the ecosystem. The second being to detect change over time, more importantly any changes above the baseline. Overall, the process allows planners to observe why changes are occurring (Vaughan et al., 2001).

Evaluation is becoming increasingly popular in the public sector. Evaluation today is a result of two phases. The first phase of program evaluation sprung during the 1960s and early 1970s (Seasons, 2003, p.431). Literature resulting from this surge discusses rational and technical analysis (such as goals and cost-benefit analysis) but little evidence exists of the use of these techniques. The second phase of program evaluation resulted in many articles promoting monitoring and detailing what should occur when evaluation principles are applied (Seasons, 2003).

Since then and over the past few decades, many municipalities have developed more complex monitoring techniques as environmental issues have become increasingly complex, one could say these have turned into a wicked problem. Environment Canada published the "State of the Environment" in 1991, followed by provincial initiatives and municipal reports alike. Although interest in monitoring is increasing and the concept has been understood since the 60s, monitoring and evaluation are still beginner concepts to municipal governments (Elmsford, 1973).

3.2 The Importance of Long-term Shoreline Monitoring

Monitoring strategies can greatly assist the practice of planning. Monitoring can assist planners in establishing causality between planning commitments and the end result. Furthermore, this can assist planners in determining whether a planning decision is correct or

successful while offering a true evaluation of planning alternatives. Seasons substantiates this by stating that monitoring and evaluation also assists planners in answering fundamental questions relevant to planning practice since the strategies have the potential to increase the efficacy of policies by highlighting issues that need to be addressed (Seasons, 2003).

Importance of long-term monitoring on shorelines is exemplified by research conducted on Lake Simcoe where the ecological health of the watershed was being destroyed by human activities. In response to these human stressors, the Lake Simcoe Environmental Management Strategy (LSEMS) was introduced in the 1980s in order to provide counteractive actions to mitigate inputs (Palmer et al., 2011, p.1). The LSEMS consisted of a wide range of participants including: the Lake Simcoe Region Conservation Authority (LSRCA), the Ministry of the Environment and Climate Change, the Ministry of Natural Resources and Forestry, the Ministry of Agriculture, Food and Rural Affairs, the Ministry of Municipal Affairs and Housing, public infrastructure renewal, the Department of Fisheries and Oceans, the Chippiwas of Georgina Island First Nation, watershed municipalities and other stakeholders. To address the long-term environmental issues bestowed on Lake Simcoe, the provincial government passed the Lake Simcoe Protection Act in 2008 (the sole lake in Canada to have its own legislative act) (Palmer et al., 2011, p.2). The Act launched the Lake Simcoe Protection Plan, created to protect and reinstate the Lake Simcoe watershed to its original ecological health. The Plan is based on scientific research and is an adaptive management strategy which integrates long-term monitoring strategies as well as funding allocations for implementation. This case study is an excellent example of a shared understanding of an area's ecology as well as a successful shoreline management strategy that involves collaborative partnerships by several stakeholders to protect a watershed. Research conducted by the LSPP demonstrates how to effectively evaluate factors that control stressors influencing inland lakes in Southern Ontario. This information is not only critical for shoreline monitoring - it also provides a baseline for evaluation of future changes (Palmer et al., 2011). This is further supported by Vaughan et al. (2001) who specified the importance of having long-term data records in order to detect changes in ecosystems over time.

On a Federal level, natural resources are protected by Environmental Impact Assessments (EIAs) which predict negative environmental impacts of projects before they happen and includes a follow-up program to validate the usefulness of mitigation methods that are also proposed. Environmental assessments are regulated under the Canadian Environmental Assessment Act (CEAA) which was created in 2012 (Canadian Environmental

Assessment Agency, 2012). These assessments are mainly implemented to protect the environment and to better include public participation. As environmental assessments are conducted on a federal level, usually only significant projects that threaten a highly adverse effect on the environment are eligible for an assessment. The two types of environmental assessments include assessment by a responsible authority (by the Agency) and an environmental assessment by a review panel (by the Minister of the Environment) (CEAA, 2012). While follow-up procedures are mandatory for all projects assessed by a comprehensive study or review panel, unfortunately, the follow-up process is optional for projects assessed by a screening done by responsible authorities (CEAA, 2012). A study done by Fitzpatrick and Sinclair (2009) demonstrates that "in other areas of the world, efforts to create a regional EIA framework aimed at coordination have been more successful" (p.259). This emphasizes how Canada's environmental impact assessment system is lacking in both coordination with jurisdictions and in the follow-up process. Perhaps the lack of follow-up and compliance monitoring at the Federal level has caused the provincial level to push aside follow-up procedures and initiatives as well, potentially leading to the lack of follow-up procedures and monitoring of minor projects and development in the Official Plans of the District of Muskoka. The following paragraph details initiatives the province has undertaken to protect watersheds and shorelines in Ontario, though these initiatives are volunteer-based and not enforced by regulation.

Under provincial provision, authorities also play a major role in environmental stewardship, especially the Ontario Ministry of Natural Resources and Forestry (OMNRF), the Ministry of the Environment and Climate Change (MOECC), and Fisheries and Oceans Canada. In its best interest to protect water sources and their ecosystems, Fisheries and Oceans Canada has worked in collaboration with Cottage Life to produce mini booklets on waterfront stewardship in order to keep shorelines as natural as possible (Cottage Life, 2014). The OMNRF acts as the Provincial steward for forests, parks, wildlife, fisheries, aggregates, petroleum resources, compliance and monitoring of Crown Land, and watersheds (OMNRF, 2014). In relation to my research, the OMNRF manages biodiversity, natural heritage and protected areas, and water on a large scale. The MOECC also focuses on compliance and has environmental compliance officers but these are mainly for corporations involved with large projects involving the release of pollutants and/or waste. When addressing the environment, amendments to Plans go through the MOECC which are posted on the Environmental Bill of Rights Registry for comments. The MOECC then may make further proposal amendments (perhaps relating to monitoring policies).

The MOECC also monitors hundreds of inland lakes through the Lake Partner Program, another program of volunteers that monitor water quality (MOECC, 2014). The OMNRF oversees its aforementioned domains through several strategies and regulatory processes such as Ontario's Biodiversity Strategy, administering the Conservation Authorities Act, and the Lakes and Rivers Improvement, the Endangered Species Act, and the Fish and Wildlife Conservation Act all while promoting stewardship (OMNRF, 2014). The OMNRF also has many partnerships with associations, organizations, and sponsors to protect and preserve the health of watersheds in Ontario (such as the Canada-Ontario agreement respecting the Great Lakes Basin) (OMNRF, 2014). Many times a project will be funded jointly on all different levels (Federal, Provincial, and local). An example of this is the Muskoka Inventory Project completed in 2009 which was funded by the Ontario Trillium Foundation, the OMNRF, the District of Muskoka, Fisheries and Oceans Canada for aquatic components, and not-for-profit programs such as the Environmental Systems Research Institute (ESRI) Conservation Program for software support (Muskoka Watershed Council, 2015). Along with these general federal and provincial initiatives, the next few paragraphs will narrow in on attempted monitoring efforts achieved in the past.

3.3 Works to Date

The literature conducted on monitoring and evaluation to date seems to focus on research methods involving past case studies and the identification of gaps between advice being proposed in literature and actual realities of planning departments in Ontario. The following literature review and case studies will exemplify these elements.

Since the introduction of the Intergrated Coastal Zone Management (ICZM) framework at the United Nations Conference on environment and development in 1992, an opportunity has presented itself to apply new ideas to a breadth of coastal and shoreline areas tackling parallel management and monitoring concerns in Ontario (Lawrence, 1997, p.93). Since then, the Great Lakes shoreline management policies and programs were born and thus came the initiation of provincial Shoreline Management Plans (SMPs). The Planning Act (R.S.O. 1990) outlines two broad policies regarding shoreline management: to regulate shoreline hazard setbacks and that further development of SMPs were to be initiated by Conservation Authorities (CAs). Accordingly, CAs started to develop advanced methods to increase levels of communication and cooperation with partners such as the Federal government, non-government agencies and interested citizens. However, shortly after this initiative begun, provincial funding and program cutbacks questioned the entire process and CAs were unable to continue with the Plans or provide support services for that matter (such as Plan inputs, shoreline area reviews, and

technical support). These services were important to landowners who were concerned about the protection of their shorelines and surrounding construction activities. Since CAs were unable to develop Plans, responsibility grew on local municipalities in the province to reflect on shoreline monitoring issues. Currently, Ontario politics are focused on cutbacks to government programs, staffing and services but it is evident that there is a need for monitoring as shoreline monitoring issues remain a concern. Perhaps this is an opportunity to change in the direction of collaborative management towards policy change? (Lawrence, 1997).

There have been numerous examples of successful collaborative management initiatives around the world. The following shoreline monitoring example illustrates the possibility and effectiveness of collaborative management, especially when resources such as funding are lacking. Milligan, O'Riordan, Nicholson-Cole and Watkinson (2009) conducted a case study in England on a coastal site in Norfolk. At the time, England was experiencing a change in shoreline governance and was in the process of creating a new tactic to work in partnership and coordinate more sufficient funding. The study focuses on the role of local residents being involved in the decision-making process of this shoreline governance change. Similar to the study previously discussed on the Great Lakes, a SMP for the coastal site was created for three timelines: present day (0-20 years), medium-term (20-50 years) and finally for the long-term (50-100 years). The SMP was created through a series of local workshops which was moderated by a conservation agency and further involved landowners, residents and other coastal users. The workshops were independently facilitated by the conservation agency and all interests were included in the study. Though SMPs were successfully created, the many choices between individuals with different objectives created tension between the group as the implications of certain management choices meant consequences to people's homes, properties and even personal lifestyles (Milligan et al., 2009). Therefore, making a decision on a pretentious issue such as creating a new shoreline monitoring strategy can be quite difficult among multiple stakeholders. The study concluded that there is a growing need to manage public expectations in such situations, that partnership in decision-making is valuable and important, and finally that new governance strategies for maintaining sustainable shorelines must be addressed. This leads to a pertinent question: How can society collaboratively work together and agree when attempting to introduce new policies?

The Peninsula Lake Association (PLA) is another example of an organization that practices collaborative management. The PLA has a Lake Plan program which consists of two main leaders who are in charge of implementation, and many volunteers who work towards the

same goal of enhancing the quality of Penlake. The plan sets out projects that need to be completed and allocates leaders to each. For 2014, the Association led projects for nine specific topics: a loon survey, working with partners, stewardship awards, shoreline re-vegetation, communication plan, water quality, invasive species, educational workshops, and shore stewards. Through open discussions, the Association continues to hold a strong relationship with municipal representatives, and the Township of Lake of Bays in Muskoka approved a recommendation in its Official Plan (OP) to consider adding in a Lake Plan involving the factors that were valued by lake stakeholders. Such values include water quality, appropriate property development, protection of natural habitat and historical features, protection of landscapes, protection of natural shorelines, and many more. PLA outlines that natural shorelines be kept through three main actions: (1) volunteer shoreline restoration projects and encouragement to property owners, (2) the timing and type of construction for docks and boathouses is properly communicated, and (3) increased setbacks and shoreline buffer areas. Therefore, the Association identifies actions relating to both land use planning regulations (OPs, zoning by-laws and site plan control) and stewardship (volunteer) actions in order to request an OP amendment with the Township of Lake of Bays. Communication remains constant with cottagers, visitors, contractors, youth, municipalities, real estate agents, awards, the media, workshops, tours, and potential partners. The intent here is to monitor development on the lake by contacting the municipalities to find out about potential major developments and by reviewing development applications within the watershed (Peninsula Lake Plan, 2001). This program seems to be somewhat successful in shoreline management, however, it is only applied to Penlake. This example raises the question of management directions for shorelines – essentially if shorelines should be managed by individual lakes or under a regional umbrella by OP policies.

Past case studies have been explored to exemplify the importance of long-term shoreline monitoring as well as identify trends and gaps in research conducted to date. The next section of the literature review will discuss major themes of current research in further detail with support from additional case studies.

3.4 Major Themes of Current Research

Throughout the reviewed literature, there seems to be five main trends. The first trend entails that more participation from a variety of stakeholders is required to make decisions in shoreline monitoring. The second trend is the fact that there is an obvious lack of resources to accomplish successful long-term shoreline monitoring in Ontario. The third trend is a question of

an effective monitoring framework and range of indicators in which to monitor. The fourth trend displays long-term monitoring as a forgotten and un-prioritized stage of planning. The fifth and final trend found in the conducted literature review showed that further research and leadership in monitoring initiatives is needed in order for long-term shoreline monitoring to be successfully maintained in the province. The following paragraphs will go into further detail on these five trends.

3.4.1 Participation

As discussed in many of the case studies presented, there is an obvious need to involve local communities to participate when establishing distinct goals to carry out a beneficial vision for changing shorelines. It has been discussed that SMPs are a great strategy within the province, however, more public involvement is needed in combination with these SMPs. Though successful local shoreline monitoring strategies have been put in place, as shown in Lake Simcoe, the collaboration of shoreline management and cooperation by several stakeholders must be practiced further in Ontario. In summary, it is evident that shoreline management should be more transparent in decision-making and participation.

3.4.2 Lack of Resources

Hoernig and Seasons (2004) stress that application towards monitoring in regional and local planning practice is scant. The reason for this can be seen in the literature reviewed as well as the research conducted for this paper. The authors express that there is a general lack of resources dedicated to long-term shoreline monitoring in Ontario. These resources include money, time and skills. Seasons (2003) states that policy is formed on performance and productivity that actually requires proper monitoring and evaluation but this cannot be completed due to lack of funds. Hoernig and Seasons emphasize that monitoring involves resource-intensive efforts along with a long-term investment. In the Great Lakes example, it was shown that funding cutbacks often occur to programs, services and staffing on areas such as monitoring that are not necessarily a first priority. Unfortunately, the need for monitoring is especially strong as Ontario's population and development continues to increase (Hoernig & Seasons, 2004).

3.4.3 What Defines an Effective Monitoring Framework?

In the same article published by Hoernig and Seasons (2004), the authors discuss how monitoring cannot be a separate item. The authors argue that both knowledge and action must go hand in hand. Their work examines the way indicators and monitoring processes can be viewed and applied. As it currently stands, there is no formal structure of a monitoring

framework in the province and as such, the range of indicators to monitor is unknown. Hoernig and Seasons (2004) further argue that since planners take a community-wide approach in their work, any efforts to monitor also comes with the daunting task of determining how to monitor conditions as well as its changes.

Unfortunately there is currently no universal solution to the challenge of how to gauge monitoring. “The whole question of indicators and their measurement, interpretation and comparability became and remains an area of intense debate” (Elmsford, 1973, p.263). Hoernig and Seasons (2004) have proposed three key indicators and four core approaches to tackle long-term monitoring in North America. The three key indicators include: the economic, social and environmental spheres. The authors point out that environmental factors may be the strongest indicator of our generation meaning that the majority of North America’s population is most concerned about the natural environment. Firstly, the authors debate that there has been lost confidence in the usefulness of social indicators as they have failed to resolve social policy conflicts in the past. Secondly, the authors discuss how economic indicators have numerous limitations such as the inability to encapsulate the different mechanisms of the economy and the fact that the economy is constantly changing. The authors continue to debate that the use of environmental indicators in North America is growing because of industrialization and the consequences of urbanization. The four core approaches offered for monitoring include: Adaptive Management, Environmental Impact Assessment, Pressure-State Response (PSR model), and State of Environment (SOE) reporting. The authors also offer that an analysis of existing development proposals will complement these four approaches. Together, Hoernig and Seasons believe that these indicators and approaches will satisfy economic, social, environmental, sustainable and healthy communities in addition to quality of life. In allowing the human, environmental, and political causal links to come together, essentially this proposal will overall produce a wholesome monitoring strategy (Hoernig & Seasons, 2004).

The article exhibited two examples of real monitoring frameworks. The first framework rooted from a regional exercise in the Buffalo-Niagara region which occurred back in the late 1990s when efforts were undertaken to improve regional planning and collaboration. The Regional Information Network, a team of eleven locally-admired leaders, was created to assist with regional growth and the understanding of program measurement. These leaders worked with task force alliances of various backgrounds to create key monitoring indicators. Each task force investigated one of the eleven regional concerns: “economy, environment, government, education, technology and information, health, public safety, human services, equity, planning

and land use, and regional assets" (Hoernig & Seasons, 2004, p.93). Monitoring results have been published in baseline reports for the region which summarize chosen indicators, efforts made and future challenges. The second framework rooted from the 'Performance Monitoring in the Planning System'. This was one of three municipal performance initiatives launched by the government (the Ministry of Municipal Affairs and Housing) to progress towards provincial and OP policy goals, and voluntary monitoring as well as streamline responsibility within planning departments. Significant indicators were chosen by a group consisting of municipalities, ministries, academics, and related organizations. Seven municipalities in Ontario led this initiative to run a trial on the usefulness of the indicators. Most municipality representatives found these indicators useful but a common response was that there was a lack of data on the topic. A summary report was also created for this study to demonstrate and support the use of indicators in the future including the tool's strengths and weaknesses. Unfortunately a change in provincial government put a halt on this initiative, another gauge as to why resources are imperative in policy change (Hoernig & Seasons, 2004).

3.4.4 Monitoring as a Non-priority Planning Stage

Seasons (2003) details that most monitoring in planning applications are usually only associated with particular processes. For example, monitoring is usually incorporated with growth management policies, sustainability evaluation and when reviewing suitability of municipal plans. As previously stated, there is no universal solution to monitoring and therefore it is a known fact that planners do not monitor their activities in a consistent manner. In addition, Seasons (2003) further stipulates that many plans simply cannot implement monitoring because the goals and objectives in the policies themselves are too vague. Furthermore, research has shown that organizations are reluctant to change mostly to avoid criticism from the public and so they remain content with present circumstances even though studies have shown that some planning departments are receptive to monitoring. A case study conducted by Seasons interviewed eleven municipalities in Ontario: the Regional municipalities of Niagara, Durham, Peel, Halton, Hamilton-Wentworth, Waterloo, York, Ottawa-Carleton, Haldimand-Norfolk, Sudbury, the District of Muskoka, City of Toronto, and the Counties of Huron and Oxford (Seasons, 2003). In his research, Seasons found that these planning departments do use quantitative indicators as part of monitoring (such as censuses, municipal assessment records, development applications, and surveys, etc.). Further, Seasons found that a small number of regional municipalities actually combined quantitative monitoring techniques with qualitative indicators which included social traits such as feelings, values, and perceptions about municipal government success with projects, policies, and goals in planning. Although this study showed

that municipal planners understand the importance of monitoring, many planners find it very difficult to implement due to several factors already discussed in this paper (lack of time, funding and skills). Therefore, monitoring will continue to be a difficult strategy to implement.

3.4.5 Further Research Needed

The examples in Buffalo-Niagara Region and performance monitoring suggested that more attention is needed in the design and development of land-use policy monitoring so that outcomes can be best used by policy decision-makers. It was also found in these studies that further research on municipal planning and monitoring indicators in general is needed. More specifically, further research is needed on incorporating monitoring with specific planning policy areas rather than broad areas (such as growth management policies, sustainability, etc.). Such specific policy areas could include downtown revitalization and shoreline management.

This section reviewed common themes in current shoreline monitoring research on a local and regional level through several case studies. The following section will expand on these themes by investigating shoreline monitoring research specifically conducted in the District of Muskoka.

3.5 Long-term Shoreline Monitoring in the District of Muskoka

The current research and knowledge base regarding long-term shoreline monitoring in Muskoka revolves around two trends: the link between public participation and decision-making, and endorsement of the mutual awareness towards the lack of monitoring plans in local policy documents. Several concepts in this research reiterate the major themes that were found in current research on monitoring in general.

3.5.1 Public Participation and Decision-making

As previously discussed and shown in the case studies presented in the literature review, involving participation and input of local communities and stakeholders is a crucial component of developing successful policies for implementation. This is especially true with a pretentious issue such as monitoring developed shoreline properties. Hunsberger (2004) lists similar goals as this research paper in that citizen monitoring programs in Muskoka will hopefully have recommendations be integrated into bylaws, the watershed report card will inform future development planning and decision-making, and shoreline monitoring will contribute to a perception of long-term change. In 2004, Carol Hunsberger studied the link between citizen environmental monitoring and decision-making focusing on three Ontario case study examples. Firstly, Hunsberger verifies the importance of long-term monitoring. The author discusses that

monitoring is important because it involves coordination of various groups, and it is an endeavour to not only measure but also monitor quality of life in a specific area while creating a long-term monitoring platform that offers local information and comparative statistics. Hunsberger (2004) further stresses the importance of a long-term monitoring platform in a seasonally-popular region. Contrarily, the author also stresses that both enablers and obstacles most definitely exist when involving citizens in processes such as monitoring (p.49) (**see Table 6**). The author and interviewees admit that in reality more obstacles than enablers exist when combining citizen monitoring and decision-making.

Table 6: Enablers vs Obstacles of Citizens in Monitoring

Enablers	Obstacles
• General agreement on importance of environmental protection in Muskoka (citizens and municipal governments) • Many retired volunteers with expertise, political influence • Higher-income demographic means funding is available for monitoring (e.g. through cottagers' associations) • Good communication between stakeholder groups (some members have multiple roles)	• MLA program too new for data to be applied • Slow uptake – data may not be applied for 5-10 years • Report card still being developed • Resistance to standardization from some groups that work independently • Some groups reluctant to share data

Source: Hunsberger (2004, p.65)

The article also supports the common research theme of unknown components of an effective monitoring framework. Some interviewees indicated "for methods that were developed within the community, interviewees in Hamilton and Muskoka stated that exposing these methods to scientific peer review through academic publications or presentations helped to build recognition for locally generated protocols" (Hunsberger, 2004, p.79). In other words, indicators could be established much easier if published and communicated. Hence the importance of building the knowledge base of long-term monitoring. Other interviewees in Muskoka had thoughts of fixed ideal characteristics instead of examples of successful plans such as focusing on coordination, rigour and organization. This was posed as some interviewees' pictured differing monitoring frameworks throughout the province and so sharing data with a compatible database would be key to successfully engage citizens in monitoring.

A lack of resources seems to be a recurring theme when deliberating on the topic of monitoring in Ontario. In Hunsberger's (2004) article, one interviewee in Muskoka suggested that the level of available funding affects the choice of programs that an organization pursues; if

little funding is available, then low-cost monitoring programs such as wildlife watching may be chosen over more technically advanced programs. Hunsberger states that taxes in the region are not currently set up to fund monitoring activities. Similar to other case studies presented, interviewees in Muskoka also identified lack of staff time and available resources as a barrier of effective partnership building between governments and citizen monitoring groups (Hunsberger, 2004).

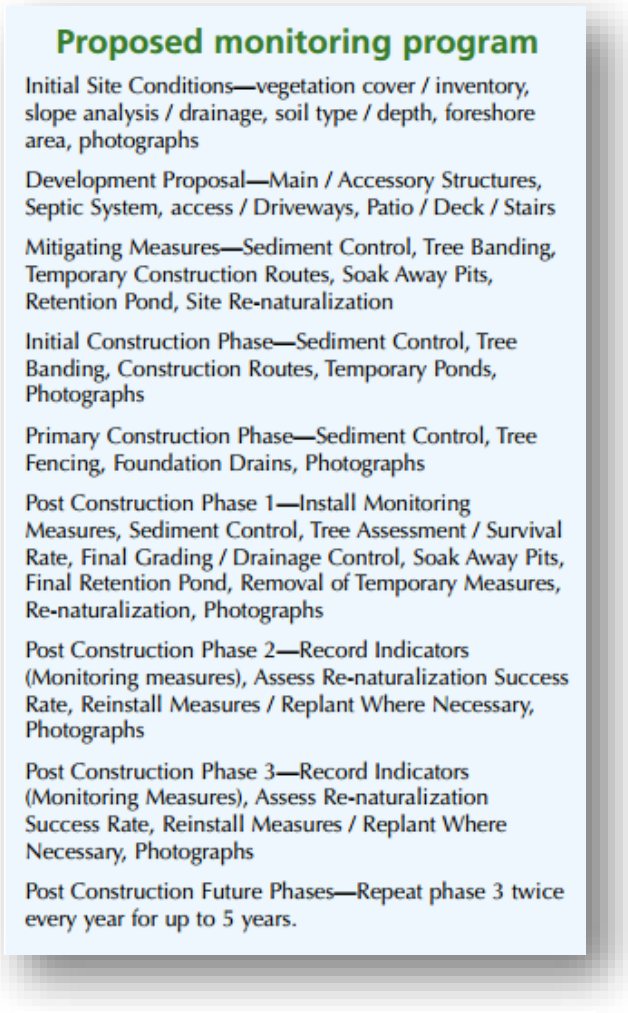
Similar to Seasons' (2003) article, interviewees in Muskoka described a general agreement between local governments and citizen organizations on environmental priorities and monitoring programs. Hunsberger attributes this to a superior level of understanding in terms of environmental health by citizens as well as the local governments' willingness to protect the northern environment. It was pointed out that cottager's associations have more money to devote to monitoring programs than municipal or regional governments. The challenge here is that groups operating independently are now being confronted by the District to adopt compatible research methods to advance towards a joint framework with townships and towns. "As well, in the absence of established thresholds and clear connections to existing decision making frameworks, it can be difficult to link long-term monitoring results to specific actions to mitigate or prevent environmental damage" (Hunsberger, 2004, p.86). This quote further substantiates previous claims regarding the importance of a standard set of indicators and a universal monitoring solution in Ontario.

While Hunsberger communicates that public participation and monitoring should work in unison to establish monitoring programs, the author also describes that the link between citizen monitoring and decision-making is weak in Muskoka as no results have come about between the two thus far. This research recommends that monitoring initiatives go past this level, involving citizens in actual decision making processes including agenda setting. Created partnerships in ecological monitoring should be based on power sharing that enables citizens to play an important role in terms of influence and authority. The last apparent theme of this research is that mutually beneficial partnerships can only be realized if all parties agree on a set of compatible priorities, commit to following orders, and are dedicated to applying the outcomes of monitoring efforts alike (Hunsberger, 2004).

3.5.2 Monitoring Plans Needed in Local Policy Documents

As previously stated, though initiatives are being practiced by citizens and non-governmental organizations (NGOs), municipalities do not integrate long-term monitoring as a condition of development approval on shoreline properties in Muskoka. In an article titled "Long-term Site Monitoring", Fahner and Janas (2013) argue how site monitoring is not being adequately addressed in cottage country. Furthermore, the authors comment on the environmental impacts of development along shorelines and propose a strategy for long-term sustainability. Noteworthy environmental impacts of development on shorelines include soil erosion, increase in stormwater runoff, a reduction in water quality, and impacts to wildlife habitat. In addition, development can also result in social influences such as visual impacts, a rise in pollution and a loss of landowner privacy. Fahner and Janas (2013) argue that establishing mitigating measures is just as important after construction as it is during. The authors describe how the usual means to control development on a property is through a site plan agreement in the District of Muskoka, though not all development proposals are subject to site plan control. As it stands today, changes in development and non-compliance of site plan agreements on shoreline properties are solely complaint-driven. Like the local townships and towns, the District's OP does not have long-term monitoring policies in place. The authors state that as soon as construction and plantings of a shoreline property are complete, additional supervision to monitor the property of successful upkeep of site plan agreement requirements does not exist. Similar to current research themes in this

Figure 1: Proposed Monitoring Program



Source: Fahner and Janas (2013)

paper, the authors of this article also blame lack of resources for the lack of long-term monitoring policies (expertise and more staff to be exact) (Fahner & Janas, 2013).

The article proposes that first and foremost, long-term monitoring policies should be introduced into planning documents which can then be exercised through conditions of approval and site plan agreements. It is also proposed that a security (similar to the security taken for construction and planting measures) be taken for a long-term monitoring plan to be followed by the landowner. Moreover, Fahner and Janas (2013) propose that a monitoring plan should exist not only during construction but upon completion of construction for up to five years. **Figure 1** (previous page) is a detailed plan of the authors' proposed monitoring program in Muskoka. The authors suggest that monitoring tasks be recorded into a report twice every year with the inclusion of photographs. The authors believe that a long-term monitoring plan such as this which enforces a routine habit will eventually lead to long-term environmental sustainability in cottage country (Fahner & Janas, 2013).

3.6 Collaborative Management

3.6.1 Multi-party Monitoring

This paper has discussed the possibility of collaborative management to solve monitoring challenges as well as the importance of public participation in decision-making processes. Following Fahner and Janas' case study above, how does one introduce and successfully implement new guidelines into policy documents?

In an article by Milne, Rosolen, Whitelaw and Bennett (2006) it is stressed that collaboration of multiple organizations to carry out monitoring is becoming common. The authors conclude that a standardized monitoring system is needed, and that ecological stressors must be focused on in Ontario – similar to trends in other research. Furthermore, Milne et al. (2006) expresses that equity must be present between all stakeholders in the consensus building process and most importantly, that resources are available to properly perform monitoring tasks. The article concludes with the idea that these types must be better linked to decision-making and policy development to tackle environmental issues. In response to the question of who should fund citizen monitoring programs, interviewees from Hunsberger's study who were involved in citizen monitoring initiatives provided a range of suggestions. Most popular was the idea of continuous funding from several levels of government with contributions from federal, provincial, and local agencies. One interviewee described a funding model that would be based on an arrangement of provincial and federal funding, while another felt that the

provincial government should be responsible for funding environmental research. Another idea was to adjust municipal taxes to include an explicit category for environmental initiatives. This system has already been implemented to pay for a program of septic inspections in the Township of Lake of Bays (Hunsberger, 2004).

On the positive side, this Hunsberger's research suggests that monitoring can be conducted in a way that is applicable to decision making if citizen groups and decision makers agree in advance on collective needs as well as how these needs can be achieved. These recommendations suggest that research on monitoring is most applicable in the decision-making process if stakeholders agree on what problems are relevant and useful, and if results can be linked to action.

Ultimately, it is up to landowners in combination with local municipalities and authorities to start an effective shoreline monitoring strategy. In order to achieve implementation of an effective shoreline management and healthy watershed strategy, it is important to identify best practices that will provide for optimal outcomes. Currently in Muskoka an education and awareness strategy exists with support from communities and organizations who share the same values. Still, this strategy is not working to improve compliance, therefore, new strategy(s) must be developed between multiple stakeholders.

3.6.2 Advocacy Coalition Framework

As planning policy continues to evolve due to changes in beliefs and circumstances, an in-depth understanding of how these changes occur is important. There have been numerous studies done on understanding policy change, of which most studies either analyze the process theoretically, or through examination of a specific case study. One theory that explains policy change is the Advocacy Coalition Framework (ACF), termed by Paul Sabatier and Hank Jenkins-Smith (Sabatier & Weible, 2007). The ACF revolves around the idea that policy change results from clashes of various systems of beliefs (Jenkins-Smith & Sabatier, 1994). In this theory, policy change is best envisioned through policy subsystems in the sense that different groups collaborate to pursue change in government decisions regarding a certain policy matter (Sabatier, 1988). Before diving into the structure of the ACF, it is important to have an understanding of some of the framework's strengths and weaknesses.

The four key strengths of the ACF found in conducting a literature review are as listed: application, knowledge, and two important aspects of the belief system. The four key weaknesses found were conflict, self-interest, applicability in political systems, and a lack of

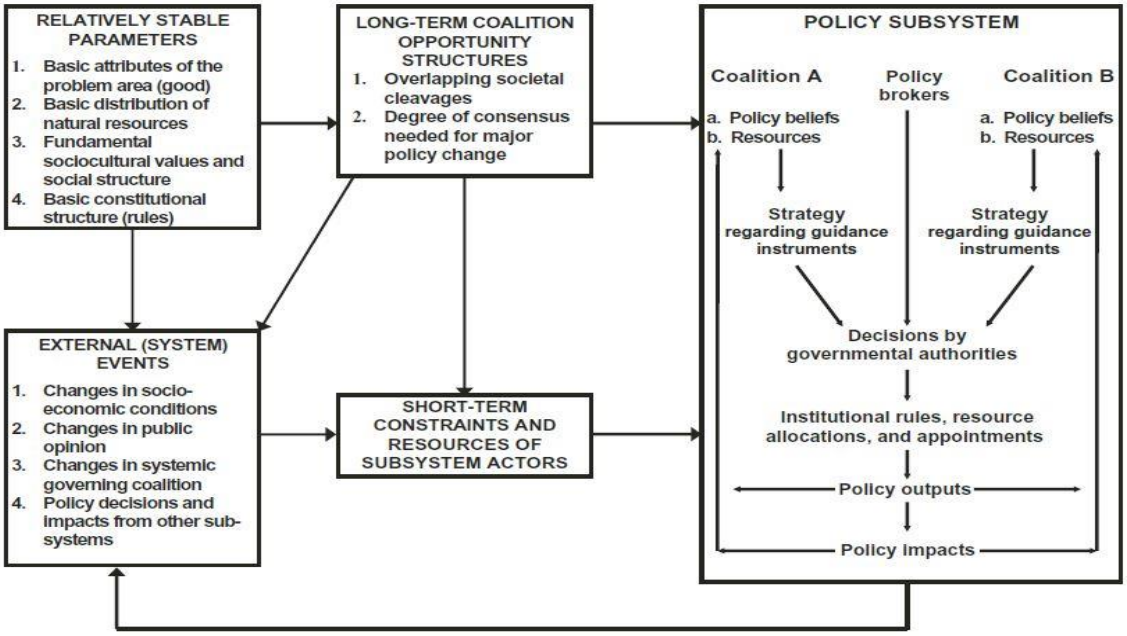
research done on numerous aspects of the ACF (which was the most prominent weakness throughout supporting literature) (Weible, Sabatier & McQueen, 2009). Many weaknesses of the ACF are shared with decision-making and changes in the planning system in that conflict can easily arise and there is a lack of research. Despite these weaknesses, the structure of the ACF still proposes a fitting solution to implementing a monitoring framework in Muskoka.

The structure of the ACF classifies beliefs into a hierarchy of three categories: deep-core beliefs, policy-core beliefs, and secondary-aspect beliefs (Jenkins-Smith & Sabatier, 1994). Starting at the top are deep-core beliefs which includes normative and ontological beliefs (i.e. the alleged make-up of humans) that persists through all areas of policy. Beneath deep-core beliefs in the hierarchy are policy-core beliefs. Policy-core beliefs also persist through all areas of policy as they signify normative obligations of a coalition in three ways. First, these beliefs include values such as the significance of ecological preservation versus economic development in long-term monitoring (Weible, 2005). Second, they include the opinions on the root of the issue, and finally they include the recognition of core values in the subsystem (Sabatier, 1988). Policy-core beliefs are known as the bonding force of all the coalitions. At the bottom of the hierarchy are secondary-aspect beliefs. These beliefs are opposite on the spectrum in this hierarchy of beliefs in that policy-core beliefs are largely resistant to change while secondary-aspect beliefs can adjust to change relatively quickly since they include beliefs that are less limited and focus on the views of specific issues in the policy subsystem (Sabatier, 1988).

Each coalition develops a plan in an effort to modify the behaviour of a government organization to conform them to its policy goals, at any point in time (Sabatier & Jenkins-Smith, 1993). This is where conflict can arise from different coalitions, and is also where the policy broker comes in. Similar to the modern day planner, the policy broker acts as a mediator in order to find some common ground and eventually reach a compromise between all coalitions, which can be observed in **Figure 2**. Eventually, these compromises lead to new or modified policies through government programs (Sabatier, 1998). Policy brokers contribute to cross-coalition learning in that two or more coalitions compromise to form an agreement. Weible, Sabatier and McQueen establish nine circumstances in which the probability of policy change through cross-coalition learning will be influenced: “a hurting stalemate, effective leadership, consensus-based decision rules, diverse funding, duration of process and commitment of members, a focus on empirical issues, an emphasis on building trust and a lack of alternative venues” (Weible, Sabatier & McQueen, 2009, p. 124). The District of Muskoka has most, if not

all, of these listed circumstances. Therefore, probability of policy change through coalitions is likely.

Figure 2: The 2007 Advocacy Coalition Framework Diagram



Source: http://journals2.scholarsportal.info.subzero.lib.uoguelph.ca/tmp/14168550843906274238.pdf

A long-term monitoring strategy could be applied through the ACF similar to the example demonstrated by Olsson (2009). Olsson conducted a case study in Orebro, Sweden which essentially underwent a policy change by transforming a run-down area into a nature reserve. Olsson (2009) demonstrated how much beliefs and values can take a toll in decision-making. In short, a coalition of exploiters (who wanted to develop the area) competed with a coalition of environmental activists (who wanted a nature reserve), both coalitions having completely different beliefs. However, the coalition of environmentalists eventually were able to more heavily contribute to the decision-making and implement their values, taking over the role of the local planning committee. Damaged development sites on Muskoka's shorelines could be transformed back to its natural state (almost) through site re-naturalization steps after development is completed.

Of course, it is not that easy to change policy, but the ACF provides a logical reasoning and method to how these sorts of changes could perhaps come about more frequently. In the example used by Olsson (2009), it is stressed that context is a significant factor in the success of policy change, aside from beliefs and values. For example, at the time the run-down area in

Sweden was being examined, the planning committee was interested in implementing ecological values into the development project and Sweden was experiencing an economic decline. At one point in time, the planning committee and environmental coalition were actually working together. Thus, this particular area was vulnerable to change and these factors acted as a gateway for environmentalists to act fast. Other factors came into play as well such as the fact that the environmental coalition knew the region very well and had worked there for many years, and certain people were chosen to make important decision within this coalition (which had more power). Perhaps this method could be effective when the District of Muskoka is vulnerable to change (such as experiencing economic hardship) and environmental concerns are rising more than ever. Environmental coalitions in Muskoka are already in place such as the Federation of Ontario Cottager's Association, the Muskoka Water Web, and Muskoka Conservancy who are continually working to find ways to preserve the region's natural resources.

It is examples like this that lead to the believable theory of ACF and the convinced opinion that the ACF is in fact a useful theory not only for policy change, but especially for certain types of planning problems such as long-term resource monitoring.

Future research on the ACF will definitely increase an understanding as well as the validity of the theory. Perhaps the weaknesses outlined can be used as future research goals for this framework, and unknown questions and gaps in the theory can be satisfied. In addition, if the most prominent weakness of the ACF (lack of research) is addressed, a deeper understanding of policy change could result and the theoretical framework of advocacy coalitions would have the chance to transform into a practicing method.

It is hoped that a similar approach to ACF can be executed to implement a long-term shoreline monitoring strategy into Muskoka's OP. As discussed in the next section, various systems of beliefs on monitoring exist in Muskoka and these could very well come together to adopt policy change. In regards to monitoring, deep-core, policy-core, and secondary-aspect beliefs all exist in Muskoka such as values to maintain Muskoka's character, a common belief to continue to preserve the District's natural environment, and a shared opinion that follow-up on ecological programs is needed. The missing component here is mutual collaboration between these groups in order to drive change in policy. Though the ACF provides a solid platform to base a long-term shoreline monitoring strategy off of, there are many unanswered questions pertaining to the framework and more research would need to be done in order to utilize this framework in Muskoka to direct policy change.

3.7 Significance of Research

This literature review justifies a dire need of attention to review long-term shoreline monitoring and an immediate need to implement long-term strategies. The research conducted in this paper was chosen in deference to the population and development growth that Muskoka is currently experiencing. Like Muskoka residents and seasonal visitors, the Researcher also observed that larger developments occurring on Muskoka's shorelines are adversely transforming the shoreline's natural characteristics. Research methods chosen for this paper are based on previous methods used to study monitoring. Previous methods would include literature and document reviews, semi-structured interviews and case studies. This paper will further contribute to the current state of knowledge, research base, trends and performed work in the field of long-term shoreline monitoring. Contributions to this topic are especially important in light of findings that not enough research is available on the topic of monitoring. Furthermore, the paper will outline all aforementioned contributions in the context of three rural waterfront municipalities in the District of Muskoka which is expected to experience continued growth within the next decade: the Town of Gravenhurst, the Township of Muskoka Lakes and the Township of Lake of Bays.

The literature review raised some key questions for future research pertaining to monitoring:

1. How do elected decision-makers perceive citizen monitoring groups in terms of their capacity to contribute knowledge to decision making?
2. How can decision-making be shared between the government and citizens?
3. How can ownership of property and shoreline impacts be combined so that it doesn't impair enjoyment of property or infringe on public right?

An extensive literature review has been done on current long-term monitoring research to date. In order to understand unknowns and gaps in research and the topic of long-term monitoring in a local context, current initiatives in Muskoka must be investigated. The next section will explore the strengths and weaknesses of current long-term monitoring initiatives within the District.

4.0 CURRENT LONG-TERM MONITORING INITIATIVES IN MUSKOKA

As outlined in **Table 7**, current monitoring initiatives are restricted primarily to water quality as the determinant of Muskoka's shoreline and watershed health. Shoreline development activity is measured within the region through the Shoreline Stewardship and Lake System Health programs by creating Muskoka Watershed Report Cards and Shoreline Land Use Surveys. The table offers a summary of five key monitoring programs along with their objectives and initiatives. The report cards and land use surveys will be further investigated and followed by commentary to stress the importance of development as an indicator of shoreline health.

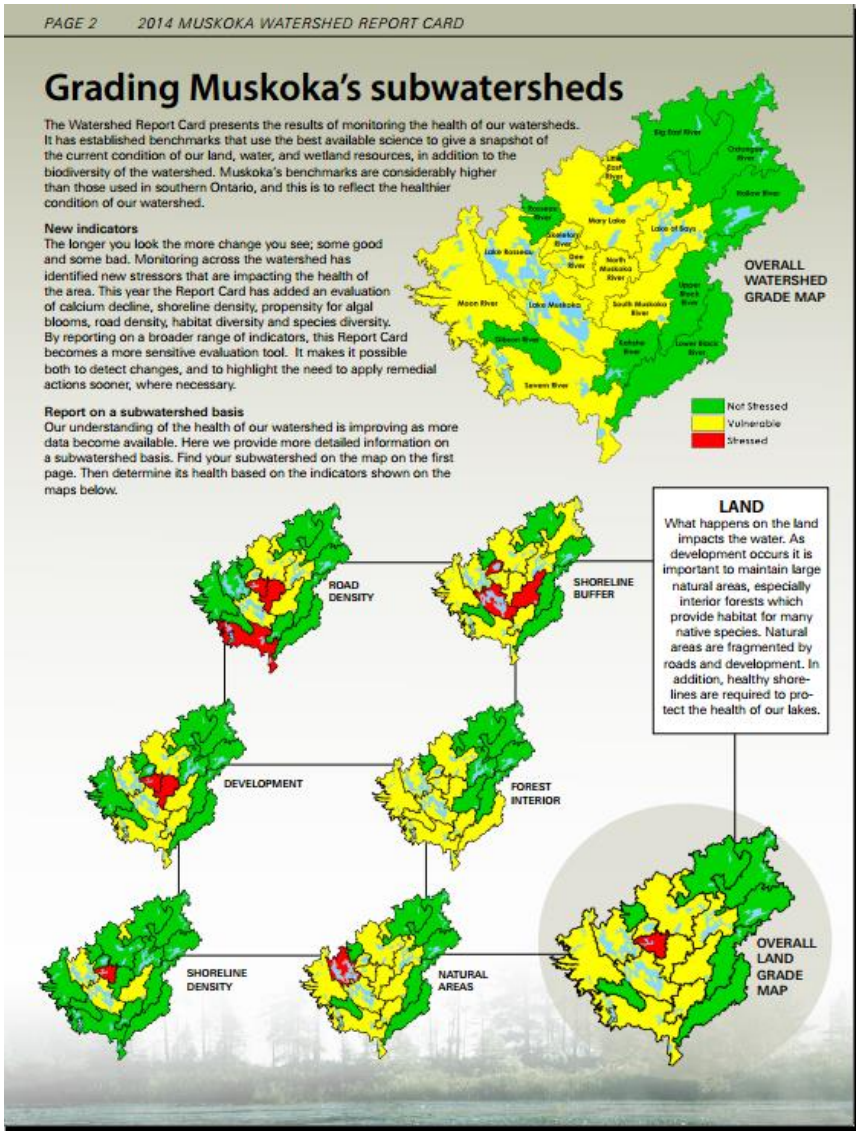
Table 7: Current Long-term Monitoring Initiatives in Muskoka

Program and Authority	Objectives	Initiatives
Shoreline Stewardship Program Ontario Trillium Foundation Muskoka Conservancy Muskoka Lakes Association (MLA)	-OTF awarded $113,000 to the Muskoka Conservancy to provide solutions to shoreline issues over a two year period and to create a continuing shoreline stewardship program -Raising community awareness of water quality issues and shoreline management strategies -Improve Muskoka's shorelines, wildlife habitat, limit development impacts on shorelines and encourage landowners to focus on shoreline restoration	-Water quality monitoring/reporting by MLA volunteers -Landowner workshops on solutions to shoreline issues -Site visits to privately-owned shoreline properties to offer recommendations -Community shoreline restorations -Annual symposium 'Working Around Water' -Muskoka Watershed Report Cards
Lake System Health Program District of Muskoka Muskoka Water Web	-To protect Muskoka's water resources -continues/enhances education on lake health, stewardship efforts and monitoring	-Lake health monitored by water quality testing, shoreline surveys, technical assistance -Growth assessment for lakes only based on acceptable threshold for phosphorus levels -Stewardship brochures ('Protecting Muskoka's Water, 'Guide to Healthy Shorelines', etc.)
Lake Partner Program Ministry of Environment and Climate Change	-To protect the quality of Ontario's inland lakes	-This water quality monitoring program began in 1996 when the MOE, the Federation of Ontario Cottagers' Associations and the Lake of the Woods District Property Owners' Association collaborated (MOECC, 2014). Water quality is monitored by volunteers out of the Dorset Environmental Science Centre. Data reports published annually and posted on the program's website.
Love Your Lake Program Ontario Trillium Foundation Watersheds Canada Canadian Wildlife Federation Fisheries & Oceans Canada	-To encourage communities to preserve their shorelines and monitor watershed health	-Also funded by the OTF, this program focuses on lake health and stewardship providing resources and training to landowners. Each waterfront landowner receives a written report of an assessment of their waterfront and actions towards lakefront protection if lake associations volunteer their lake to participate in the program.
Compliance Audits Local Municipalities	-To ensure long-term compliance of site plan agreements	-Conducted upon implementation of the Development Permit System in Lake of Bays (2006), staff and Council approved development applications only if shoreline buffers were maintained/established. Also conducted if a township receives a high number of site plan applications in a given year.

4.1 Muskoka Watershed Report Cards

As identified in **Table 7**, the Muskoka Watershed Council also appears to be pursuing institutionalization of citizen-informed monitoring through the development of its Watershed Report Card (**Figure 3**), an ongoing initiative. The Muskoka watershed report card and nineteen sub-watershed report cards communicate the state and ecological health of the region's water, wetlands, land and biodiversity. The MWC publishes a watershed report card every four years which outlines the condition of water quality, wetlands, biodiversity and natural areas in Muskoka as well as stresses the need for good monitoring and research. To reach watershed health results and connect to monitoring, benchmarks are established to measure conditions. Indicators used by the MWC are any stressors influencing the health of the watershed. The indicators used include: algal blooms, road density, habitat diversity, calcium decline, shoreline density and species diversity. The MWC believes it is important to account for a more comprehensive list of indicators, making it more effective for evaluation as changes can be detected in addition to remedial recommendations. The report card displays an inclusive land grade map as the MWC aims to stress the importance of development which is what heavily influences shorelines and water quality. In showing this, the MWC underlines that the upkeep of large natural areas and healthy shorelines is key (Muskoka Watershed Council, 2015a).

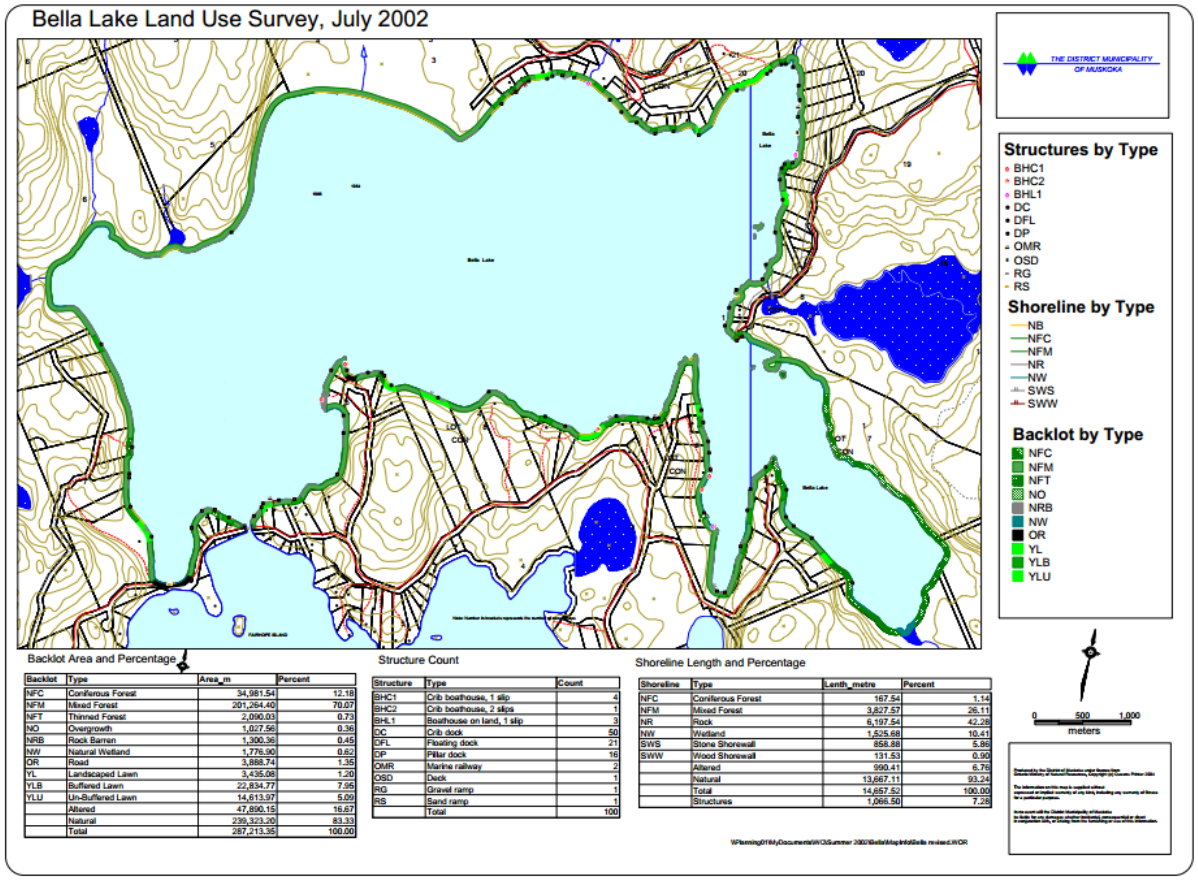
Figure 3: Example of 2014 Muskoka Watershed Report Card



Source: Muskoka Watershed Council (2015a)

4.2 Shoreline Land Use Surveys

Figure 4: Bella Lake Land Use Survey



The shoreline land use survey is a data collection method added by the MWW in 2002 to add to the lake data sheets which solely focus on water quality (see **Appendix B** for example of Bella Lake Data Sheet). The survey shows shoreline vegetation, structures and the first twenty metres of land along the shoreline. As an example, Bella Lake was tested by MWW in both 2002 and again in 2013 (MWW, 2015b). In 2002, Bella Lake was comprised of 93% natural shoreline and 6% altered shoreline with a total of 58 structures on the lake. A sample of the Bella Lake Land Use Survey is exemplified in **Figure 4**. In 2013, Bella Lake data had changed to 86% natural shoreline and 14% altered shoreline. In 2007, a portion of Lake Muskoka was comprised of only 80% of natural shoreline and 20% of altered shoreline with 499 structures built on the shoreline just along Muskoka Bay alone. The other portion of Lake Muskoka surveyed (Muskoka River) had a low 56% natural shoreline, 44% altered and 355 structures along its shoreline (MWW, 2015b). As the shoreline survey data demonstrates, development on Muskoka's shorelines is increasing and shorelines are becoming less naturalized. Shorelines are an integral component of healthy ecosystems, biodiversity and the health of lake water. It is a must that landowners ensure that shoreline development is properly controlled and that buffers remain an active component of each shoreline property.

Source: Muskoka Water Web (2015b)

4.3 Comments on Current Initiatives

As summarized in **Table 7,** so far growth assessment for inland lakes in Muskoka are only based on acceptable thresholds for phosphorus levels. However, so many other indicators such as shoreline surveys and stewardship education could be factored into growth assessments of waterbodies. Information included in shoreline surveys can be observed in **Figure 4** which includes development indicators such as shoreline structure types, type of shorelines, and type of backlots. In addition, the surveys provide total shoreline structure counts, backlot area percentages and shoreline length percentages. As Muskoka continues to experience population and development growth, these indicators would be legitimately useful for the District to assess shoreline growth on a local and regional level. Though the aforementioned programs continue to enhance education on lake health, stewardship efforts and monitoring, the programs primarily focus on present lake health and long-term thinking is not a part of mandatory legislation. The database of water quality, shoreline information and long-term trends are constantly growing yet this information is not used in legislation. Associations like the Muskoka Watershed Council, Muskoka Water Web and Muskoka Conservancy are not enforcement agencies but they do provide information to decision-makers and the general public on how to restore watershed resources. While education and awareness programs such as the LYLP are useful, once this program is finished, it is still up to the lake association or partner to ensure that landowners have taken proper action on stewardship and that an association has been made between individual properties and health of the associated lake. This is where further compliance strategies are needed, as well as collaboration of the community.

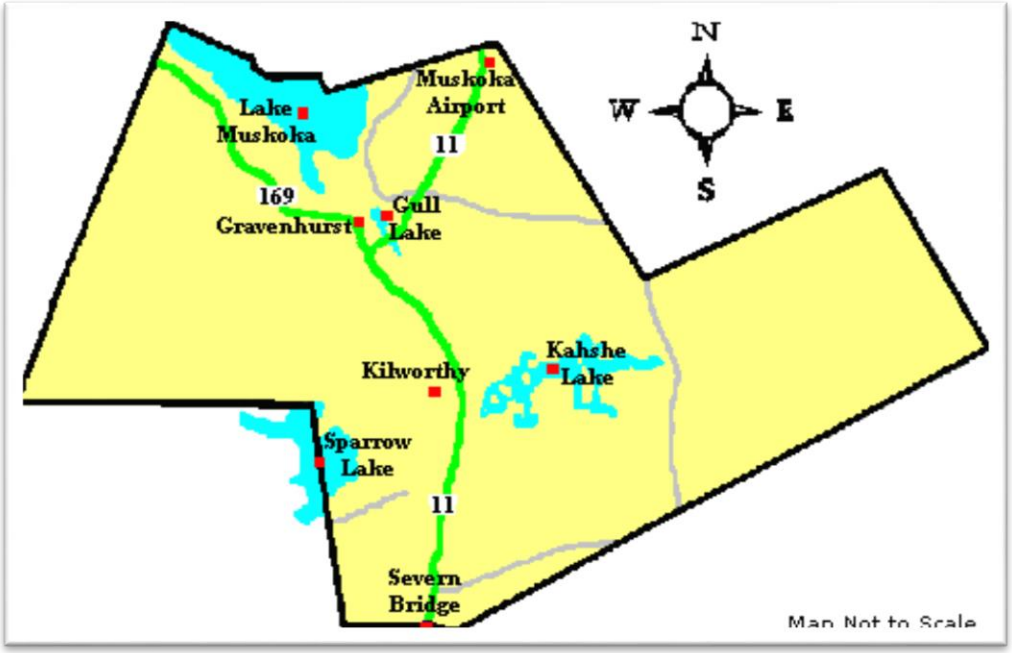
The Muskoka Water Web's online website has two sections relating to long-term shoreline monitoring: monitoring and stewardship. The monitoring section discusses how the MWC translates collected data into identified changes and trends over time. Even though not directly influential to legislation, the Council's programs somewhat attest to the effectiveness of District policies and programs. The Council claims that a long-term commitment to simple data collection strategy is better than a complex program which cannot be continued due to lack of resources (a common constraint discussed in relation to monitoring). In addition to its ongoing initiatives, the MWC organizes an annual 'Muskoka Stewardship Conference' in collaboration with the District. The conference is held to provide an opportunity for like-minded individuals to discuss lake and land stewardship as well as to create a networking place between the public and experts to share new ideas on stewardship. While MWC has a monitoring program in place, this program is specifically centred on lake water quality. More studies and data collection is needed on the general health of shorelines in Muskoka in relation to human activity and development.

Essentially, all mentioned stewardship programs which are currently offered in Muskoka are still voluntary and not mandatory for landowners. The programs are able to establish the importance of shoreline and water quality issues through site visits, seminars, and local media, but will they be able to instill and enforce this idea in landowners for the future?

5.0 CASE STUDIES

5.1 Town of Gravenhurst

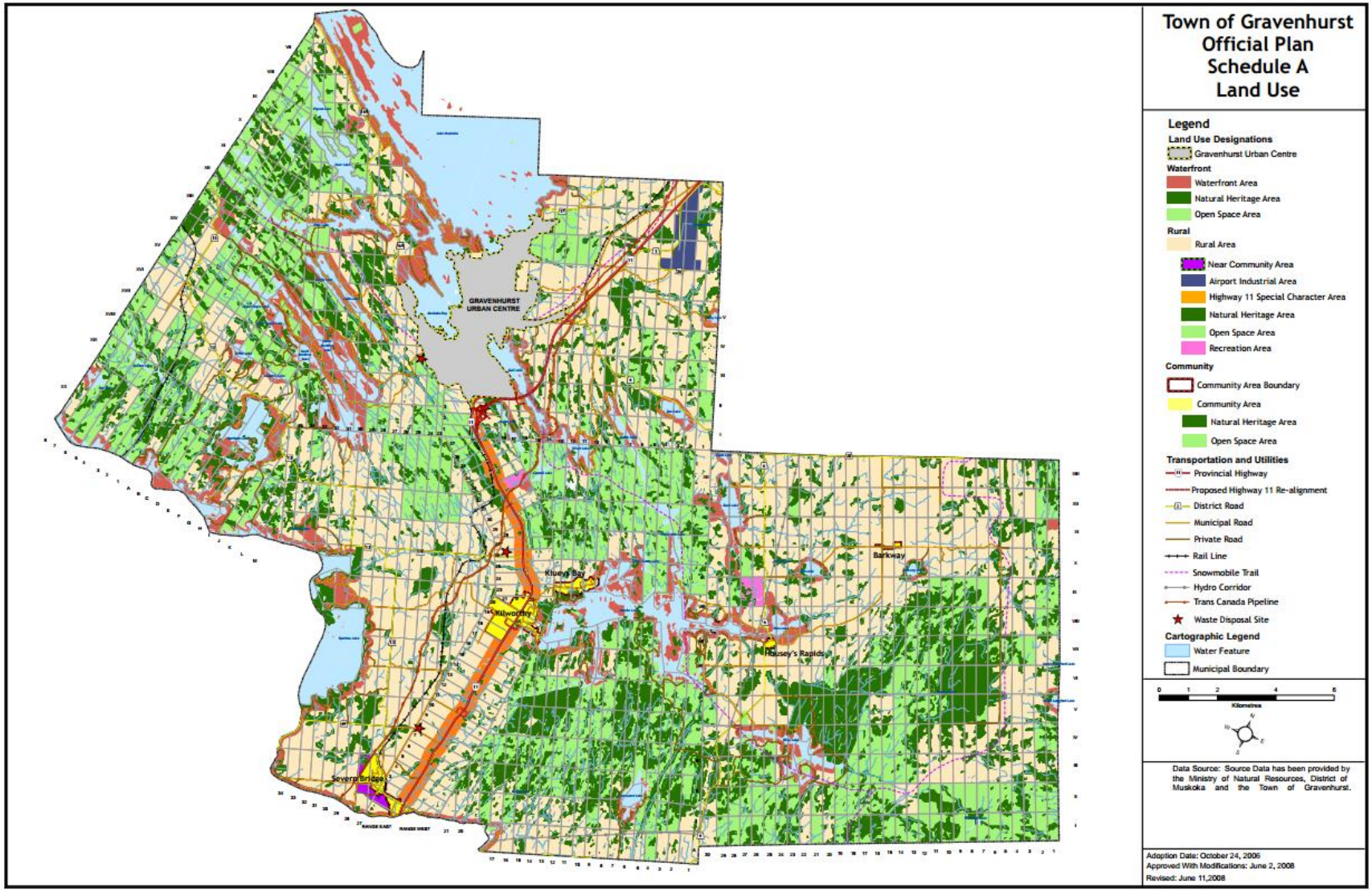
Figure 5: Map of the Town of Gravenhurst



Source: Visit Muskoka (2015)

The Town of Gravenhurst is a ninety minute drive from the City of Toronto and is home to a vibrant community rich in arts, culture, heritage and recreational facilities. The Town's total area is 518 square kilometres (Town of Gravenhurst, 2015, p.2). Gravenhurst is home to the Muskoka Wharf where the R.M.S. Segwun, the oldest operating steamship in North America, is stationed. Between the time periods of 1981-2006, the Township's permanent population grew by 2,541 people. The Town's seasonal population is also high (at approximately 11,000 people in 2006) which represents 41% of the total Gravenhurst housing inventory in 2006 (The District Municipality of Muskoka, 2014d, p.3-7). This population is projected to increase to approximately 13,100 by 2031. Gravenhurst is home to several seasonal and resort properties including the Muskoka Wharf and Taboo Golf Course and Resort, a popular upscale resort retreat for Torontonians.

Figure 6: Town of Gravenhurst Official Plan Schedule A



Source: Town of Gravenhurst (2014a)

Table 8: Town of Gravenhurst Official Plan: Site Evaluation and Shoreline Policies

Section	Goal	Permitted Uses	Subjects	Long-term Monitoring Policies
D1 *Waterfront Area* Designation (See Figure 6)	"To maintain and enhance where possible water quality, protect the ecological, natural, visual and aesthetic character of the lake and shoreline and protect the recreational, social, accessible and environmental qualities of the lakes and rivers" D1.2	Recreational, service commercial and tourist commercial uses, single-detached dwelling units, parkland and natural areas. D1.4	Uses in detail.	No.
D2 Waterfront Development	Outlines further policies in regards to all development in the *Waterfront Area* designation.	N/A	Preservation of vegetation, character of the shoreline environment, existing undersized lots, lot creation, zoning	No.
D3 Lake Capacity	"In no case shall any proposed development exceed the capacity of the waterbody to sustain additional development from a biological perspective" D3	N/A	Lake management plans and strategies (lake system health status and cold water lakes), and lake stewardship.	No.
D4 Lake Specific Policies	"The aesthetic and environmental quality of the lakes shall be maintained and enhanced through land use planning and lake stewardship initiatives" D4.1.1	"Shoreline lots within the communities shall be subject to the requirements of this section, particularly in relation to lot development and redevelopment standards" D4.1	Kashe and Bass Lake, Three Mile Lake, Muldrew Lake.	No.
I1 Environment: I1.4.30 Site Evaluation Reports	Outlines elements of a site that is to be prepared to the satisfaction of the Town.	N/A	Site evaluation report details and adjacent lands.	No.

Source: Summarized from the OP, Town of Gravenhurst (2015d)

Three site visits were conducted in the summer of 2014 to investigate shoreline development patterns and shoreline property characteristics in Gravenhurst. The Researcher was accompanied by a Municipal Representative during the site visits. Two shoreline developed properties were visited on Lake Muskoka and one on Sparrow Lake. The properties consisted of a mix of developments from smaller cabins to substantial cottage homes to resorts. As such, characteristics of shorelines were different for each. Site plan agreements were used as a basis to determine if the landowner remained compliant (see **Appendix C** for Lake of Bays' Site Plan Agreement layout and sketch sample). Overall, it was found that landowners were generally compliant with site plan agreements and maintained a naturalized shoreline buffer between their property and respective waterbody. To put these agreements into perspective, **Table 9** below displays the objectives of waterfront areas as per Gravenhurst's OP.

Table 9: Objective of Waterfront Areas:

D1.3 OBJECTIVES

a) To protect the visual qualities of the lakes and rivers and to protect or enhance the natural shoreline character.

b) To protect wetlands, wildlife habitat areas and fish habitat from incompatible development.

c) To maintain or improve the ecological, scenic or recreational character of the Town's lakes and rivers and those lands that are visually connected to the shoreline.

d) To ensure that shoreline development does not have an adverse impact on the quality of lake water and, wherever possible, to rehabilitate and naturalize shoreline areas that are currently developed.

e) To encourage an increased awareness of the sensitivity of the environment and environmental stewardship of lands in the *Waterfront Area*.

f) To ensure that development, redevelopment and the increasing use of shoreline properties does not result in additional environmental impacts or increase municipal servicing costs.

g) To promote the maintenance and enhancement of native vegetation buffer areas in all shoreline areas of the Town.

h) To promote the use of septic systems with soils that have a demonstrated ability to effectively eliminate phosphorous in all shoreline development outside of areas serviced by municipal sanitary services.

i) To exercise appropriate municipal development control in order to achieve a consistently higher standard of accessible site, building and landscape design in the shoreline area.

j) To ensure that the Town plays an active role in the development of government owned lands in the shoreline area and that these lands are developed in accordance with the policies of this Plan.

k) To encourage and support the development of lake management plans that identify and protect the unique social, cultural and ecological values of different lakes in the Town.

l) To preserve the dark sky through sensitive lighting design and installation.

Town of Gravenhurst Official Plan *D-2*
Adopted: October 24, 2006
Approved with Modifications: June 30, 2008

The vision of the OP expresses that the Town is expected to grow significantly over the next twenty years, along with development. It discusses how the town plans to manage this growth in a way that protects the area's environment while maintaining economic prosperity. The Plan states that protecting the environment can be accomplished through restoration of water quality and shoreline areas. The Urban Mixed Use Waterfront Area designation includes properties such as Muskoka Wharf on Lake Muskoka. New development within this designation are to maintain and enhance the natural shorelines. Any natural vegetation within 30 metres of the shoreline, including shoreline vegetative buffers, are to be protected. Though the OP includes such general statements, there are no policies in this document to monitor this protection. **Section D3.2**, Lake Stewardship, notes that the Town will make efforts and create partnerships with public and private affiliations to assist with the improvement and naturalization of the Town's waterways (Town of Gravenhurst, 2015d). Though the Town is currently partnered with organizations for these types of initiatives, the OP should include more content on this subject as well as incorporate policies to follow.

5.2 Township of Muskoka Lakes

Figure 7: Map of the Township of Muskoka Lakes

Source: http://www.visitmuskoka.com/muskoka_lakes_map.htm

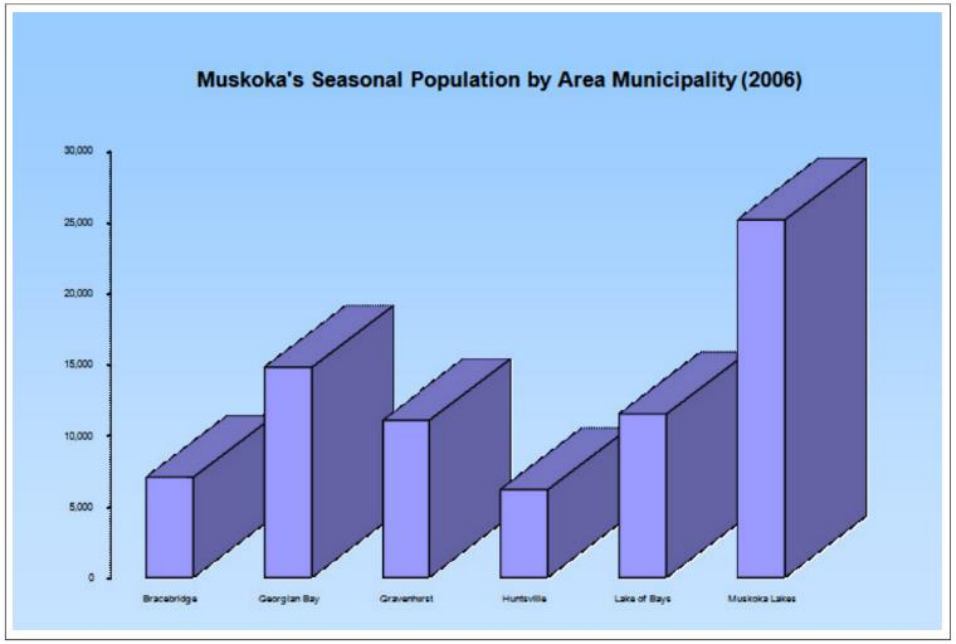
The Township of Muskoka Lakes amalgamated in January of 1971 and is located at the southern tip of the Canadian Shield. The Township is 782 square kilometres, has 80 lakes and contains three of Muskoka's largest (and most popular) lakes: Lake Rosseau, Lake Joseph and Lake Muskoka. Lake Muskoka is the District's deepest lake at 93.8 metres (Visit Muskoka, 2015). Though Muskoka Lakes is a popular tourist destination, above 80% of its land mass remains naturally covered and the municipality maintains above 85% of naturally vegetated shorelines. In terms of political structure, the Township is comprised of one mayor and nine municipal councillors. Between 1981 and 2006 the Township's permanent population grew by 1,499 persons (1.1% annually) and has increased 1.4% annually over the past five years. Similar to Gravenhurst, the seasonal population of Muskoka Lakes is also high (at approximately 27,400 people in 2011). The Township is expected to experience continued growth in the tourism and recreation industry and therefore will also experience growth in seasonal and resort development above historical rates. This seasonal development will comprise about 40% of all new population growth in Muskoka Lakes. Currently, the Township increases in population by six-fold during the summer months (The District Municipality of Gravenhurst, 2014e, p.3-2).

Table 10: Township of Muskoka Lakes Official Plan: Shoreline Policies

Section	Goal	Permitted Uses	Subjects	Long-term Monitoring Policies
B - Waterfront designation	Protect waterfront character, ensure suitable development, promoting growth while preserving the waterfront, and to manage growth.	Residential uses, commercial uses, open space, public uses, accessory structures and existing development.	Definitions, principles, development policies, lake system health, areas of limitation, lake character, open space, lake plans.	No.
B5 – General Development Policies	Outline use and implementation of policies in the Waterfront designation to protect the character of the waterfront.	N/A	Uses, development standards, water access, landings, servicing, heritage, land use compatibility.	No.
B6 – Lake System Health	To protect Muskoka's water resources, continue/enhance education on lake health, stewardship efforts and monitoring.	N/A	Lake System Health program (Phase 1&2), low sensitivity waterbodies, med-high sensitivity waterbodies, site plan control, public lands, over-threshold waterbodies.	Section B.6.3 and B.6.6 references that the District will maintain a monitoring and remedial action program but this is specific to lake water quality only.
B10 – Residential Development Policies	To control waterfront development.	One dwelling unit, one sleeping cabin per residential property and small-scale home-based businesses.	Forms of development.	No.
B13 – Shoreline Structures	To outline policies and approvals necessary in order to construct shoreline structures.	Most commonly includes docks and boathouses.	Boathouses and boatports.	No.
B14 – Lake Plans	To encourage the formation of Lake Plans on all lakes and rivers.	N/A	Lake Plan contents.	No.
B17 – Development of Undeveloped Lakes	To subject development on undeveloped lakes to site plan control.	N/A	To limit remote development.	No.
Section D Communities: D18 – Shoreline Areas	To ensure shoreline development is compatible with surrounding area.	N/A	Public access, compatibility, lot depth, soil conditions, setbacks, redevelopment.	No.
D19 – Shoreline Structures	To sustain a balance of natural and built form of shoreline structures.	N/A	Boathouses and boatports.	No.

Source: Summarized from the OP, Township of Muskoka Lakes (2014c)

Figure 8: Seasonal Population by Municipality in 2006

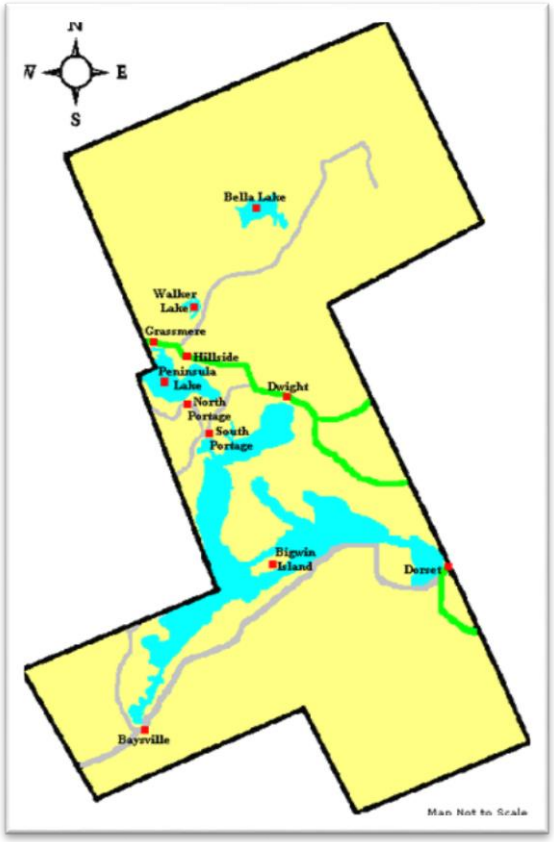


Five site visits were conducted in the summer of 2014 to investigate shoreline development patterns and shoreline property characteristics in Muskoka Lakes. The Researcher was accompanied by a Municipal Representative during the site visits. **Figure 8** to the right displays that Muskoka Lakes was by far the most popularly visited township in Muskoka for seasonal residents in 2006. This remains the same today. The Township was an especially important location to this research paper because of this factor. More importantly, Lake Muskoka is one of the three most popular lakes visited in the Muskoka region (as well as the largest) as mentioned near the beginning of this paper. To focus on this watershed, three shoreline developed properties were visited on Lake Muskoka and one on Leonard Lake for comparison. The properties consisted of a mix of developments from smaller cabins to substantial cottage homes. Characteristics of shorelines remained generally the same for each. Site plan agreements were used as a basis to determine if the landowner remained compliant. Overall, it was found that landowners were generally compliant with site plan agreements and maintained a naturalized shoreline buffer between their property and respective waterbody. As part of Muskoka Lakes' Strategic Plan, shoreline preservation and site plan control is still an ongoing task, focusing on site alteration, tree preservation, and vegetative buffer zones. The role of stewardship has also been stated as an ongoing task as part of the Plan as well as long-term sustainability (The District Municipality of Muskoka, 2014d).

Fahner and Janas (2013) note that the majority of new development on large inland lakes in the Township of Muskoka Lakes averages over 4,000 square feet complete with a large septic tank, long driveways and parking areas. In addition, luxury amenities are becoming increasingly common on cottage properties such as sleeping cabins, garages, storage buildings and tennis courts (Fahner & Janas, 2013).

5.3 Township of Lake of Bays

Figure 9: Map of the Township of Lake of Bays



Source: http://www.visitmuskoka.com/lake_of_bays.htm

The Township of Lake of Bays is also one of the largest towns in the Muskoka district. The Lake of Bays has approximately 563 kilometres of shoreline and is about 79.2 metres deep in certain spots (Visit Muskoka, 2015). The permanent population in Lake of Bays in 2006 was 3,570 (The District Municipality of Muskoka, 2015, p.4-17). Between 1981 and 2006, the Township's permanent population increased by 1,447 persons (2.1% annually) and has increased to 4.2% annually over the past five years. Parallel to Gravenhurst and Muskoka Lakes, Lake of Bays has a high seasonal population (approximately 11,500 in 2006) which represents 68% of the total housing inventory in 2006 (The Township of Lake of Bays, 2015, p.23). By 2031, Lake of Bays is expected to reach approximately 12,600 seasonal residents (The Township of Lake of Bays, 2015b).

Under its implementation section, the OP echoes that formal planning tools which the municipality can use to implement policy are set in the Planning Act or another form of legislation. However, informal planning tools such as education and public information generally done to preserve the environment, are not set out in legislation but are equally important. Though part of the Town OP vision is to preserve qualities for the future, no policies are in place that monitor policies over time to fulfill this objective. As part of the OP, Lake of Bays' growth strategy was created to help balance growth and environmental protection in the Township. As the majority of residents and projected growth is set in rural and waterfront areas, it is crucial to ensure that ecological monitoring of developed shoreline properties is being done. Currently this long-term concept is not included in the Township's OP policies.

Table 11: Township of Lake of Bays Official Plan: Environment and Shoreline Policies

Section	Goal	Permitted Uses	Subjects	Long-term Monitoring Policies
Section H-1: Waterfront Designation	To protect and preserve the Town's shoreline areas (lands extending inland 150 metres from any lake greater than 8 hectares) and water resources.	One existing dwelling, one single detached dwelling, one accessory sleeping cabin, home based business, individual access point, residential group home, conservation	Definition, function, basis and principles, boundaries of designation, character	No.
H-4 General Policy	To maintain the waterfront designation character of mixed land uses while preserving the natural environment.	N/A	Preservation of waterfront character, access, waterfront landings and access points, water/sewage servicing, boat impact assessment	No.
H-9 Land Use Policy	Land use policies detailed.	Residential uses, waterfront commercial uses, open space, conservation	Permitted uses, lot requirements, waterfront residential & commercial	No.
H-15 Special Policy Areas	Outlines policies for special areas.	N/A	Bigwin Island, Paddlefoot, Ril Lake	No.
H-25 Specific Lake Plans	"Intended to identify, reflect and respond to the character and physical capabilities of an individual water body and shoreline community within the broader framework of the waterfront designation and policies".	N/A	Peninsula, Paint, Menominee and Raven Lake Plans. A lake nearing capacity relating to phosphorus targets warrants a specific lake plan.	No.
Section D: Environment Designation, D-3 Shoreline Protection	Preservation of the natural land form, vegetation, and wetlands along the shoreline.	N/A	Definition, importance, human activity on shorelines, preservation	No.
Section J: Implementation, J-2 Impact Assessment, Site Evaluation and Technical Reports	The use of key planning tools to implement the policies of the OP and to help the municipality in assuring that proposed development is suitable and impacts on the environment are mitigated.	N/A	Mitigating potential impacts on the environment at the time of development	No.
J-18 Monitoring	To monitor the OP annually by an inventory of development applications and review of trends.	N/A		No specific monitoring strategy defined.

Source: Summarized from the OP, Township of Lake of Bays (2015c)

Table 12: District of Muskoka Official Plan: Natural Environment and Shoreline Policies

Section	Goal	Permitted Uses	Subjects	Long-term Monitoring Policies
Section D – Settlement Pattern and Policy	To sustain settlement areas while managing growth and preserving the natural environment.	N/A	Urban centres, communities, waterfront, rural, other development policies.	No.
D9 – Waterfront	Outlining policies of lands within 150 metres from a waterbody and protecting the sensitive areas of the waterfront.	Single unit residential dwellings, tourist commercial and other commercial uses related to the waterfront, industrial development servicing the waterfront community, open space, and waterfront landings.	Permitted uses, public accessibility, lot sizes, shoreline vegetation, boating, and floating residences.	No.
Section F – Environment	A summary of policies toward resource management and developmental impacts on the Muskoka environment.	N/A	Heritage areas, natural areas, pollution, hazards, facilities, Lake System Health program, water quality, lot creation, private services, flooding, implementation, role of vegetated shorelines, and the monitoring of water quality model and program.	Monitoring of water quality program mentioned but no structural long-term monitoring strategy provided.

Source: Summarized from the OP, The District Municipality of Muskoka (2014f)

The first Muskoka Official Plan was approved in 1991. Similar to the two townships and town studied, the District's OP outlines that policies are in place to ensure the long-term social, environmental, and economic health of Muskoka yet no long-term policies exist. The District of Muskoka also has a growth strategy in place (Phase 1 and Phase 2) but the documents do not include long-term strategies to monitor growth on shorelines (TDMM, 2014b).

5.4 Comments on Local Policies

Both the District of Muskoka and the Township of Lake of Bays OPs only specify broad policies regarding natural resource uses and management as well as environmental protection. Both Plans also distinguish that one of the greatest providers to the Muskoka economy is tourism. While the District of Muskoka is one of the first municipalities to implement a thorough water quality program in Ontario, the program only forecasts shoreline development effects on water quality through impacts of phosphorus. Restrictions of development are not based on alternate factors such as social, character and aesthetic influences (Peninsula Lake Plan, 2001). This claim further supports the Researcher's argument that additional indicators should be added to generate a wholesome assessment indicator base as part of the long-term monitoring process.

The Township of Lake of Bays implemented the Development Permit System (DPS) on January 1st, 2006. This planning tool is intended to combine site plan, minor variance, and zoning applications into one simplified procedure while further protecting Muskoka's environment. Specifically, the DPS also assists in the protection of natural shorelines as further laws regarding shoreline alterations, shoreline development, and vegetation removal are outlined. Currently the Township of Lake of Bays uses the term 'development' in its OP which is a very broad phrase in terms of waterfront properties. The Development Permit By-Law (04-180) further defines 'development' to specifically focus on vegetation removal and shoreline alterations and therefore allows the Township to regulate these actions. It is stated in the by-law that a property must retain 75% of its natural shoreline (vegetative buffer). In addition, the by-law enforces shoreline setbacks (twenty or thirty metres depending) and development standards (The Township of Lake of Bays, 2015a, p.4). Depending on the type of development application, approval can either be granted by staff or council.

In addition to OPs and site plan control, specific by-laws have been passed under the Municipal Act for the District and townships/towns discussed which further control the aforementioned subjects of the Plans. The Plans are general policy documents while zoning and other by-laws regulate development of lots. For example, zoning by-laws (ZBLs) include regulations such as prohibiting and regulating construction, creating standard minimum frontage, elevation and depth for properties, and the regulation of parking. Though ZBLs are an effective tool to control current development, it is obvious that the document is lacking long-term policies in OPs to properly monitor development over time. In 2014, the Town of Gravenhurst implemented a tree preservation By-

law (2014-26) in order to protect shoreline vegetation as part of the Lake System Health program to help sustain values of the lands and a healthy natural environment. This by-law is applied to all lands within sixty metres of a waterbody within the Town. The by-law states that inspection officers can enter any land to which this by-law applies, to monitor its effectiveness (Town of Gravenhurst, 2015b). Gravenhurst also implemented a site alteration By-law (2014-27) in order to further Lake System Health program goals in preventing erosion and considerable changes to waterfront areas in the Township. This by-law is also applied to all lands within sixty metres of a waterbody within the Town. Municipal by-law enforcement officers are the responsible authority to enforce this by-law. Information required to apply for a site alteration permit include general information on the property, a detailed inventory map, design and maintenance control methods for erosion and sedimentation (Town of Gravenhurst, 2015c). Similarly, Muskoka Lakes first implemented a site alteration (2008-56) and tree preservation By-law (2008-55) in 2008 to protect Muskoka's shorelines and natural landscape (Township of Muskoka Lakes, 2014a). However, within these policies there is no mention of the frequency of follow-up site visits by municipal officers or the frequency of these checkups for that matter.

Within the District's growth strategy (Phase 2), it is recommended that the District continue policies set out in the OP and OP Amendment 32 with respect to growth management in waterfront areas. It is also recommended that "local municipalities develop OP waterfront development policies which preserve lake character and establish thresholds with respect to ecological and social carrying capacity. Ecological and social carrying capacities are generally defined as follows:

- "Ecological Carrying Capacity – The amount of human activity that any given lake can properly accommodate given local environmental and ecological constraints.
- Social Carrying Capacity – The social or human limits to development that a lake can sustain and still maintain its overall character and desirability. A social carrying capacity involves two components: the number of people engaged in an activity at a density that is efficient and safe for the users, and the acceptable density of people as perceived by the users themselves" (The District Municipality of Muskoka, 2014e, p.7-14). The District's growth strategy recommendations further support the research findings in this paper – that more specific waterfront development policies should be integrated into the OP to cover aspects of not only biological but also ecological and social thresholds to assess shoreline development and overall changes.

5.5 Provincial Policy Statement

Table 13: PPS (2014): Resource Management and Shoreline Policies

Section	Goal	Permitted Uses	Subjects	Long-term Monitoring Policies
Section 2.0: Wise Use and Management of Resources	Focuses on the long-term prosperity of Ontario, balancing environmental health and social well-being.	N/A	Natural heritage, water, agriculture, minerals and petroleum, aggregate resources, and cultural heritage.	No.
2.2 Water	Sets out criteria to "protect, improve or restore the quality and quantity of water" 2.2.1	N/A	Water protection, development and site alteration, and mitigative measures.	No. Section 2.2.1 identifies cumulative impacts of development and significance of shorelines.
4.0 Implementation and Interpretation	The "Provincial Policy Statement shall be read in its entirety and all relevant policies are to be applied to each situation" Section 4.4	N/A	Council decision, implementation means, Planning Act, provincial plans, monitoring.	No – encouragement of monitoring but no structured framework.

Source: Ministry of Municipal Affairs and Housing (2014)

The province sets out some broad guidelines in terms of policy development and evaluation through the Provincial Policy Statement (PPS). The PPS states that OPs are the most powerful tools in executing PPS policies and policies within OPs to best achieve long-term planning. **Section 4.14** of the PPS states that "the Province, in consultation with municipalities, other public bodies and stakeholders shall identify performance indicators for measuring the effectiveness of some or all of the policies. The Province shall monitor their implementation, including reviewing performance indicators concurrent with any review of this Provincial Policy Statement". Furthermore, "Municipalities are encouraged to establish performance indicators to monitor the implementation of the policies in their official plans" (Ministry of Municipal Affairs and Housing, 2014, Section 4.15). However, performance monitoring indicators is merely mentioned as a broad expression and does not provide direction for a standard set of indicators for municipalities to utilize across the province. In addition, the PPS only encourages this activity rather than enforcing it. This same situation stands for policies relating to the management of resources and policy implementation as can be seen in **Table 13** above. Therefore, an improvement in policy to provide further direction is needed to apply enforcement upon municipalities in Ontario.

6.0 SEMI-STRUCTURED INTERVIEW RESPONSES

The interview questions asked of Municipal Representatives from planning departments in Muskoka can be seen in **Appendix A** (attached). Answers from the listed questions echo the background and current research themes undertaken in this paper. A Municipal Representative from the Township of Muskoka Lakes confirmed that current shoreline management strategies in place consist of site plan agreements, OPs, ZBLs and by-laws passed under the Municipal Act as well as education on shoreline naturalization. However, the majority of these tools are short-term strategies. In Gravenhurst, a Municipal Representative confirmed that the strength of these management approaches are tree protection and sediment plan control. In contrast, the challenges of these management approaches are the facts that a new development application may or may not need site plan control and that not every new application can be made subject to approval (dependent on what lake the new development is taking place on and staffing/budgeting limitations).

Reflective of the literature review conducted for this paper, the Municipal Representatives echoed that lack of time and enforcement towards long-term monitoring are definite weaknesses in the system. Representatives from the townships/town stated that planning departments do conduct development permit compliance audits but these audits are only done every five to ten years. The most recent audit for all three studied locations were conducted in 2006 and resulted in one staff report for each expressing that many landowners who are non-compliant of site plan agreements will just pay a penalty for insufficient vegetation plantings. Furthermore, a Municipal Representative from Lake of Bays mentioned that compliance audits are difficult to conduct as site visits meant to investigate vegetation cannot be done in the winter season. The interviews concluded that long-term site monitoring on shoreline properties is not being adequately addressed in Muskoka as it is solely based on a complaint-driven process. Nevertheless, it was noted that all tools needed are available but what to do with these resources and further direction on a successful monitoring framework is unknown.

7.0 ANALYSIS AND DISCUSSION

To reach the goals and objectives outlined earlier in this paper, a comprehensive literature review and certain research methodologies were utilized. This section provides a discussion and analysis on how the five proposed research goals and objectives were met while summarizing findings.

7.1 To understand the increasing importance of long-term monitoring

The first objective of this research is to better understand the increasing importance of long-term monitoring. The Researcher specifically looked into this within the District of Muskoka but did not ignore the fact that this concept is also becoming an important factor on the provincial level. The importance of long-term monitoring is evident because of numerous points highlighted in the research. Firstly, as the District of Muskoka is expected to continue to grow and preserving its natural landscape is crucial. Furthermore, it is crucial to preserve the area's natural environment since the District is considered one of the most popular tourist destinations in the province. Second, long-term monitoring will assist in balancing and controlling the impacts of population and development growth. Third, long-term monitoring will also assist in solving complex environmental issues by establishing baseline data of the current state of the system with long-term data records which will warrant the District the ability to detect change over time - solving the big 'why' question. Fourth, monitoring over time will assist in the practice of local planning and provide causality factors in terms of evaluation of planning decisions and programs. Fifth, the practice of monitoring as a routine habit will create a standard framework both locally and across the province as well as for future generations to come while offering new ideas to tackle shoreline management. Lastly, establishing long-term monitoring in policy documents will help to identify long-term thinking as a priority in Ontario, maintaining the PPS rules of municipalities to establish indicators to monitor policy. Overall, monitoring will help the province progress to a more wholesome policy structure in Ontario.

7.2 To examine federal, provincial, and local policy documents in Muskoka for long-term monitoring policies

The research provided a thorough examination of federal, provincial, and local policy documents pertaining to long-term monitoring policies. On a federal level, EIAs provide protection of natural resources which includes a follow-up program. Unfortunately, EIAs are only required for large-scale projects with high impacts to the environment and a follow-up is not necessarily needed (depending on the project). On a provincial level, Environment Canada, the OMNRF, the MOECC, and Fisheries and Oceans Canada work in collaboration with local agencies to protect water sources and enhance environmental stewardship. The province does employ environmental compliance officers who are dedicated to monitoring but this is only done

for projects being undertaken by large corporations especially relating to pollution and/or waste. On a local level, as mentioned throughout the paper several times, monitoring and evaluation are not mentioned among Muskoka's policies and are consequently not regulated.

7.3 To determine why long-term monitoring policies do not exist

Long-term monitoring policies do not exist in the District of Muskoka for various reasons. First and foremost, the number one reason is attributed to the fact that there is an obvious lack of resources which can be allocated towards monitoring. This includes resources such as time, money, and skills which are the first to go in government cutbacks. Second, there seems to be a lack of collaboration between landowners, organizations, the District, and the government. As previously discussed, collaboration is a key factor in successful policy implementation. Moreover, there seems to be a lack of mutually beneficial partnerships in power sharing. It is imperative that citizens are given the chance to play a role in the decision-making process. Third, the concept of monitoring for the long-term is not a high priority for planners and therefore falls behind day-to-day activities and programs. Fourth, to reinstate, a universal solution for monitoring does not currently exist and so it is impossible to carry out the process in a consistent manner across the province. Fifth, through conducting case studies in Muskoka it was found that some planners felt that local policy goals and objectives were already too vague – making it very difficult to merge a monitoring plan. In summary, the tools to implement monitoring laws are certainly available but the direction in which to use these tools for the purpose of a monitoring strategy is missing.

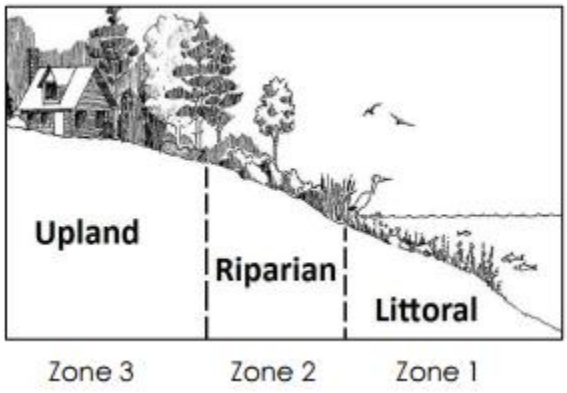
7.4 To explore the impacts of human activity on Muskoka's shorelines without long-term monitoring policies in place

Without long-term monitoring policies in place, human activity on shoreline properties lead to both physical and social negative impacts. Physical impacts to natural shorelines include a loss of vegetation and shoreline vegetation buffers, an increase in sedimentation, decrease in water quality, loss of wildlife habitat, an increase in stormwater runoff, and destruction to Muskoka's natural landscape, character, and historical features. Social influences of human development to natural shorelines include visual impacts, a rise in pollution and a loss of landowner privacy.

Shorelines vegetation buffers play a very important role for a watershed. Shorelines consist of three zones that are critical to keeping them healthy. These include the upland, riparian, and littoral zones which can be observed in **Figure 10**. The actual shoreline sits between the

riparian and the littoral zone which is where the buffer generally sits (Nature in Deed, 2011). Shoreline buffers are composed of vegetation such as plants, shrubs, and trees. “The first 10-15 metres of land that surround lakes and rivers is responsible for 90% of lake life which are born, raised and fed in these areas” (Nature in Deed, 2011, p.1). This buffer acts as a ‘glue’ component between water and land. It diminishes the impacts of flooding and helps keep water clean as it filters surface runoff before it reaches the water (Nature in Deed, 2011). The buffer zone also protects the land from rain, wind, waves and erosion. Furthermore, the shoreline is an area that birds, insects, and animals rely on for feed, shade, nesting, or access to drinking water. Essentially, shorelines are integral to the health of ecosystems and biodiversity (Cottage Life, 2014).

Figure 10: A Healthy Shoreline Buffer



7.5 To identify and analyze best practices of long-term monitoring on shoreline properties for Muskoka

Several examples of successful long-term monitoring initiatives were presented in this paper. As deliberated, SMPs seem to be a viable option to control and monitor watershed environments, however, landowners and municipalities will have to work together to execute these Plans as CAs do not have the funding to carry these out on their own. As part of these Plans and individual Lake Plans, there has been a common pattern that collaborative management is the focal point to successful Plans as local residents are able to become involved in the decision-making process to create Plans for different timelines. Similarly to a previous case study discussion, a task force could also be created to establish monitoring indicators as part of these Plans. As Fahner and Janas proposed, a long-term (five year) monitoring program could be introduced to local policy and further complimented with local stewardship organizations in Muskoka. The DPS is another framework that could be implemented in every single municipality in Ontario for all shoreline development applications. This would ensure that specific policies would be inclusive to protecting natural shorelines and could even be combined with follow-up programs.

In summary, sufficient evidence has been presented proving the high importance long-term monitoring on a local and regional level in Ontario in order to better protect our natural environment. To ensure this concept is addressed, long-term monitoring must be introduced to policy, most effectively by integration into OPs. Motives for long-term monitoring policies

currently not existing include a lack of resources, collaboration between stakeholders, the fact that long-term monitoring is a low priority and inconsistent practices (no universal solution). Without long-term shoreline monitoring policies in place, Ontario's natural shorelines will continue to experience adverse effects and degradation. Best practices of long-term shoreline monitoring strategies have been identified within Canada and internationally. It is hoped that these strategies can foster policy change in Ontario to better manage our shorelines, particularly for future benefit.

Analogous with the long-term monitoring strategies and initiatives presented, the Researcher will provide recommendations of long-term monitoring options in the following section of this paper in order to establish a successful long-term shoreline monitoring strategy in the District of Muskoka based on past best practices as found in academic literature.

8.0 ISSUES AND RECOMMENDATIONS

Based on the best practices presented in this paper, this section will provide five possible solutions to implement a long-term monitoring strategy in the District of Muskoka. **Table 14** below summarizes these five solutions and provides brief descriptions for each.

Table 14: Five Proposed Monitoring Solutions

1	**Building Permits/Site Plan Agreements** Building permit and site plan agreement process could be more inclusive to include all properties on Muskoka's shorelines. Follow-up of these agreements is equally as important.
2	**Community-wide Lake Plan Program in Muskoka** Lake Plans are usually initiated by lake associations in order to identify physical and environmental characteristics of a certain lake to provide a long-term plan for the lake community towards stewardship. Sometimes modifications to policies occur which must go through the usual municipal and public review process. The District could partner up with lake associations to initiate a community-wide Lake Plan program.
3	**Collaborative Shoreline Monitoring Strategy** The District could collaborate with the province, municipalities, lake associations, conservation authorities and landowners to start a collaborative strategy to address long-term shoreline monitoring. Existing and separate efforts can be amalgamated into a single strategy to produce a holistic program.
4	**Amendment to the District of Muskoka/Local Official Plans** The District and local OPs address environmental and shoreline topics but need to incorporate a detailed long-term monitoring strategy.
5	**Establishing a District Conservation Authority** That a Conservation Authority be established for the District. Currently the District of Muskoka does not have a Conservation Authority and watersheds are governed by the District Municipality of Muskoka, while protection of drinking water is governed by the Clean Water Act. An authority responsible for shoreline protection does not exist.

In order to achieve implementation of an effective shoreline management strategy, it is important to identify best practices that will provide for optimal outcomes. Ultimately policy must be changed to adequately address the topic of long-term monitoring. Further monitoring initiatives can continue to promote and support this. Currently, an education and awareness strategy exists in Muskoka with support from communities and organizations who share the same values. Still, this strategy is not working to improve compliance, therefore, new strategy(s) must be developed. The province holds the authority to govern shoreline properties as this is common property, which opens a window of opportunity for enforcement. Many landowners abuse this concept of authority and believe they 'own' the waterfront or shoreline of their property. The Province is also entitled to delegate the responsibility of governance to conservation authorities or to municipalities (or both). Unfortunately, Muskoka presently does

not have a conservation authority in place. In this case, multiple strategies could be combined to ensure maximum compliance and monitoring routines.

Collaborative management is an institutional approach to solving environmental issues rather than a traditional approach on a larger scale. In collaborative management, the key to successful tactics is to get all involved. This includes not just interested groups, but also stakeholders, peers, the rest of the community and government agencies. If the law is changed, it will force landowners to abide by their agreements. For example, municipalities in Muskoka could develop a policy framework to collect additional securities from landowners for the purpose of monitoring shoreline development. The District of Muskoka or lower tier townships/towns could collaborate with a third party affiliation (such as a conservation or cottager association) to monitor properties that are damaging the environment. Security fees from the process could develop an income stream to go towards monitoring and shoreline restoration. Furthermore, a five-year renewal site plan program could be implemented. This would make compliance and shoreline management mandatory, and would also instill the habits of environmental governance into behavioural change for the long-term. This continuity of cultural change would eventually lead to the adoption of best practices towards shoreline management (Douglas, 2010).

Often issues are not solved when initiatives are handled on the government level because they are either unknown or de-prioritized. By allowing local stakeholders to equally take charge of natural resource management along with the government, all physical and social issues of shoreline development can be addressed through co-management. During this share of power between different groups, it is important to understand that the approach will be used to solve shoreline development issues for the long-term on a continuous basis. It is also important to distinguish roles and responsibilities at the very beginning of the approach in order to carry out equal governance. Carlsson and Berkes (2005) define co-management as “the term given to governance systems that combine state control with local, decentralized decision making and accountability, and which, ideally, combine the strengths and mitigate the weaknesses of each” (p.66). An example of co-management between stakeholders of a monitoring strategy in Muskoka is shown on page 53 in **Table 15**. The process starts with simple exchanges of information and research and will eventually lead to partnership for change, as proposed in two of the five monitoring solutions (through a collaborative monitoring strategy and an OP amendment).

Table 15: Responsibilities of Stakeholders in Monitoring Framework

STAKEHOLDER	RESPONSIBILITIES
District of Muskoka/Local Municipalities	➢ review and modify OP changes (and ZBL changes under local municipalities) as needed based on outlined issues. Add mitigating measures to site plan agreements, conditions of approval, etc. ➢ implement the act of obtaining securities for long-term monitoring initiatives ➢ create long-term shoreline monitoring framework ➢ supply data of site conditions from past research ➢ identify acceptable indicators
Muskoka Watershed Council	➢ protection of shorelines ➢ supply shoreline data ➢ incorporation of Lake System Health Program with policy change
Shoreline property owners/local residents	➢ maintain natural shorelines ➢ monitor trends of land use patterns ➢ promote collaborative plan ➢ determine key issues to be addressed in future policy ➢ implement monitoring tools on properties and encourage new owners to do the same
Muskoka Conservancy	➢ continue to raise awareness and monitor shoreline properties ➢ collaborative research opportunities ➢ hold fundraisers
Local Associations (Lake Ratepayer's and specific lakes, FOCA)	➢ new research conducted on lakes to constantly monitoring developed shoreline properties ➢ constantly update local policies in line with the province ➢ volunteer time as needed to carry out monitoring duties
Government of Ontario	➢ see that funding is obtained and allocated appropriately in Muskoka ➢ assist in absorbing costs of long-term monitoring initiatives ➢ work with local communities ➢ implement provincial policies on long-term monitoring ➢ maintain collaborative relationships
Municipal staff/Council	➢ provide clear direction for policy addressing shoreline monitoring ➢ maintain healthy relationships with communities and government ➢ conduct site visits after completion of shoreline development to ensure monitoring has been carried out; file reports and photos

The following SWOT analysis (**Figure 11**) on page 54 demonstrates assumptions and risks as well as strengths, weaknesses and opportunities associated with implementing this long-term monitoring plan.

Figure 11: SWOT Analysis of Proposed Collaborative Monitoring Framework

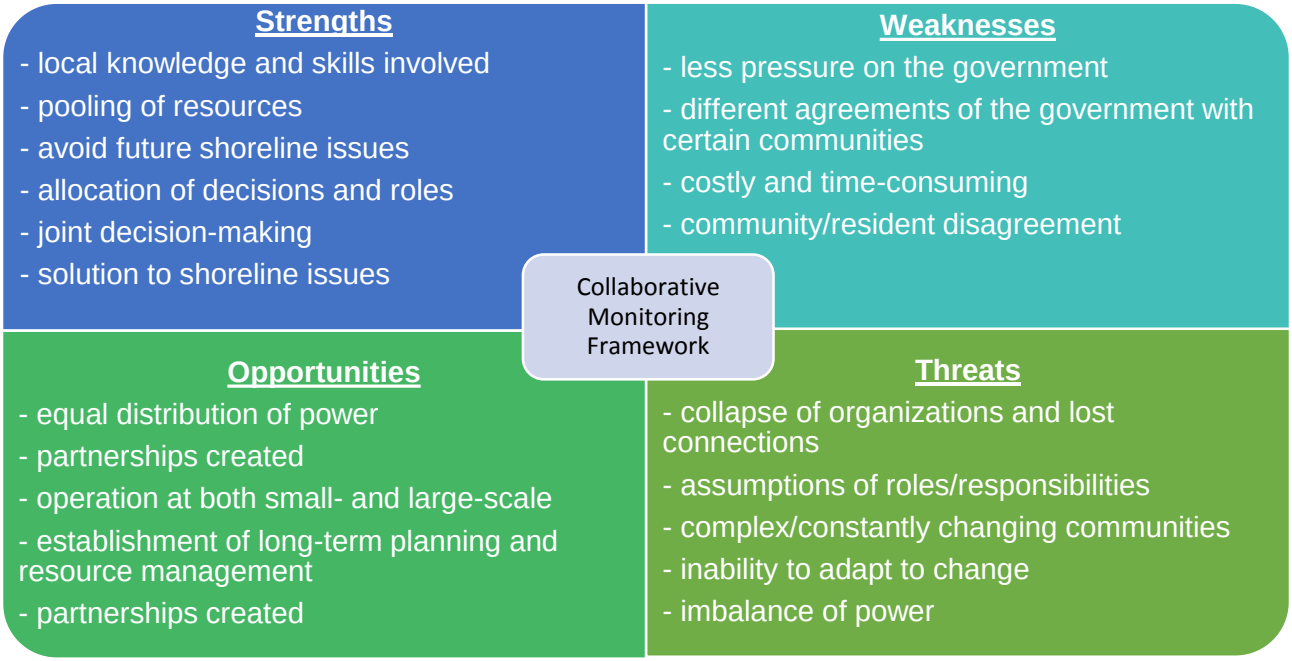


Table 16: Components of Monitoring Framework

Inputs	Activities	Outputs	Outcomes
- Public-private partnerships - Long-term monitoring expertise & research - Shoreline monitoring tools - Aerial photos of shoreline properties - Trained volunteers and residents - Shoreline development records	- Continue shoreline development data collection - Continue long-term monitoring awareness initiatives - Conduct site visits - Identify issues - Create reports	- Shoreline development is continuously measured, contributing to research database, starting to monitor shorelines for the long-term - Local communities and government working towards collective goal - Increase in natural shorelines - Implement new policies - Reduction in physical and social shoreline issues	- Exchange of information/data - Collaboration between government and local stakeholders toward common goal - Relationships built - An increase in natural shorelines and satisfaction of monitoring for the future - Start of a continuous collaborative long-term monitoring process of healthy watersheds in Muskoka

The table above, **Table 16**, is a logical framework model which describes components of the possible long-term monitoring framework discussed above including the inputs, activities, outputs and intended outcomes (descriptions and targets).

As can be seen from **Table 16**, many more positive outputs and outcomes come out of the proposed long-term monitoring framework compared to the inputs put in and accompanied activities. These outcomes lead to strengths, weaknesses, opportunities and threats as displayed in **Figure 11**. By observing **Figure 11** it can be seen that the many strengths offered by a collaborative monitoring framework outweigh the weaknesses.

In summary, long-term shoreline monitoring is a growing concern in the District of Muskoka. This is especially true due to the increasing demand for recreational properties and projected populations in the Muskoka region as previously discussed. It has been established that policy change is needed to adequately address long-term shoreline monitoring in Muskoka. In addition to shoreline governance, the above proposed framework offers a plausible strategy to form a collaborative management plan between local stakeholders and the government in order to monitor Muskoka's shorelines for the long-term before it becomes too late to solve the issue of the lack of remedial strategies altogether.

9.0 CONCLUSION

The purpose of this major research paper was to demonstrate Muskoka's changing shorelines due to human development activity. In response to these changes and Muskoka's current and projected growth, the Researcher further demonstrated the importance of long-term shoreline monitoring and the need to incorporate a streamlined strategy into local policy documents. This was achieved through conducting a comprehensive literature review followed by semi-structured interviews, a case study in Muskoka, and extensive document reviews. Five major findings were observed throughout current literature all alluding to why long-term monitoring is currently not included in policy. The five findings are as follows: there is a lack of stakeholder participation in decision-making, a lack of available resources, it is unknown how to create an effective and universal monitoring framework, monitoring is not a high priority and further research on the topic is needed. As a recurring theme, surely further research on long-term monitoring would not only provide additional information on the topic but it would also offer an increased validity of the concept as well as insight on possible frameworks. In conclusion, it is recommended that long-term monitoring continue to be researched and studied to increase its knowledge base and awareness to the public and decision-makers. This will allow for a fully comprehensive understanding of long-term monitoring and its process. The District of Muskoka's watersheds and complementing shorelines are vital components of the social, economic and ecological environments of Southern Ontario and attention to long-term efforts must be strongly maintained to ensure its continued value for future generations.

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Appendix A: Interview Discussion Guide

Interview Discussion Guide

What are the factors contributing to non-compliance of site plan agreements?

What kind of short-term and long-term shoreline management strategy does the township have in place as of now?

What are the strengths of the shoreline management approach in the township?

What are the challenges or weaknesses of the shoreline management approach in the township?

What are some strategies to address these shoreline management issues? Detail successful approaches to shoreline management and/or success stories.

Is long-term site monitoring being adequately addressed in the Muskoka region?

How has the township balanced economic development and environmental sustainability in regards to shoreline development?

Does the township conduct development permit compliance audits? If so, how and when were these done and what were your findings?

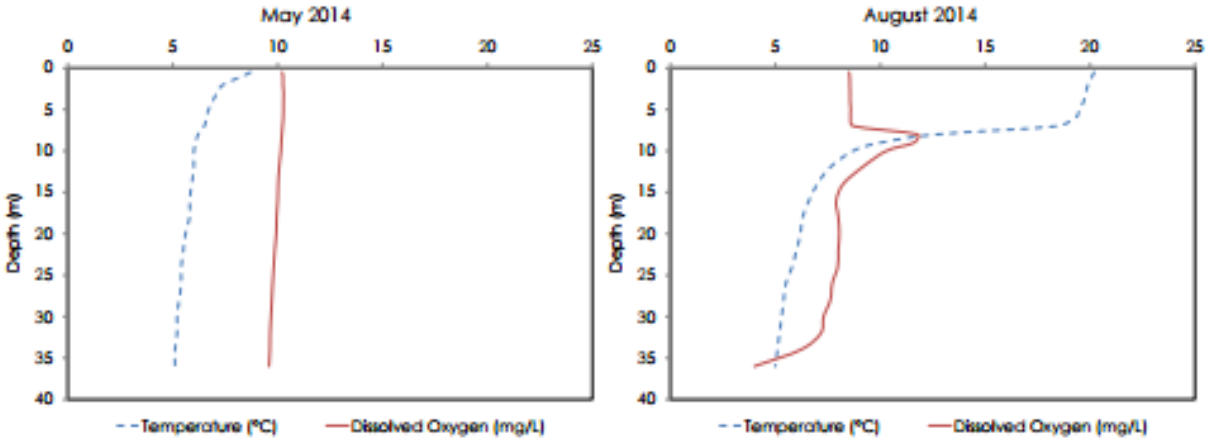
Appendix B: Bella Lake Data Sheet

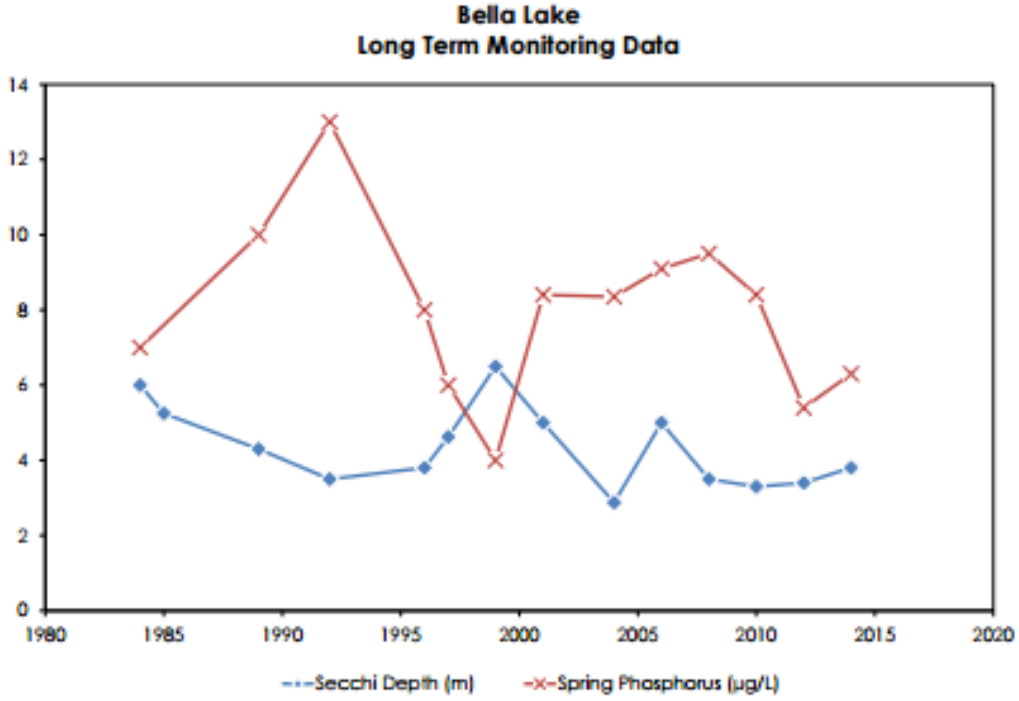
THE DISTRICT OF MUSKOKA

Lake Data Sheet
2014

Bella Lake

Municipality:	**Lake of Bays**	Quaternary Watershed:	**Big East River**
Surface Area:	**3.57 km²**	Watershed Area (excluding lake):	**11.49 km²**
Maximum Depth:	**35 m**	Lake Trout Lake?	**Yes (AC)**
Wetland Area:	**6 %**	Secchi Depth (10-year average):	**3.8 m**
Phosphorus (10-year average):	**7.7 µg/L**	Sensitivity:	**Moderate**





Appendix C: Township of Lake of Bays Site Plan Agreement

The Corporation of The Township of Lake of Bays

SITE PLAN AGREEMENT

Planning Department
1012 Dwight Beach Rd.
Dwight, ON P0A 1H0
Phone: (705)635-2272
Fax: (705)635-2132

The undersigned hereby applies to the Council of the Township of Lake of Bays under Section 34 of The Planning Act, R.S.O., c.P. 13, for approval as described in this application.

OFFICE USE ONLY Application No: _____

Roll No.: 4427-_____-_____-_____

Site Plan Agreement Fee: $300.00 Date Received: _____

Amendment Agreement Fee: $150.00 Date Received: _____

Cost Acknowledgement Agreement (signed): _____

Checked By: _____

1. Owner Information

Name of Registered Owner(s) _____

Address: _____

Telephone (home): _____ (Office): _____

Fax: _____ E-mail: _____

2. Authorized Agent Information (if applicable)

Name of Authorized Agent: _____

Address: _____

Telephone (home): _____ (Office): _____

Fax: _____ E-mail: _____

3. Name of any Mortgagees, Holders of Charges or any Encumbrances

Name: _____

Address: _____

Telephone (home): _____ (Office): _____

Fax: _____ E-mail: _____

4. Legal Property Description ***PLEASE ATTACH COPY OF MOST CURRENT DEED(S)***

Ward or Former Township: _____ Lot No: _____ Concession: _____

Registered Plan of Subdivision No. (if any): _____

Lot No. on Plan: _____ Assessment Roll No.: _____

5. Dimensions of Property (in metric and imperial if possible)

Frontage on Road: _____ Frontage on Water: _____

Depth: _____ Width: _____

Area: _____

6. Zoning Information

Existing Zoning: _____

_____

7. Use of subject lands *(PLEASE BE SPECIFIC i.e. vacant, single family dwelling)*

Existing: _____

_____

Proposed: _____

_____

8. Water Supply

Existing	Proposed	
☐	☐	Municipally owned and operated piped water
☐	☐	Lake/River
☐	☐	Well
☐	☐	Other (specify): _____

9. Sewage Disposal

Existing	Proposed	
☐	☐	Municipally owned and operated sanitary sewers
☐	☐	Septic Tank and Tile Field
☐	☐	Pit Privy
☐	☐	Other (specify): _____

10. Road Access

Existing	Proposed	
☐	☐	Municipal Road (Year round maintained)
☐	☐	Municipal Road (Seasonally maintained)
☐	☐	Private Road
☐	☐	Water Access

Name of Street or Road: _____

11. Planning History

Has the owner previously applied for site plan approval in respect of the subject lands? ☐ YES ☐ NO

If yes, please describe briefly: _____

Is this agreement subject to the condition of another Planning Application? ☐ YES ☐ NO

If yes, please supply the application number: _____

12. Additional Information

_____

_____

_____

_____

_____

_____

13. Drawing Details

Drawings must be to a usable scale, done in black ink, contain a north arrow, and be on paper that is a maximum size of 11"x17". **Three (3)** copies are to be submitted.

RESIDENTIAL:

- must be of professional quality and clearly show all existing and proposed structures to scale, and delineate forested areas versus lawn/cleared areas

COMMERCIAL:

- A professional architect or engineer or surveyor shall prepare all site plan drawings for commercial site plan applications, as follows:

a) Site Plan

The following information must be shown on site plans for review by the Township:

1) Proposed location, height, dimensions and uses of all buildings and structures including massing, conceptual design, and general type of building materials and the use of all remaining lands on the site;
2) Facilities to provide access to and from the land such as ramps, curbings and traffic direction signs;
3) Off-street vehicular loading and parking facilities (including barrier free parking), either covered or uncovered, access driveways, (including driveways for emergency vehicles) and the surfacing of such areas and driveways;
4) Walkways, including the surfacing thereof, and all other means of pedestrian access;
5) Facilities for the lighting, (including flood-lighting), or the land, or of any buildings or structures thereon;
6) Exterior fascia, pylon and other signage;
7) All exterior industrial, commercial and institutional building, site and sign illumination shall be "dark sky friendly" and certified as shown by a qualified illumination professional;
8) Retaining walls, fences, hedges, trees, shrubs, or other ground cover or facilities for the landscaping of the lands or the protection of the adjoining lands (e.g., planting and landscape strips, etc.);
9) Vaults, central storage and collection areas and other facilities and enclosures for the storage of garbage, recycling, waste and snow as applicable;
10) Grading or alteration in elevation or contour of the land and provisions for the disposal of storm, surface and waste water from the land and from any buildings or structures thereon;
11) Road widening and/or easements required by the municipality;
12) A zoning information chart providing information as to how applicable requirements of the zoning by-law are to be satisfied (e.g., parking, building floor area, landscaped area, yard requirements, lot coverage, number of units, etc.).

b) Landscape Plan

As part of the site plan, or separately, landscape plan details are also required. Location, types and sizes of all plants should be indicated and areas to be sodded, seeded, retained in a natural state, etc. should be clearly delineated. Any fencing and/or retaining walls shall also be shown. A landscape architect may be required to prepare this plan for commercial site plan applications, as determined by Planning Staff.

c) Elevation Plans

Dimension drawings illustrating the design of all sides of the development.

d) Site Servicing, Grading and Drainage Plans

As part of the Site Plan review, site servicing, grading and drainage plans may be required. Requirements for this approval may include provision of a storm water management report and/or appropriate storm water attenuation measures. A qualified professional Engineer is required to prepare this report.

Approval of there plans will occur concurrently with the site plan. The following information must be submitted to the Township for review and approval and may be included on the Site Plan or a separate plan:

1) Storm water Management facilities, such as catch basins, storm sewers, roof top detention and parking lot detention. On some sites, a detailed Storm water Management Report (minimum **four (4)** copies) must also be submitted;
2) Private well (if applicable);
3) Sanitary sewers and service connections, including existing services or abutting streets (if applicable);
4) Private sewage disposal system (if applicable);
5) Water mains, service connections and hydrants, including existing services or abutting streets (if applicable)
6) If the project abuts a Provincial Highway, the applicant shall contact the Ministry of Transportation to determine whether any additional setbacks, road widening, or permits, etc. will be necessary, and the Township shall be informed that any such requirements have been satisfied; and
7) If the project abuts a District Road, the applicant shall contact the District Municipality of Muskoka to determine whether any additional setbacks, road widening or permits, etc. will be necessary and the Township shall be informed that any such requirements have been satisfied.

AFFIDAVIT OR SWORN DECLARATION FOR THE PRESCRIBED INFORMATION

I/We _____ solemnly declare that all the statements contained in this application and in all statements contained in all exhibits transmitted herewith are true and I/We make this solemn declaration conscientiously believe it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of the Canada Evidence Act. I further agree for the purposes of the Municipal Freedom of Information and Protection of Privacy Act, to authorize and consent to the use by of the disclosure to any person or public body of any personal information that is collected under the authority of the Planning Act for the purposes of processing this application.

DECLARED before me at _____,)
(City/Town))
In the District/County of_____, this _____ day)
of _____, 20____.)
)

_____
Signature of Applicant, Solicitor, or Authorized Agent

_____
A Commissioner, etc.
place stamp here:

AUTHORIZATIONS

If the applicant is not the owner of the land that is the subject of this application, the written authorization of the owner that the applicant is authorized to make the application must be attached or the authorization set out below must be completed by the owner.

Consent of Owner

I, _____ am the owner of the land that is the subject of this application and, for the purposes of the Freedom of Information and Protection of Privacy Act, I authorize and consent to the use by or the disclosure to any person or public body of any personal information that is collected under the authority of the Planning Act for the purposes of processing this application.

DECLARED before me at _____,)
(City/Town))
In the District/County of_____, this _____ day)
of _____, 20____.)
)

_____
Signature of Owner

_____
A Commissioner, etc.
place stamp here:

Authorization of Owner for Agent to make the application

I, _____ am the owner of the land that is the subject of this application and I authorize _____ to make application on my behalf.

_____ _____
Date Signature of Owner

If the applicant is not the owner of the land that is the subject of this application, complete the authorization of the owner concerning personal information set out below.

Authorization of Owner for Agent to Provide Personal Information

I, _____ am the owner of the land that is the subject of this application, and for the purposes of the Freedom of Information and Protection of Privacy Act, I authorize _____ as my agent for this application, to provide any of my personal information that will by included in this application or collected during the processing of the application.

_____ _____
Date Signature of Owner

PERMISSION TO ENTER
IN RELATION TO
PLANNING APPLICATION

Date: _____

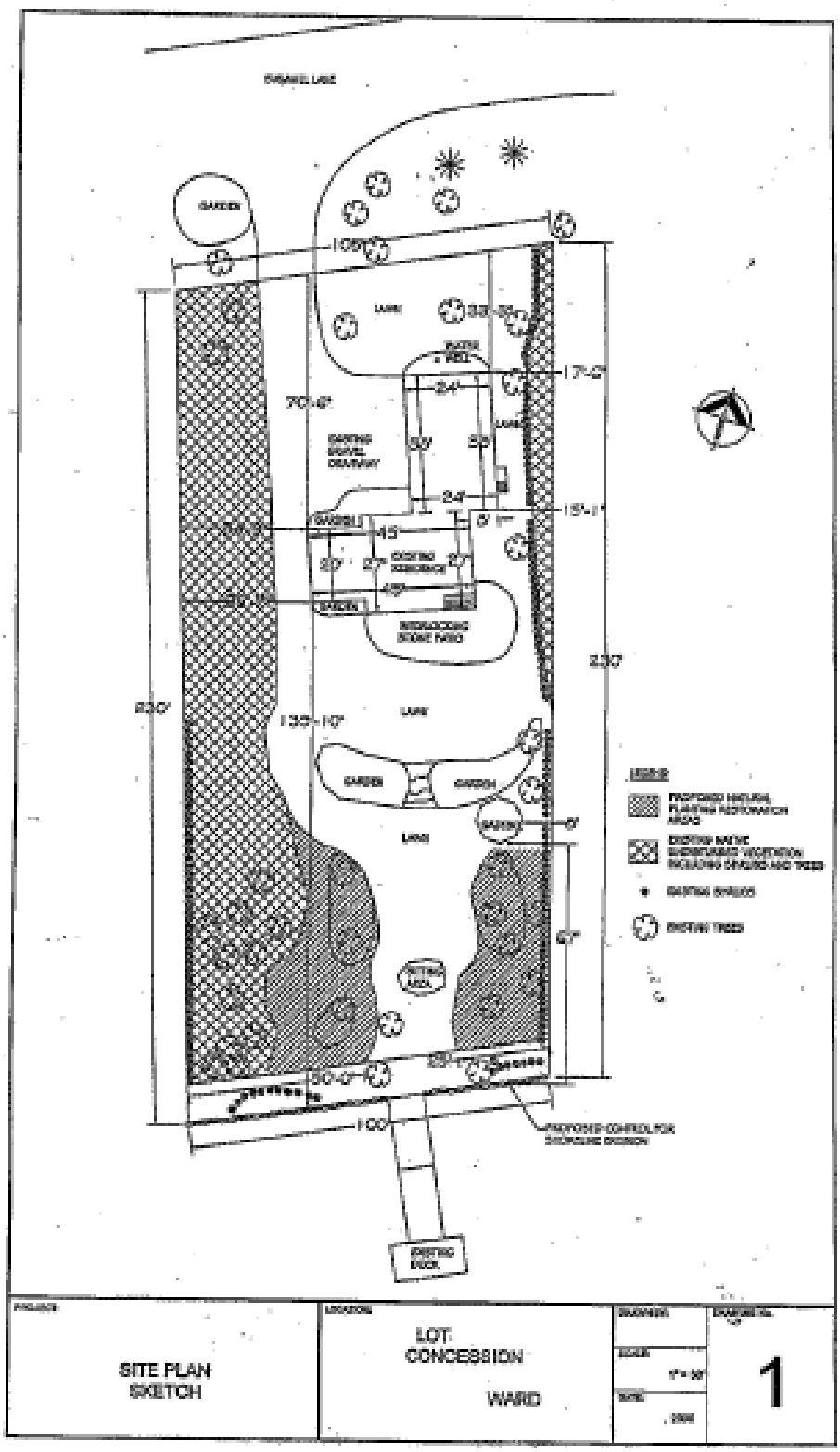
The Township of Lake of Bays
Planning Department
1012 Dwight Beach Rd.
Dwight, ON P0A 1H0

RE: Site Plan Application to Council

Location of Land: _____
(Municipal address or legal description)

I hereby authorize the members of the Township of Lake of Bays Council, members of staff of the Township of Lake of Bays and designated consultants to enter onto the above-noted property for the limited purposes of evaluating the merits of this application over the time this application is under consideration by the Township.

_____ _____
Signature of owner or authorized agent Please print name



SAMPLE SKETCH

where "Natural Planting Restoration Areas" are required