PLANNING FOR A SUSTAINABLE FUTURE

The Buck Lake Plan

Buck Lake Association

May 26, 2012

Planning for a Sustainable Future

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List of Abbreviations

ANSI	Area of Natural and Scientific Interest
BLA	Buck Lake Association
BLP	Buck Lake Plan
CA	Conservation Authority
CRCA	Cataraqui Region Conservation Authority
FA	Frontenac Arch
FAB	Frontenac Arch Biosphere Reserve
FLC	Buck Lake Association Friends of the Lake Committee
FOCA	Federation of Ontario Cottagers' Association
MMAH	Ontario Ministry of Municipal Affairs and Housing
MNR	Ontario Ministry of Natural Resources
MOE	Ontario Ministry of the Environment
OP	Official Plan
TP	Total Phosphorus
TSF	Township of South Frontenac
UNESCO	United Nations Educational, Scientific and Cultural Organization
ZBL	Zoning Bylaws

Executive Summary

This plan was created by the Buck Lake Association in response to a growing collective awareness that increased human activity on and around Buck Lake is having an adverse effect on water quality. It was also in response to an appreciation that various government services or programs were being reduced or withdrawn, and that if a proactive approach was to be taken regarding the future health of the lake, this would have to be undertaken by lake residents.

Intended to be a "living document," this plan will be reviewed and updated periodically as new information and issues are identified. It explains the objectives of lake planning and outlines the specific focus that the Buck Lake Association envisions. It delves into the geography of the area and provides an extensive social history of the Buck Lake environs. The foundation of this plan – the report on findings – includes in-depth, scientific and social research undertaken by the Buck Lake Association and/or various provincial ministries. The synthesis of this research resulted in the "future challenges/opportunities" section that identifies what can be done by the Association as well as by individual lot owners. The plan will be submitted to The Township of South Frontenac and to the County of Frontenac for consideration by policy-makers and planners.

This plan – a fusion of existing Ontario government research with research commissioned by the Association – represents the combined efforts of numerous lake residents, cottagers and stakeholders. It presents findings from:

1. a Lake Planning Survey (2009);
2. a Water Quality Study (2009);
3. a Fish Summary (by the Ontario Ministry of Natural Resources); and concludes with,
4. an analysis of Future Challenges and Opportunities.

Planning a Sustainable Future for Buck Lake

The greatest challenges to Buck Lake are – and will continue to be – water quality protection, appropriate property development and maintenance of natural habitats and shorelines. Only through a concerted effort of all individual lake users will we be able to preserve the water quality of the lake for future generations – which is integral to maintaining ecosystem health and the social, economic and recreational enjoyment of the lake. Accordingly, the plan endorses the following 11 measures and actions:

1. continue monitoring programs to provide an ongoing record of water quality parameters;
2. re-implementing the Dock Talk program to educate landowners about eco-friendly and sustainable practices for lakefront owners;

3. maintain partnerships between the Buck Lake Association, the Ministry of the Environment, the Ministry of National Resources, the Health Unit and Cataraqui Region Conservation Authority to encourage support for continued monitoring;
4. improving septic systems through regular inspection;
5. promoting awareness of threats to water quality through education and good stewardship practices;
6. protecting shoreline vegetation;
7. stopping the use of pesticides, herbicides and fertilizers;
8. creating a buffer of one metre from lawn to shoreline;
9. using phosphate-free detergents and cleaning agents;
10. encouraging use of four-stroke marine motors and phasing-out of two-stroke motors; and,
11. limiting fuel spillage.

This plan aims to promote sustainable development within the entire watershed. Development should be undertaken with extreme caution. Accordingly, this plan endorses the following nine recommendations:

1. encourage The Township of South Frontenac to strengthen the Official Plan and zoning bylaws statements to limit development disturbances on the waterfront;
2. request that recommendations from this plan be integrated into township planning documents;
3. encourage protection and enhancement of shoreline buffer and natural areas during and following development;
4. encourage application to shoreline development of all relevant Conservation Authority regulations;
5. educate landowners in the watershed about development pressures and how they can be minimized;
6. encourage The Township of South Frontenac to implement tax incentives to encourage shoreline buffer zones and regular (every three to five years) septic pumping;
7. encourage The Township of South Frontenac to implement incentives to replace outdated/defective septic systems;
8. educate the community on the merits of composting toilets; and
9. encourage The Township of South Frontenac to implement incentives to construct composting toilets.

"If any [lakes] surpass the rest in picturesque beauty, we should incline to give the palm to Buck Lake and its vicinity."
~ Charles William Cooper in *Frontenac, Lennox and Addington: An Essay*, 1856.

1. Introduction

Buck Lake is composed of a North and a South Branch and is located approximately 30 minutes north of Kingston, Ontario along Perth Road. The lake and entire watershed are included in the Frontenac Arch Biosphere, a United Nations Educational, Scientific and Cultural Organization Biosphere Reserve. Additionally, a significant portion of the North Branch abuts Frontenac Provincial Park to the west. The Ontario Ministry of the Environment (MOE) also recognizes Buck Lake as a "Highly Sensitive Lake Trout Lake." Buck Lake was first settled in the early 1800s and as of 2011 there were approximately 457 property owners (480 lots) with lake frontage.

The Buck Lake community wants to preserve and enhance the future of the lake and surrounding watershed. Once a pristine natural environment, untouched by humans, the lake is now surrounded by residential development. People are attracted to the area by its recreational opportunities, natural environment and social values which the stakeholders would like to see these preserved for future generations. The conception of the Buck Lake Plan occurred in 2003 when a subcommittee of the board of directors of the Buck Lake Association (BLA) was struck to investigate the lake planning process. This subcommittee has since changed into the Friends of the Lake Standing Committee (FLC), who, with board approval, completed a Terms of Reference (see appendix) and outlined what was to be included in the plan.

The Buck Lake Plan was prepared using a community-based process that identified the natural, physical and social values viewed as the most important in preserving the quality of life around the lake. In order to determine what aspects of the lake were viewed as the most important, a survey was distributed in 2009 to all known property owners around the lake. The Buck Lake Plan is intended to be a "living document" that will be reviewed and updated as new information and issues are identified. It was developed with the guidance of the BLA Friends of the Lake Committee with information from The Township of South Frontenac, the Federation of Ontario Cottagers' Associations (FOCA), the Cataraqui Region Conservation Authority (CRCA), the Ontario Ministry of Natural Resources (MNR) and the Ontario Ministry of the Environment (MOE). The plan was created in response to a growing sense of collective awareness that increased human activity on the lake will add pressure on and around Buck Lake, adversely affecting water quality and lake trout survival.

2. Acknowledgement of Participants and Stakeholders

The development of this plan began in 2008 and since that time many lake residents and

volunteers have helped to make it happen. Most recently in the summer of 2011 the plan took a great leap forward when the BLA hired Anthony Hommik, a candidate in the Master of Urban and Regional Planning program at Queen's University in Kingston, Ontario to research and write the draft document. His work was undertaken as part of the internship program between the first and second years of this degree. Following the creation of the draft planning document, both the Friends of the Lake Committee and the board of the Buck Lake Association have reviewed and amended it.

This plan is a combination of publicly available government data, research by various government ministries, previous work by the Buck Lake Association and Anthony's primary research carried out under the terms of his internship. Many people helped to support Anthony's work including: Liz Whelpdale and Wayne Myles who supervised the project; Kathy and Ralph Wirsig who provided their research on the history and development of the area; Gigi Foster who summarized the findings of the Lake Planning Survey; Barbra Rose Perry who synthesized the water quality study; Duncan Sinclair who provided excellent background information with respect to the history of the Buck Lake Community and many sources to explore; Lindsay Mills at The Township of South Frontenac who answered questions relating to planning; Travis York with the Cataraqui Region Conservation Authority who prepared and provided the maps for this plan; Susan Greaves at the Queen's University Maps, Air Photos, Data and Government Information Centre who provided the historical maps of the area; and Dr. Brian Osborne, Professor Emeritus of Geography, Queen's University, who reviewed the social history section and made valuable suggestions. The FLC also provided valuable feedback. Finally, acknowledgement must be given to the leadership and contribution of earlier BLA board members, Fred Johnston, Jim Nolan and Mary Rawlyk.

3. Background to the Buck Lake Plan

The Lake Plan for Buck Lake was conceived in April 2003. At that month's board meeting a motion was proposed and approved to appoint a subcommittee to look into the subject of lake planning. The members of this subcommittee were Jim Nolan, Mary Rawlyk and Fred Johnston. The board's impetus to explore the idea of lake planning came from a "growing sense of awareness that what it [had] engaged in over the course of a half-dozen years did not represent a conscious, premeditated stewardship over a lake community that each of us [had] come to admire, enjoy and covet; our actions reflected a rear-guard reaction to events taking place over which we had little control, and only occasionally even, some influence."
Fred Johnston prepared *A Report on Lake Studies* in March 2004, asking the question: "If the property owners on Buck Lake do not assume a leadership role in the nurturing care of the lake, who will?" The overarching reason for looking into lake planning was to preserve the lake community for future generations.

At the time, official plans failed to distinguish between waterfront property and traditional land use regulations. Simply put, municipal and provincial governments did not fully consider the unique planning requirements of waterfront property. However, encouraging changes were starting to occur. The report notes that "in the absence of governmental responsibility for dealing with the special needs of waterfront property owners, public interests were beginning to band together, to form community organizations and to justify change based on research into the conditions of individual lakes." One of the most important aspects in good planning is the extensive involvement of stakeholders, and this willingness of the public to become involved in the lake planning effort represented a significant change. The original objectives set out by the subcommittee were as follows:

1. To investigate what is involved in producing a Lake Plan.

2. To determine how The Township of South Frontenac views lake planning and how it might wish to make use of such plans.

3. To consider how a Lake Plan might benefit all stakeholders on and around our lake.

4. To identify and make contact with provincial and local government and non-government agencies concerned with the environment as sources of information and/or assistance.

5. To report to the board in an ongoing, timely manner on our activities and findings.

6. To engage other members of the board in our activities.

The efforts of the subcommittee represent invaluable work toward the goal of producing a formal lake plan. Jim Nolan, Mary Rawlyk and Fred Johnston as well as other members of the board gathered a lengthy list of contacts, attended various relevant conferences and meetings, met with local governmental representatives, planners, and scientists, and collected a significant number of data sources and existing lake studies and plans to inform a Lake Study for Buck Lake. The group also identified a preliminary list of issues that were to be addressed in the plan. In conclusion, the committee recommended that, "**contingent on the willingness of members to volunteer for the many tasks to be accomplished at the pre-plan stage, a significant increase in membership, and most importantly, the availability of funds, we plan the initiation of a Lake Plan Study for Buck Lake.**"

A Report on Lake Studies was written in 2004, in part to apply for funding from Ontario's Trillium Foundation but the application was unsuccessful. Membership in the Buck Lake Association (The Buck Lake Protective Association at the time), as a result, experienced a reduction in numbers and hence was lower than what it is today. Consequently, interest in lake planning wavered for some time.

In 2005-06 the BLA board under the leadership of board member, Jim Manuel, applied for funding for a FOCA program called Dock Talk. This time the application was accepted with enough money to hire three part time people: a

co-ordinator and two assistants. Buck Lake resident Jana Johnson was hired as the co-ordinator. The Dock Talk project was primarily educational with a stewardship focus, engaging property owners in individualized conversations around responsible care of waterfront property. Both year-round and seasonal residents volunteered to participate. They engaged in a site visit by one of the employees with a conversation about aspects of lakefront living including septic systems, shoreline management and eco-friendly household products. These conversations included gentle suggestions for improving practices affecting water quality and researching answers to questions raised by participants. Seventy-five Buck Lake property owners participated in the program during the 2006 summer season.

In 2008, the BLA board of directors again made the lake planning effort a top priority. Wayne Myles was assigned as the director of this project, and to oversee the ad hoc Friends of the Lake Committee. It was determined very early by the FLC that the focus of the plan was to be on preserving water quality. Since then, volunteering for activities related to the lake planning process has increased substantially, membership in the BLA has risen, and the BLA has been able to fund this endeavour. In 2011 the FLC was upgraded to a standing committee to continue to oversee the Lake Plan.

Some lake residents perceived that their right to use their property as they saw fit might be affected by decisions arising from the Association's planning. It became clear that neither an overly zealous approach to lake planning, nor one that was intrusive and did not include the support of a majority of lake residents, would be acceptable. The board recognized that education and inclusiveness would be critical to the success of the lake planning process.

4. What is Lake Planning?[1]

Lake planning is a strategic process that provides the opportunity to engage all people, governments and business operators in developing and implementing actions to maintain or improve the natural and social qualities of life on our lakes, rivers and shoreline communities. Planning and management of our lakes and river systems has been ongoing for many decades. However, until the recent revival of the lake plan community-based approach in 1999, these processes had been primarily conducted in a top-down manner by federal, provincial and municipal governments. Reasons for their involvement were usually geared towards specific resource uses.

The main shift in this new community-based approach is that it puts the process into the hands of the community, so they may have a voice in the establishment of stewardship actions and government planning regulations at

[1]Excerpted from FOCA and French Planning Services, *Lake Planning Handbook for Community Groups* (Peterborough: FOCA and French Planning Services, 2010). *Planning Handbook for Community Groups* (Peterborough: FOCA and French Planning Services, 2010).

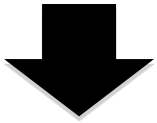
all levels. The process embraces the principles and stages of other planning processes for forest, parks, water and resource management planning, and for establishing municipal planning policies.

The purpose of lake planning is to engage community members in identifying and protecting the unique characteristics of a specific shoreline community, and to recommend land use policy and/or stewardship approaches to ensure long-term protection, sustainability, maintenance and restoration of natural, social and physical features. It results in consensus-based actions and extends the responsibility of implementation to all people in the community. A lake plan is not a legal document and should not be undertaken in reaction to a development proposal or used to regulate or police activities in the community. It has no legal standing as provincial legislation or municipal bylaws. A lake plan is a long-term action plan, developed by the lake community, to protect the health and special features of a lake. A lake plan reflects community consensus about what is needed to protect the natural, physical, cultural and economic aspects of a lake and its watershed.

4.1 Why Do Lake Planning?[2]

The Purposes of Lake Planning:

- Identify and protect specific lake values.
- Promote community discussion and action.
- Educate and communicate with all community members.
- Set a future vision for the lake.
- Set environmental and social targets.
- Recommend stewardship actions.
- Recommend land use policy.
- Create a current inventory or snapshot of resources.
- Identify issues and impacts.
- Recognize and address new issues.



The Benefits of Lake Planning:

- Identify and give voice to common values and concerns.
- Bring lake inhabitants together as a community.
- Engage and represent people beyond Association members.
- Identify and develop partnerships.
- Fill an information gap by synthesizing existing information.
- Engage people to think about the future.
- Instil a sense of responsibility and accountability.
- Engage and harmonize multi-jurisdictions.
- Inform external agencies about the values and concerns of the lake community.
- Build awareness through communication and education.
- Define existing and future desired character.
- Provide a history of the lake community.

[2] FOCA and French Planning Services, *Lake Planning Handbook for Community Groups* (Peterborough: FOCA and French Planning Services, 2010).

5. Vision Statement and Focus of the Plan

The Buck Lake Association mission statement is "**to enhance people's enjoyment of Buck Lake now and for future generations.**" The vision statement for the Lake Plan is:

To preserve and enhance the health of Buck Lake and its watershed for generations to come.

Achieving this vision for Buck Lake (or for any lake) constitutes a substantial challenge given the quantity of water it contains. This water is constantly exposed to two major threats: the natural process of eutrophication and anthropogenic (human) effects on the environment.

Eutrophication is a natural process by which bodies of water (like lakes and ponds) gradually become transformed into swamps and eventually disappear as a result of water being displaced by composted plant material. Normally eutrophication takes place very, very slowly – over thousands, if not millions, of years. This process has been taking place in Buck Lake since glaciers at the end of the last ice age created the lake. Sadly, human impact on lakes generally speeds up the process of eutrophication, primarily by increasing the volume of nutrients that enter the water, thereby accelerating the rate at which algae, weeds and other vegetation grow. There is nothing we can change to alter the natural eutrophication process. However there are many things we can do to modify, reduce, even eliminate the accelerating effects on that process that are a consequence of human impact. As a result, the Buck Lake Plan will be focused primarily on ways and means of moderating the rate of eutrophication. The results of the Lake Planning Survey, discussed in a subsequent section, corroborate the focus on water quality set forth by the BLA.

6. Buck Lake and its Environs

Buck Lake is approximately 30 kilometres north of Kingston, Ontario in Frontenac County (44° 31 N, 76° 27 W). Buck Lake spans the boundaries of Loughborough, Bedford and Storrington Townships. The lake is situated at approximately 130 metres above sea level and the North Branch has a surface area of 2.64 km^2 while the South Branch has a surface area of 4.91 km^2. The mean depths of the North and South Branches are 10.5 and 12.4 metres, respectively. A significant portion of the western shore of the North Branch abuts Frontenac Provincial Park and the entire lake is

How do nutrients (especially phosphorus and nitrogen) get into our water?

- Use of poorly constructed or improperly maintained septic tanks and tile fields to dispose of sewage and so-called "grey water" from sinks, showers, *etc.*
- Cutting down vegetation right to the water's edge. Such vegetation normally filters and slows down the rate of rainwater run-off
- Use of fertilizers on lakeside lawns, gardens and flower beds.

(Source: www.scienceclarified.com/El-Ex.Eutrophication.html)

included in the Frontenac Arch Biosphere, a UNESCO recognized site. In general, the lake has a rocky shoreline with steep slopes and the surrounding land is of poor agricultural quality, covered primarily in forest.

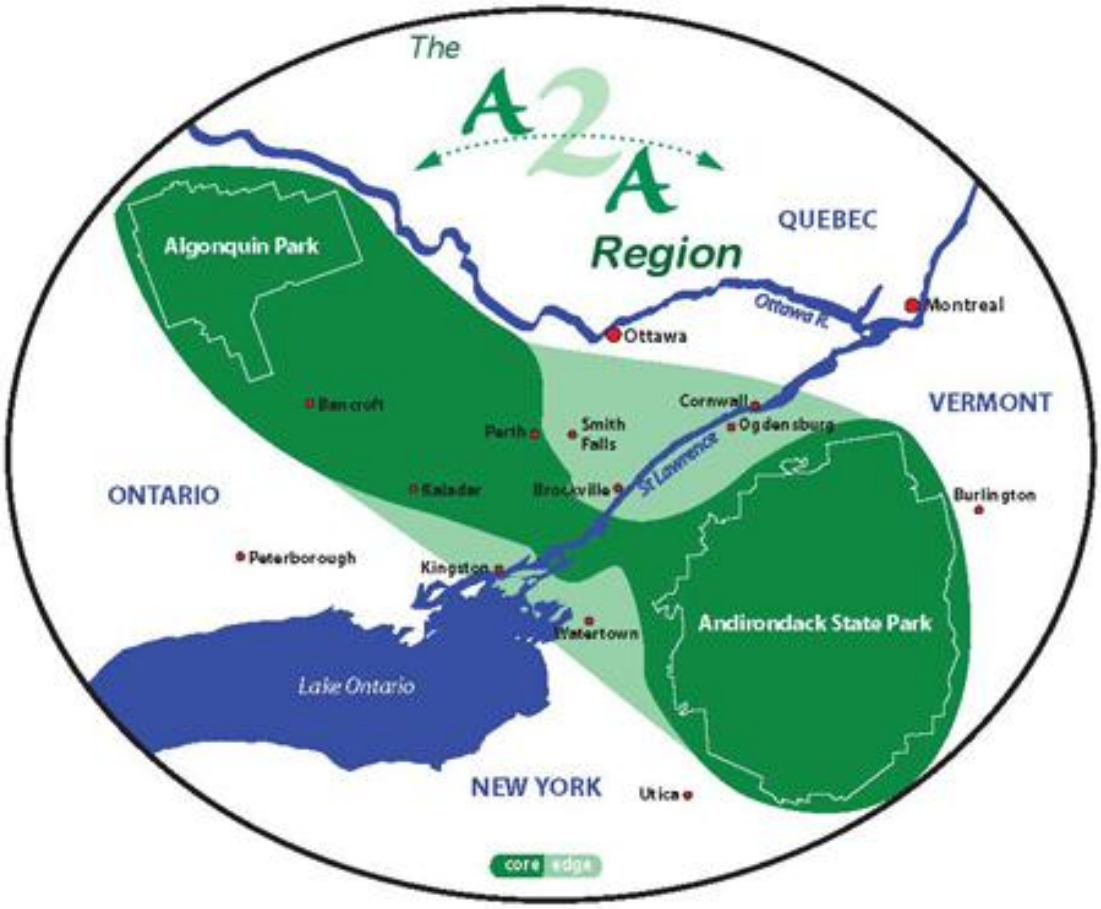
Buck Lake is essentially composed of two distinct water bodies separated by a stream running under Perth Road through a culvert. The North and South Branches are different shapes and sizes with different watershed sizes and bedrock geology, and therefore experience different water qualities. A watershed refers to all lands that drain into a specific water body. Buck Lake is located in the Cataraqui River watershed, but the North and South Branches also have their own individual watersheds. The watershed that surrounds and drains into the North Branch has an area of 10.6 km^2, while the South Branch watershed covers 51.28 km^2. The flushing rates for the North and South Branches are 0.12 and 0.28 times per year, respectively. This is a measure of the amount of the lake's volume that flows out of the lake each year. In other words, the North Branch clears all of its water every 8.3 years, whereas the South Branch does this every 3.6 years. Approximately 25 streams drain into Buck Lake from the surrounding watersheds and a virtually incalculable amount of groundwater finds its way into the lake.

The Canadian Shield, made up of Precambrian rock, covers an enormous portion of Canada. While the geology of the area around Buck Lake very much resembles the Canadian Shield, Buck Lake is situated on a narrow belt of Shield known as the Frontenac Arch in the Grenville Province of the Shield. The Frontenac Arch links the Adirondack Mountains of upstate New York with the Canadian Shield and separates the St. Lawrence Lowlands from the Great Lakes Lowlands. Limestone plains occupy these lowlands. We tend to think of the geology of the region as being shaped by glaciers, but there are geological features in the Buck Lake region that have been dated at over one billion years old. Exposed Precambrian rock (predominantly granite, quartzite, gneiss and marble) and small areas of glacial till (a mixture of unsorted rock fragments from clay to boulders deposited directly from glaciers without water transport) are characteristic of the area. The exposed Precambrian rock was left behind when glaciers scoured the area from about 75,000 years ago until they retreated about 12,000 years ago. The glaciers of the last ice age also created the myriad of lakes, ponds and wetlands in the region.

Not only is the Frontenac Arch rich in geologic history, it is also home to some of the richest biodiversity in Canada. The Arch connects Adirondack Park in New York state with Algonquin Park and serves as a funnel for movement and dispersal of wildlife including wide-ranging mammals like the fisher. The Frontenac Arch is known, in particular for its high diversity of amphibians like salamanders, frogs, toads, and reptiles such as turtles, snakes and the only lizard in Ontario, the five-lined skink. The area is also home to a large number of rare and threatened species such as the common musk turtle, the least bittern, the

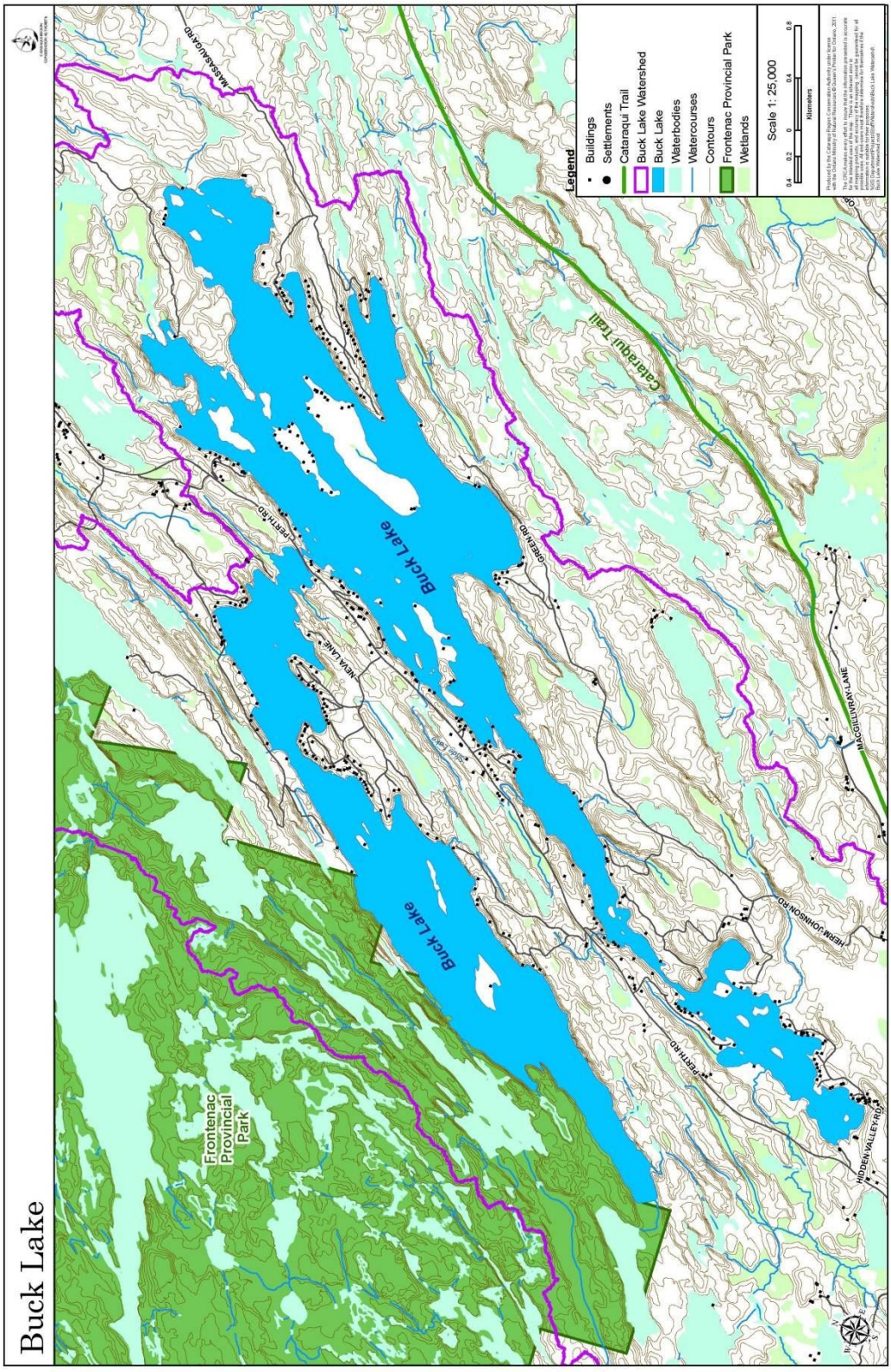
cerulean warbler, the blunt-lobed woodsia (a fern) and the gray ratsnake.

Map 1 – Frontenac Arch

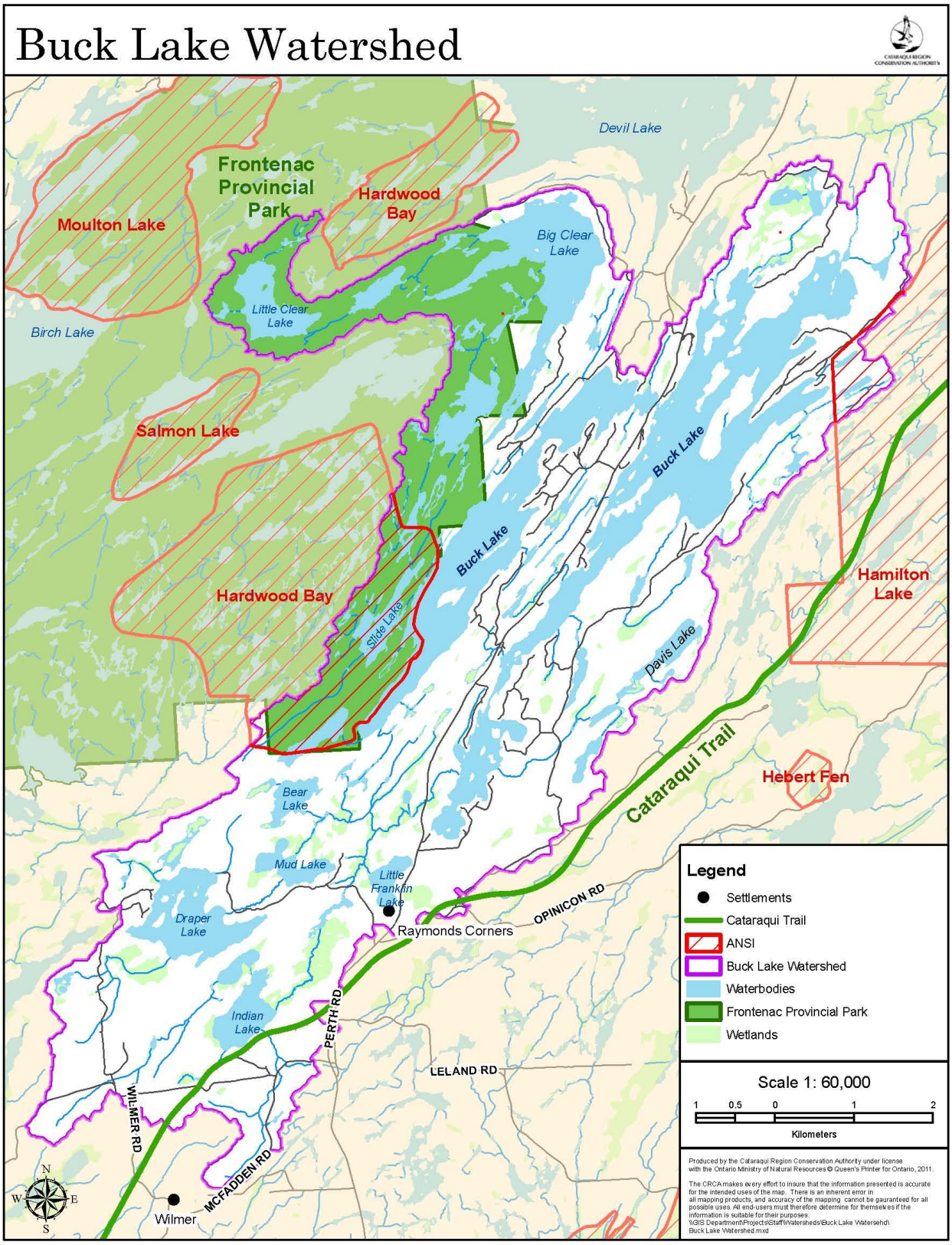


(Source: Mississippi Valley Field Naturalists)

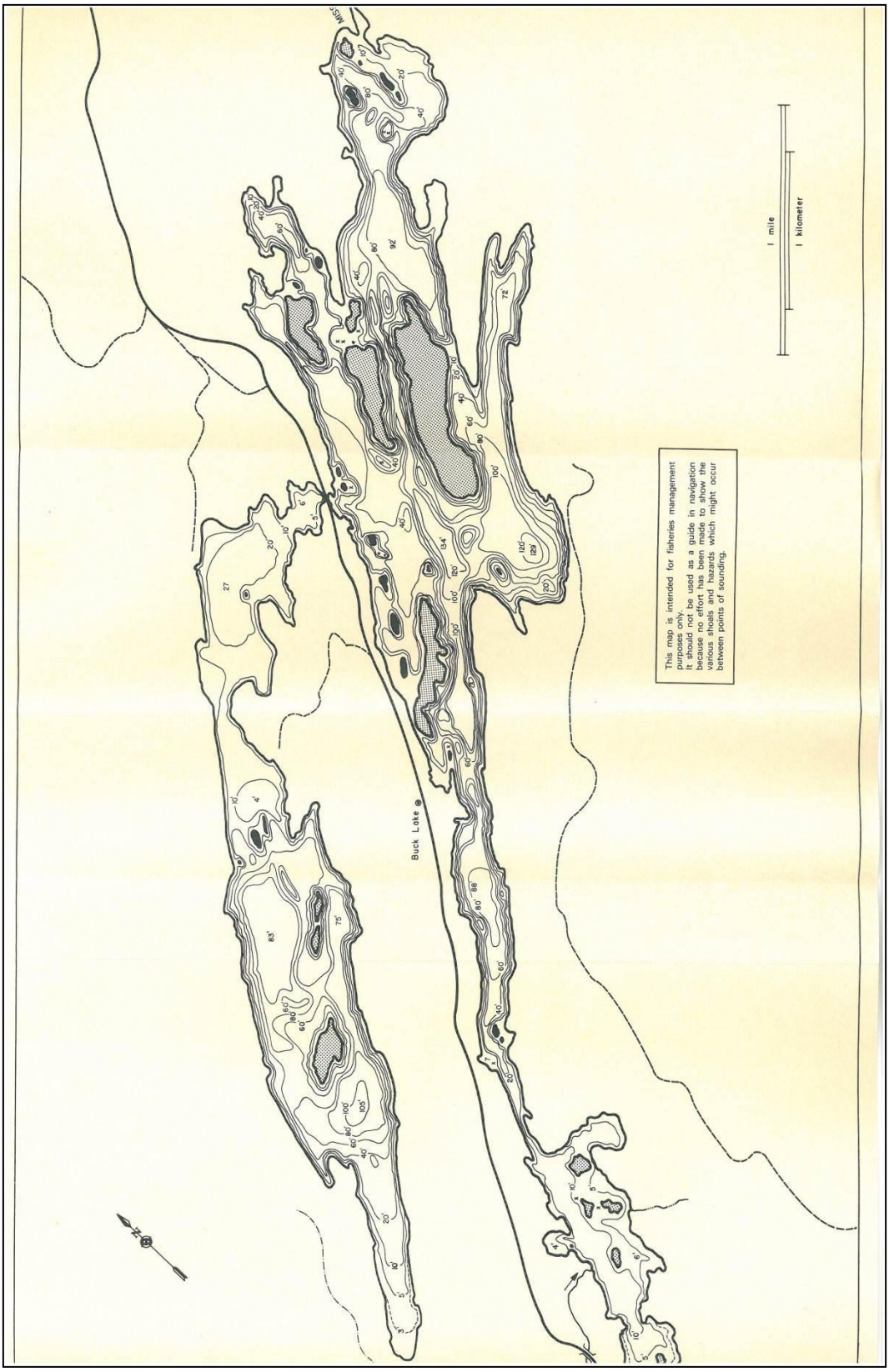
Map 2 – Buck Lake



Map 3 – Buck Lake Watershed



Map 4 - Lake Bathymetry (Lake Depths)



7. Social History of Buck Lake and its Community

It is generally agreed that First Nations peoples began to occupy southern Ontario, including the area north of Kingston, after the retreat of the last Ice Age (11,000 BCE). Unfortunately, according to Ron Vastokas, the very earliest inhabitants of Frontenac County left few remains.[3] We know that the first inhabitants came from the Great Plains (the area between the Mississippi River and the Rocky Mountains in the United States) and it is thought that the large game animals that colonized the area around the Great Lakes attracted them. Around 9,000 years ago, the local climate began to warm, bringing more species of plants and animals – and the human population increased. A population that was predominantly reliant on hunting now began to trap, fish and gather seeds, berries and tubers. The period from seven thousand years ago until three thousand years ago is known as the Archaic Period when two cultures existed in Ontario – the Laurentian culture of southern Ontario and the Shield culture, coinciding with the geography of the Shield.

By the late Archaic Period, "we find evidence of increased population growth, noticeable adaptations to regional resources, widespread trade, and the appearance of several technological innovations – namely the making of clay pots." [4] The Woodland period of prehistory begins around three thousand years ago. At this time, the Shield cultures were still very much dependent on hunting and fishing, but in the Laurentian cultures we see a "greater variety and richness in material goods and ceremonial life." [5] Another important arrival made its way from the Mississippi and Ohio Valleys in this period – the growing of maize (corn). By about a thousand years ago, the "hunting and gathering communities of southern Ontario were settling down into villages and were beginning to raise corn, beans, squash and tobacco." [6] These communities evolved into the Iroquoian tribes that we read about, as described by the French explorers and missionaries. First contact between the First Nations of the area and Europeans commenced with the explorations of Samuel Champlain in 1615 and the settlement established by Count Frontenac at Cataraqui (Kingston) in 1673. Control shifted to the British with the arrival of the Loyalists in 1783 who acquired the lands behind Kingston from the Ojibwa Mississauga "as far as a man could travail (sic) in a day," by the Crawford Purchase of 1783. These lands were the traditional hunting grounds of the former occupants, the Haudenosaunee (Six Nations Iroquois Confederacy) and the Anishinaabe (Ojibway, Mississauga and Algonquin) peoples who occupied the region at the time of the arrival of the British.

[3] Ron Vastokas, "Before Written History," in *County of a Thousand Lakes*, ed. Bryan Rollason (Kingston: Frontenac County Council, 1982), 10.

[4] *Ibid.*
[5] *Ibid.*
[6] *Ibid.*

With the establishment of the province of Upper Canada in 1791, the survey of lands commenced and, as early as 1792, Alex Aitken was instructed to survey lands to the rear of Pittsburgh, Loyalist Township. He abandoned his task because "I would be putting Government to a useless expense to Survey lands that will never be settled." [7] Samuel Wilmot took over from Aitken and he too declared that the land "cannot be settle (sic), being either rocks or swamps."[8] In 1821 Samuel Benson was charged with surveying Bedford Township and three years into the project he gave up, explaining that the "land is so bad that there can never be settlement affected (sic) on it."[9] All of these initial surveyors expressed serious doubts about the quality of the land for agriculture and settlement because they were encountering the Frontenac Axis of the Canadian Shield that extended from the north, through Kingston's hinterland and extended across the St. Lawrence to the Adirondacks. The lands surrounding Buck Lake were considered unsuited for pioneer settlement, best developed as timberlands, and long remained a pristine wilderness until their beauty attracted new attention.

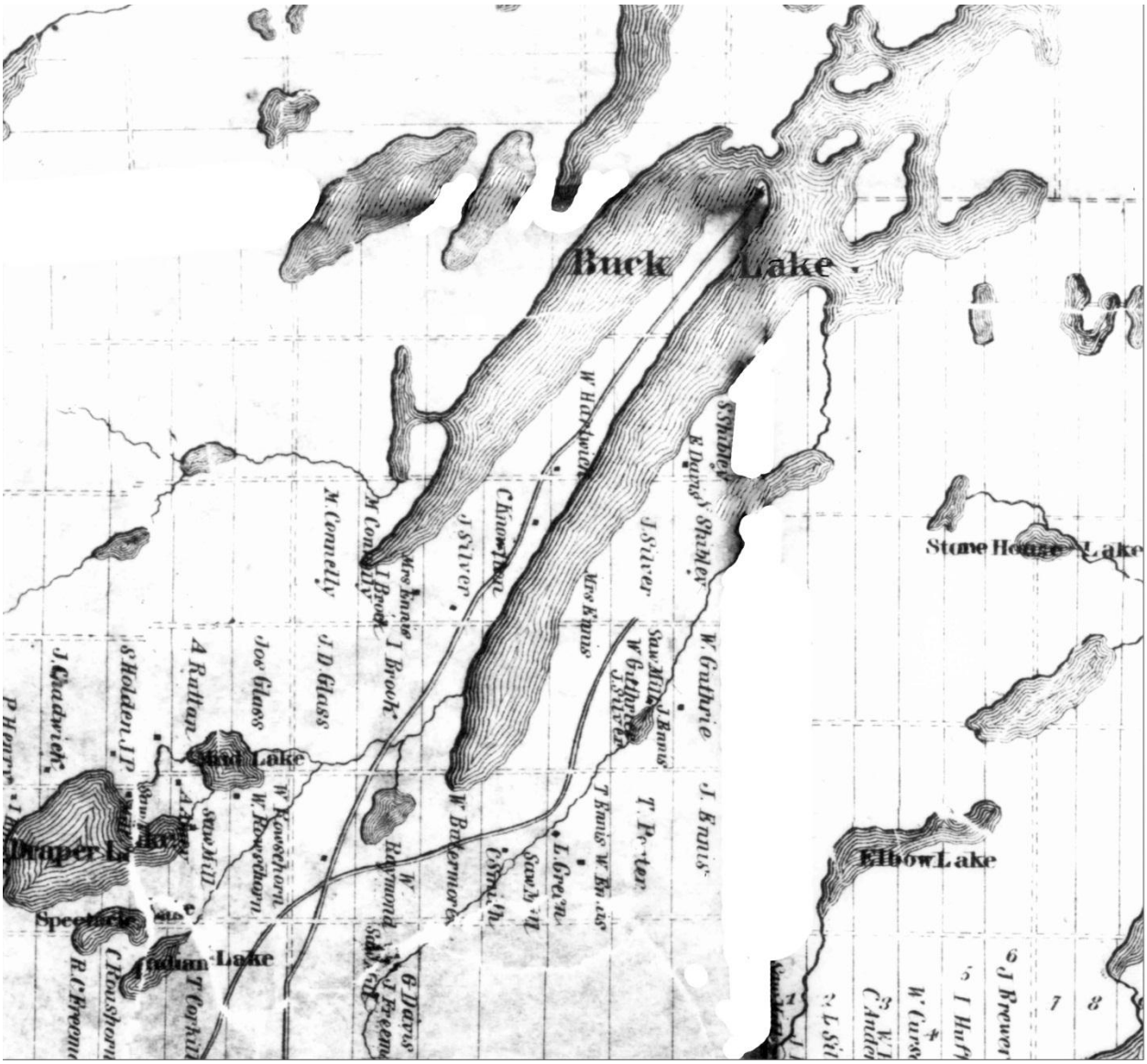
Field notes from the original surveyors indicate that people were living in the area at the turn of the 19th century, but it is likely they were squatting on land that was not owned by them. As Fuchs and Barber note, "driven by reasons of their own – desire, poverty, sheer lack of alternatives, curiosity, single-mindedness, antisocial tendencies, wanderlust, ambition – they had followed a mere shadow of a trail"[10] into the wilderness. Rankin's 1832 field notes confirm that settlers must have frequented the area before then because he makes reference to the names Buck, Bear and Draper Lakes. It is unclear who named the lakes originally or precisely when people started to settle the area. Although the area was still very remote, we do know that Chaffey's Mill was already established on the Massassauga Creek in 1826 and Benjamin Tett was operating a mill, a store and a distillery at Bedford Mills as early as 1829, according to his own personal notes.

It wasn't until the passing of the Baldwin Act (formally known as the Municipal Corporations Act) in 1849 that official communities were formed. For the Buck Lake area, the most important byproduct of the Baldwin Act was that road construction began in earnest. In the early 1850s the Kingston hinterland was virtually without road transport. Thanks to the efforts of Sir John A. Macdonald and John Counter, the Mayor of Kingston at the time, a company was established in 1850 to build a legitimate road to Perth, Ontario. Progress was slow, but it was reported in the *British Whig* that in 1855 James Campbell had sold some 30 lots on the new Perth Road in what would become New Inverary[11] (Inverary today). Inverary was as far as the stagecoach travelled at the time, so people had to either drive by horse or walk from Inverary to Kingston. The Perth Road was winterized in 1856 and it is clear that the road

[7] Brian S. Osborne and Donald Swainson, *Kingston: Building on the Past for the Future*, Kingston: Quarry Press, 2011, 167.
[8] Barber and Fuchs, *Their Enduring Spirit*, 25.
[9] *Ibid.*
[10] *Ibid.,* 21.
[11] *Ibid.,* 199.

improvement was the catalyst in opening up the backcountry. Perth Road Village was first settled in the mid-1800s but grew substantially in 1870 when Christopher Roushorn discovered lead in the area. At the time, the village was known as Stoness Corners, after founders James and Jabez Stoness. The second major factor in the settling of the backcountry was the Great Famine in Ireland. Between 1845 and 1852, a million people emigrated from Ireland, some of whom arrived in Kingston and sought cheap property in the hinterland.

In 1860, H.F. Walling produced the first map that depicted the area well. On this map we can see 10 lots that have been patented to various individuals or families, roughly as far north as where Norman Lane is today. The following names were included on the 1860 map: P. Woodcock, S. Shibley, E. Davis, J. Silver, Mrs. Ennis, C. Smith, W. Batermore, I. Brook, M. Connolly, C. Knowlton. The map also shows us that some of these landowners had already constructed buildings at the time of the mapping.



Walling's Co. Map, 1862 (Detail)

Curiously, by the time of the next mapping in 1878 by the Meachem Map Company (note the very distorted sizes of the North and South Branches on both the 1860 and 1878 maps), very few of the names from 1860 were still evident in the area. The 1878 map shows people living all around both the North and South Branches of Buck Lake, including a concentration of residents along Perth Road from Buck Lake past Devil Lake. The names on this map include: David Sears, H. Sears, William Sears, Henry Green, William Green, Jabez Stoness, N. McCallum, William See, Benjamin Aykroyd, I. Cobett, James C. Darling, Joseph Darling, C.W. Darling, Joseph Harris, George McFarlane, George Teepell, Thomas Votrey, Thomas Galliger, George Ennis, John Ennis, James Hamilton, John Richardson, John Buck, S. Hartman, H. Scott, S.W. Davis, W.E.M. Davis, S. Ennis and James Rutledge. There is one particularly dark story from these early settlers. Elijah Vankoughnet murdered John Richardson in 1881 at his home on Buck Lake. For the murder,

Vankoughnet entered the history books as the last man hanged in Frontenac County. At this point a small amount of land was still controlled by the Canada Company, a large private British company established in 1825 to aid in the colonization of Canada. The Green Family was among the first settlers of the area, having arrived from either Ireland or Chicago. The Green Family was made up of hunters, trappers, fishermen and guides. An old Green family cemetery still sits on Roushorn Road and direct descendants of the original settlers still live on the lake.

J.H. Meacham & Co. Atlas, 1878 (Detail)

The major drivers of commerce in the area were logging and mining and the biggest entrepreneurs around Buck Lake were the Tett and Chaffey families. In the 1860s the combined operations of John Chaffey and Benjamin Tett were milling as much as seven million board feet per year, making them one of the biggest mills on the entire Rideau system. A substantial amount of logging occurred around Slide Lake, and the logs were floated to the Tett or Chaffey mills via Buck Lake. The largest concentration of logging activity occurred around Lake Opinicon, where there were three mills, owned by James Hunter, Charles Gildersleeve and the Tett-Chaffey operation. Initially, many of the mills were sawing boards for settlers to construct houses, but as the lumber business grew, wood was being floated down to Kingston or up to Ottawa. As part of this endeavour, John Chaffey built 44 boats, tugs and barges at Bedford Mills. Many of the logging entrepreneurs also helped open up the backcountry. After a section was logged it could then be sold as farmland.

Shortly after logging brought settlers into the area, mineral deposits were discovered. Apatite (also referred to as phosphate; primarily used in fertilizer manufacturing) was discovered around Buck Lake in the 1870s, during the height of the lumbering. Mica was also discovered in the area in the 1880s. The mica in the area north of Kingston is of the muscovite variety (the most common form of mica; can be split into very thin sheets) and it was used in the production of isinglass. Transparent isinglass sheets were used for peepholes in boilers, lanterns and stoves because mica was less likely to shatter under extreme heat. Mica was also crushed up and used as what is referred to as a dry-lubricant, especially for tank treads in World War I. The mica was mostly shipped to Buffalo, but there was a mica cobbing (separating the crystals from the waste) operation in Sydenham. The raw mica was transported down to Kingston on barges and then loaded on the Kingston and Pembroke Railway back up to Sydenham until the Canadian Northern Railway came through the area in 1912. This section of the Canadian Northern ran from Smiths Falls down to Strathcona, north of Napanee and made shipping the mica to Sydenham far less time consuming and costly. The Canadian National Railway eventually acquired this section of track and today we know it as the Cataraqui Trail. People may have used the Canadian Northern to get to Buck Lake, as there was a stop in Perth Road Village. Visitors would have travelled on the Grand Trunk Railway and transferred up to Smiths Falls on the Canadian Pacific.

British companies funded most of the mining ventures, but the Tetts, thanks to revenues from the timber business, financed their own mica mine. Additionally, several substantial commercial mines opened up in the area – General Electric's Lacey Mine near Sydenham, the Frontenac Lead Mine near Wilmer, and the Richardson Feldspar Mine near Thirty Island Lake. The largest single crystal of mica ever found was discovered at the Lacey Mine and weighed approximately 330 tons, measuring 10 x 4.3 x 4.3 metres.[12] Closer to Buck Lake proper, an exploration site was established in 1860 on the spine of land between Slide and Buck Lakes, searching for gold, iron, silver and lead. In addition to the larger commercial mines, farmers would supplement their incomes by selling whatever

[12]Peter Rickwood, "The largest crystals," *American Minerologist* 66: 885-907 (1981).

This is a current start for a living history of the lake that will be updated in the future. At present, there is a committee of Buck Lake residents working on compiling stories from around the lake and historical information about the lake. Anyone who has stories of their ancestors or who would like to contribute to lake history is invited to contact the committee at: mailto:info@bucklake.ca

info@bucklake.ca

minerals they came across while working the land. We often hear of Buck Lake residents discovering small mine openings on their properties. It is quite likely that this is where a farmer, trying to eke out a living, would extract whatever mica or phosphorus he could find. In addition to logging and mining, trapping would have been the next largest source of commerce in the area.

Mining had a boom period from the 1880s to the 1890s, but, in 1893, it was reported that large quantities of phosphates were discovered on the surface in Florida, meaning that it could virtually be scooped up with a shovel, a process known as strip mining. Almost immediately, the United States imposed an embargo on Canadian phosphorus imports, causing the market to crash, leading to the end of phosphate mining in the area. Eventually, cheaper mica was found elsewhere and gold, silver, iron and lead were never found in quantities worth extracting. The logging industry also began to fade away around the turn of the 20th century. The beaver had been trapped to near extinction and the deer population was dwindling, not to reappear in significant numbers until the 1960s and 1970s. As industry was declining, families began abandoning the marginal farmland in the area as well. Subdividing the land around Buck Lake for cottage lots started to occur in the mid 1920s and the 1930s. Several American families purchased land around the lake for the purpose of selling cottage lots. One man in particular, Charles Meyer, had a significant amount of land that he bequeathed to a local man by the name of George Matthews. The land was eventually acquired by the Norman family who played a major role in expanding the Buck Lake community from the 10 families of 1869 to the many more who live on and around the lake today.

8. Development on Buck Lake

As mentioned in the history of Buck Lake, the environs were first settled in the early 1800s. There is little record of the early settlers, but we know that by 1860 there were 10 families who owned lots with Lake Frontage. By 1878, the number of property owners with frontage had risen to about 30. There is a significant lack of publicly available data from the late 1800s until the 1990s, but we know that in 1993 there were 268 total buildings on Buck Lake. At the time, on the North Branch there were no reported permanent homes and 77 seasonal dwellings. There were 15 permanent dwellings and 176 seasonal dwellings on the South Branch. Currently there are approximately 110 dwellings on the North Branch and 260 dwellings on the South Branch. It is difficult to estimate how many new homes or cottages may be built on Buck Lake in the future, as there are still empty lots around the lake. The creation of new lots, however, is unlikely while it has a lake trout designation. Under the lake trout designation the current restrictive setbacks and lot size are guaranteed to remain fixed.

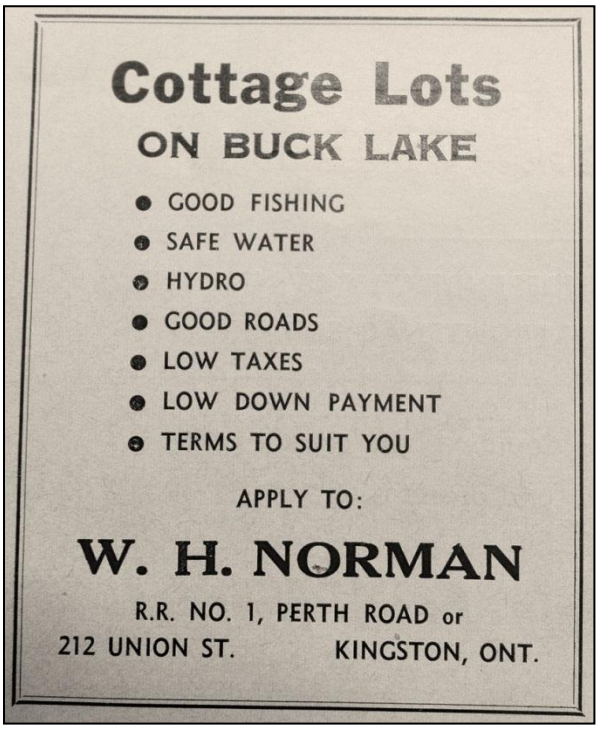
However, a decline in the trout population, improvements in septic system technology, or a resetting of acceptable phosphorus levels, could each have a bearing on allowable development, through relaxation of the criteria of the lake's capacity for development – and lead to the removal of the lake trout designation.

More houses built means more pressure on our environment. In the case of Buck Lake, water quality is the main environmental concern now and will be into the foreseeable future. Realizing that some development is inevitable, and arguably necessary, the aim of this plan is to ensure that all development is done in a sustainable manner. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs. In the words of Duncan Sinclair,[13] "we will eventually use up the lake and all that it provides for us, the question is how fast will we do so?"

The Buck Lake Plan is intended to complement the Official Plan (OP) for The Township of South Frontenac. The purpose of the OP is to "provide vision, goals, objectives and policies to direct the physical development of The Township of South Frontenac while having regard for relevant social, economic and environmental matters." In order to understand what is meant by development in an official sense, we borrow again from the OP. Development means the "creation of a new lot, a change in land use, or the construction of buildings and structures, requiring approval under the *Planning Act*." The OP also includes a Natural Heritage Goal: "development decisions will be made from a long term cumulative impact point of view which protects the natural heritage systems within the Township." In other words, The Township of South Frontenac is promoting sustainable development. When considering development, it is important to understand that all lands adjacent to all

[13]Duncan Sinclair is a Buck Lake resident and former president of the Buck Lake Association.

Township lakes are considered environmentally sensitive areas because of the potential impact development may have on water quality. We must be cognizant that water quality is not only a concern on lands immediately adjacent to the lake, but throughout the entire watershed. However, specifically all land within 90 metres of the high-water mark is considered to be environmentally sensitive. Keeping this in mind, the OP calls for vegetation within this setback to be disturbed as little as possible, and the soil mantle should not be altered at all. This is to minimize lake impacts by reducing phosphorus inputs, preventing erosion and by maintaining a natural appearance. Additionally the minimum setback for building construction is 30 metres and all development inside of this will require an Ontario Environmental Impact Assessment.



(An advertisement from a 1960s Frontenac County tourism brochure)

The OP recognizes that "development is one of the factors which may reduce the ability of a lake to maintain a healthy, self-sustaining lake trout population by adding nutrients (phosphorus and others) which may negatively impact water quality, thereby reducing the lake trout population." The Ontario Ministry of the Environment has recognized Buck Lake as a "highly sensitive lake trout lake," meaning that the lake is *at capacity* for development due to the potential to add phosphorus or other nutrients, directly or indirectly, into the lake.

The OP echoes this, stating, "Development and/or site alteration will not be permitted on a highly sensitive lake trout lake (*i.e.,* they cannot accommodate additional development). The OP further explains that "generally, the creation of new lots, through the severance consent process, within 300 metres of a highly sensitive lake trout lake will not be considered for approval due to the potential to further degrade the water quality." It is important to note that the lake trout designation is based on the dissolved oxygen content in the water, and future development may eventually be permitted due to the implications of new technologies. For example, if a new septic system was to be installed and it could be shown to have zero effect on lake water oxygen content, development may be allowed to proceed.

Existing lots on record may be subdivided or developed provided they follow the same conditions set forth in the above paragraph – and new lots may be created within 300 metres under special or unique circumstances. Furthermore, the OP has effectively stopped the development of lots without water frontage on private roads (i.e. back-lot development). The Buck Lake Association was instrumental in working with the Township of South Frontenac to stop back-lot development. It is hoped that the OP and policies at the county and provincial level will minimize new development around Buck Lake. The township building inspector enforces these policies and every effort is made to pursue legal action when an infraction is discovered.

As mentioned earlier, development at the OP level refers to new lots and new structures, but it only applies to structures of a certain size. Currently in South Frontenac, any building with a footprint of less than 108 square feet does not require a building permit. All structures, regardless of size must still adhere to the minimum setback requirements. As an example of impact on water quality, a building of this size could serve as a bunkie, which could house more guests/residents on the same septic system, resulting in increased nutrient loading. Outhouses pose another challenge since they also do not require a permit. Improperly constructed outhouses will result in leaching into the groundwater and then into the lake. An initiative that could assist in improving the sustainable future of the lake would be to construct new or retrofit existing outhouses into composting toilets. They utilize living organisms (like worms) to break down our waste into an end product of clean soil, much like the process in a typical backyard food composter.

Again, in order to preserve the water quality of Buck Lake, the purpose of this Lake Plan is to advocate for good citizenship. By learning about the increased pressure development places on the lake, it is hoped that residents will understand, agree with and therefore follow the rules. The aim is to educate stakeholders around the lake to ensure development is done sustainably and sensibly. This plan aims to convey to all lake users the importance of preserving water quality to help ensure a healthy ecosystem for all creatures – human and

non-human – that call the lake home. We hope to see future construction, be it new homes, new cottages, or conversion of cottages into homes done as sustainably as possible with utmost regard for all stakeholders.

<u>What is an official plan</u>?

(From the Ontario Ministry of Municipal Affairs and Housing)

An official plan describes your upper, lower or single-tier municipal council's policies on how land in your community should be used. It is prepared with input from you and others in your community and helps to ensure that future planning and development will meet the specific needs of your community. An official plan deals mainly with issues such as:

- Where new housing, industry, offices and shops will be located.
- What services like roads, water mains, sewers, parks and schools will be needed.
- When, and in what order, parts of your community will grow.
- Community improvement initiatives.

Why do you need an official plan?

Your municipality's official plan:

- Lets the public know the municipality's general land use planning policies.
- Makes sure that growth is coordinated and meets your community's needs.
- Helps all members of your community understand how their land may be used now and in the future.
- Helps decide where roads, water mains, sewers, garbage dumps, parks and other services will be built.
- Provides a framework for establishing municipal zoning bylaws to set local regulations and standards, like the size of lots and height of buildings.
- Provides a way to evaluate and settle conflicting land uses while meeting local, regional and provincial interests.
- Shows council's commitment to the future growth of your community.

9. Reports on Findings

This section provides summaries of studies that have been completed or commissioned by the BLA. The recommendations suggested at the end of each study summary have informed the future challenges and opportunities section by highlighting areas of concern around Buck Lake. So far the lake planning survey and the water quality study have been completed, but more projects have been planned and will commence in the near future. Upcoming studies will focus on shorelines, netting, loons, lake trout, shore fish, frogs, toads, turtles, birds, invasive species, and flora and fauna (the BioBlitz project). Upon completion, these studies will be summarized in this section, and the future challenges and opportunities section will be expanded accordingly.

9.1 The Lake Planning Survey

The Lake Planning Survey (summer 2009) solicited information from Buck Lake users about a variety of issues pertaining to the appearance of the lake, the aspects of their lake experience that they valued least and most, and ideas they have about preserving and enhancing the lake. This section summarizes the findings from this survey, with the aim of crafting some recommendations for future actions to preserve and enhance the lake for current and future generations to enjoy. To create the survey, sample surveys from other lake associations in the area were used as templates, and the questions and framing were customized to the context of Buck Lake. Richard Linley, a BLA volunteer managed the process of uploading the survey online, creating a link from the Buck Lake website to the survey, and managing the response data.

A print survey was distributed to all 457 known property owners on the lake on a late June weekend in 2009, mostly by boat, but also by land to mailboxes. All surveys were wrapped in plastic bags and attached to people's docks, one dock at a time. This time-intensive process was made possible due to the generous assistance of about 15 BLA volunteers, who took the opportunity to meet with property owners and spread the word about other Association activities. Respondents were invited to complete the survey online or mail it in or drop it off at specified sites. By September, the survey was taken offline and results were tabulated. Approximately 33 per cent (150 surveys) of property owners responded either online or via hard copy.

The survey contained basic identifying information about each respondent, including name and contact information, along with scaled response items (standard agree-disagree questions) and questions asking for free-form answers. Information about whether each respondent resided on the North or South Branch of the lake was merged in following further due diligence after the survey had been administered. (see Appendix IV for full report).

The survey asked three main questions followed by a list of items for the respondent to check off (copy of the survey in Appendix III):

1. What is your connection to Buck Lake?
2. Over the last five years, how do you feel that appearance of the shoreline has changed on the lake with respect to the following?
3. Values: Please rate how the following values add to your personal enjoyment of Buck Lake (please check one box for each of the personal values listed.

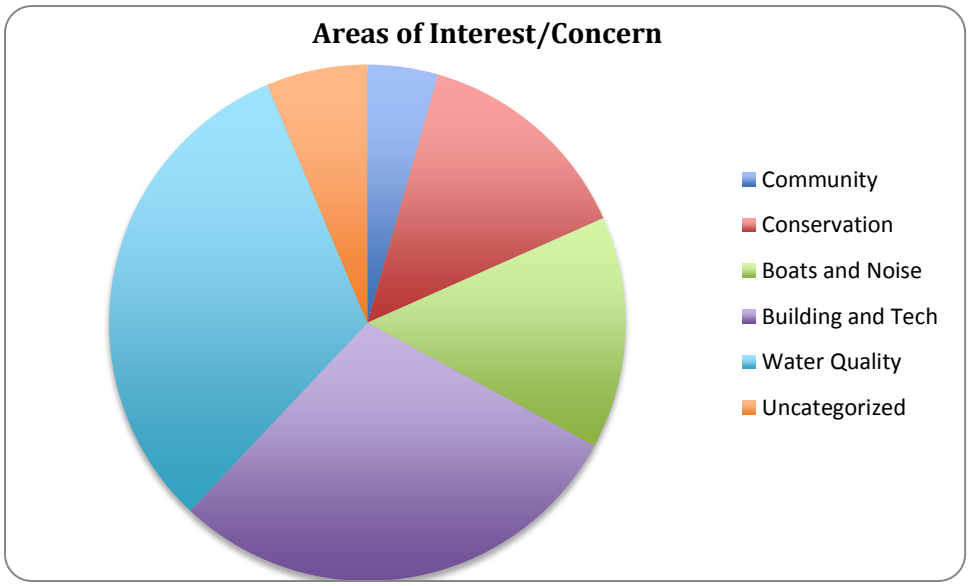
Above all other results obtained from this survey, in terms of importance and statistical strength, respondents value water quality, and the vast majority value it very highly. Of the 134 respondents who answered the question of how important water quality was to them, they all responded important or very important (seven important and 127 very important). While stated preferences and beliefs in regard to many items were varied, water quality was important to everyone. This concern was also evident throughout the free-form answers, suggesting actions to preserve and enhance the lake into the future. Below are some quotations that relate directly to water quality:

Other widely held preferences include some level of concern about development (88 per cent of respondents) and some level of enjoyment of non-power boating (87 per cent of respondents). These concerns can also be interpreted as indirectly relating to water quality. Higher development levels would be associated with more people (hence more potential for lake pollution); and the enjoyment of non-motorized boating would probably be lower if the lake were more polluted. Those who enjoy muscle- or wind-powered boating choose and/or enjoy it because they know they are not contributing to water pollution. Responses

Selected respondent's quotations:

- "continue to monitor the quality of the water"
- "encourage proper disposal of grey water"
- "inspect septic systems"
- "upgrade of septic systems"
- "no fertilizer anywhere"
- "continue water control monitoring"
- "deal with lake pollution – algae bloom very bad this year"
- "research the cause of the algae"
- "septic inspections and lake pollution from lawn, grey water, etc."
- "every boater or cottager needs to be mindful of how they use the lake and leave no pollution"
- "grant to hire a student to wash boats at the culvert before they enter Buck Lake"
- "ensure water is clean/weed free"
- "education on preserving water quality"

indicate that seasonal and year-round residents are quite similar in their preferences, although respondents from the South Branch were statistically more likely to be seasonal residents than respondents from the North Branch. The following graph illustrates the five main areas of interest/concern with respect to lake planning.



A few more respondent quotations:

- "We don't want too much Big Brother – we like activity and enjoy boats and watercraft of all types!"
- "Not that I'm opposed to powerboats, just dirty/smelly/loud boats on a small lake where most users/owners value peace and quiet, and many drink the water. The standard rules as to near-shore speeds limits are totally ignored as far as I can tell. Motors that release oil into the water should be prohibited completely: if it's not OK to just pour oil from the can directly into the lake, why is it OK to have the motor do it?"
- "Many good education moments have been presented by various experts, but only a few dedicated souls attend. Getting more of this information to all residents would be a good thing to do."
- "The survey is useful. It's a good way to identify shared concerns around the lake."

Recommendations:
- Educate Buck Lake residents about the threats posed to water quality by malfunctioning septic systems, conventional motor use, fertilizer use, boat washing, and grey water disposal.
- Building and development around the lake should be undertaken cautiously.
- Educate residents about the importance of maintaining natural habitats and shorelines.
- Promote sensible-boating awareness.

9.2 The Water Quality Study

The Buck Lake Association hired Reg Genge in 2009 to conduct a Water Quality Study of Buck Lake for inclusion in the Lake Plan.[14] The following is a very short summary of the most important findings (the full report is 377 pages). There is also a more comprehensive executive summary of 36 pages that can be found on the website noted below.

Buck Lake has been well documented with respect to water quality from 1972 to 2008 by the MNR, MOE and the BLA and both basins of Buck Lake are managed as cold-water lake trout fisheries by the MNR. As such, it has been the focus of some recent efforts (2005, 2007 and 2008) to document water quality, particularly as it pertains to recording oxygen and temperature conditions. A new more restrictive oxygen objective is being applied and the most recent efforts have been concentrated on determining if these objectives can be achieved in the late summer. At this point, neither the North nor the South Branch can achieve the new oxygen objective. The data reconfirms the need for the "at capacity" designation that has been applied to both basins of Buck Lake. From this analysis there has not been much change in water quality in the 36 years of record. There are some gaps in the record, but data on more than 20 different parameters are discussed in the report. The most plentiful data available pertains to the trophic state indicators, which are the most telling parameters as they have direct links to the human use of lake shorelines. The highlights are discussed below.

Water Clarity: Generally, there have been complete ice-free season Secchi dish (a standard instrument used to measure water clarity) depth recordings from 1972-2008, with some gaps in the South Branch from 2001 to 2008.

Water Quality: Water quality has not declined in either basin. The South Branch has better water quality and is classified as oligotrophic (generally having little or no aquatic vegetation, few nutrients, and relatively clear) while the North Branch has poorer levels and is classified as mesotrophic (intermediate productivity and medium nutrient levels).

Chlorophyll-a: This is a pigment found in photosynthetic algae and is used as a measure of algal productivity. Analysis for this parameter was undertaken from 1975 to 1995. The data set is more complete for the North Branch, but both basins show a decline in algal levels and this is consistent

[14] http://www.bucklake.ca/lakeplan/waterquality2009.pdf

with findings across Ontario. Once again based on this parameter, the South Branch is classified as oligotrophic while the North Branch is mesotrophic.

Phosphorus: The data set for the phosphorus levels is sparse until 1996. Using derivative total phosphorus (TP) values from chlorophyll concentrations, an examination of trends through time has been accomplished. Both basins show a decline in TP over this time period but the relationship is weak. The North Branch has higher levels than the South Branch, but they both exceed the levels for lake trout lakes. Based solely on phosphorus, both basins would actually be classified as mesotrophic. Collectively, while the three parameters are separate and distinct, the data indicates that each is supportive of the other. Water clarity has changed little if any. Total phosphorus appears to have declined and chlorophyll-a concentrations have declined. These observations provide some confidence to the conclusion that conditions for these three parameters have not changed and may in fact have improved very slightly over the period of record. The nitrogen to phosphorus ratio is also an indication of lake trophic status and using this ratio, both basins are considered to be oligotrophic.

Oxygen: The most critical parameter for Buck Lake (especially the North Branch) is the poor oxygen level in the hypolimnion (the dense bottom layer in a thermally-stratified lake). Data from 21 readings indicates very poor conditions from mid-summer through the fall turnover in each year. Likely as a result of lake morphometry and local topography, there is incomplete mixing in the spring turnover. Factors contributing to the poor oxygen conditions are small volume, large epilimnion (top-most layer) relative to hypolimnion, small watershed and a slow flushing rate. The North Branch is sensitive to nutrient loadings, and shoreline development is contributing to poor water quality. The oxygen levels in the South Branch are better than the North, but are still of concern from late August to September. Better oxygen levels in the South Branch are directly related to a larger and deeper basin with a small epilimnion to hypolimnion ratio, and the fact that it has a much larger watershed with a higher flushing rate. It is still very important to be vigilant about reducing nutrient loadings from the shoreline, as the oxygen conditions at the end of summer are marginal for lake trout.

Recommendations:

- The BLA should attempt to record a more intensive phosphorus sampling throughout the ice-free season for at least one year.
- Water clarity readings should be taken twice monthly in both basins from ice-out until fall turnover. This provides the longest dataset to allow for trend over time analysis.
- It is time to collect current data for deep-water oxygen levels in both basins. These recordings should be made as soon as possible after ice-out and then monthly until late fall. These findings will affect fisheries management and shoreline development decisions.
- It is important for the BLA to educate all the shoreline owners of the threats posed to water quality by their near-shore activities.

Buck Lake Association Actions:

- The BLA began monthly phosphorus testing in 2010 and are continuing with this endeavour. There are two testing sites on each branch, and testing is done monthly from April to October.
- The BLA is taking bi-weekly Secchi disk readings to measure water clarity in the same sites as above, also from April to October.
- MNR has done oxygen and temperature readings in 2010. These could be continued to provide a long-term baseline of data.

9.3 Ministry of Natural Resources Fish Stock Summary[15]

GAME FISH:
Lake trout: Density, size, age distribution and growth compares favourably with most other local lakes where trout are found. In some years, low dissolved oxygen in the hypolimnion (deeper cold water zone) in late summer and fall reaches a critical level for trout, especially in the North Branch. This results in poor recruitment and/or a decrease in the population. In general though, the population is stable with an estimated maximum population of 2,000 fish and able to sustain a fishery where approximately 400 fish averaging four pounds can be harvested each year. Because of the low oxygen factor, the lake has reached its maximum capacity for shoreline development. This is mainly due to runoff from disrupted shorelines that adds to the sediment and organic matter entering the lake. This is the primary cause of oxygen depletion by a process called eutrophication.

Splake: (lake trout - speckled trout cross) six stockings of approximately 4,000 fingerlings each, mostly in the North Branch, were done from 1984 to 1989. Probably none still exist.

Northern pike: There is a good population of generally larger, faster growing and healthier fish compared with other local lakes.

Large and small mouth bass: Good numbers, but smaller and slower growing fish than in other lakes. This is believed to be the result of high angling pressure.

PAN FISH:
Black crappie: Good numbers but generally smaller fish. Black crappie is especially heavily fished through the ice.

Yellow perch: Good healthy population.

Sunfish (bluegill and pumpkinseed): Plentiful.

Rock bass: Plentiful.

Bullheads (yellow and brown): A higher number of larger fish compared to other lakes.

FORAGE FISH:
Lake herring or cisco: The main food for trout and are plentiful and healthy averaging 12 to 14 inches in length.

Minnows: The most common and important food for bass, pike and crappies are the common shiner, golden shiner and bluntnose minnow.

Small members of the perch family: logperch, darters are common.

White suckers: Plentiful

Whitefish: Few and seldom caught by anglers but were caught by MNR nettings in 1992 (1) and 1997 (2), so presumably a small population exists.

Fish stocking in Buck Lake: Other than the

[15]http://www.bucklake.ca/misc/MNRBuckLakeFishSummary.pdf

splake, there have been several stockings of lake trout and bass on and off from 1935 to 1989.

Walleye: Four stockings of almost 200,000 each time. These were last netted in 1960, so obviously didn't survive.

Muskellunge: Five thousand were stocked in 1965, but apparently did not survive.

Recommendations:

- The BLA should work with municipality (Official Plan) and Buck Lake residents to support protection and enhancement of lake trout habitat.
- The BLA should work with Buck Lake residents to reduce nutrient inputs.
- The BLA and lake residents should improve shoals to create better breeding sites for trout.

Buck Lake Association Actions:

- The BLA has completed a water quality study in 2009.
- The BLA continues to monitor water quality on a regular basis.
- The BLA and MNR are working together to monitor fish populations including fish netting sampling in 2011.

10. Future Challenges and Opportunities

The greatest challenges to Buck Lake will arise in the areas of water quality protection, appropriate property development, maintenance of natural habitats and of natural shorelines. The causes of these challenges can be divided into four categories: development, redevelopment, human activities and natural occurrences. This plan provides five actions/opportunities that broadly fall into the realms of land use planning and zoning, stewardship and education. These actions/opportunities are intended as educational tools to inform stakeholders of what can be done from the BLA level right down to lot level. Only through a concerted effort of all individual lake users will we be able to preserve the water quality of the lake for future generations. These areas of concern were widely identified as the most pressing in the lake planning survey and the water quality study (see Recommendations boxes at the end of the preceding Reports on Findings sections).

10.1 Surface Water Quality

Respondents of the survey ranked water quality as the number one concern. Water quality is integral to maintaining ecosystem health and the social, economic and recreational enjoyment of the lake. Water quality is affected by many activities such as (but certainly not limited to) nutrient run-off from farms and lawn fertilizers, poor septic maintenance, shoreline and upland erosion from removal, alteration of shoreline vegetation, and near-shore development.

What can we do?

- Continue and enhance the monitoring programs on Buck Lake as needed to provide an ongoing record of water quality parameters.
- Re-implement the Dock Talk program that was initiated in 2006 and that sponsored presentations to 100 participants of which 75 were Buck Lake residents. The aim was to educate landowners about eco-friendly and sustainable practices for lakefront owners and sharing information about such things as septic beds and naturalized waterfronts.
- Maintain partnerships that exist between BLA and MOE, MNR, Health Unit and CRCA to ensure support is available for continued monitoring.
- Maintain and improve our septic systems by having septic systems inspected and regularly maintained to ensure proper working order.
- Promote awareness of threats to water quality through education and good stewardship practices.
- Protect shoreline vegetation and reduce removal – this vegetation acts as a buffer keeping nutrients from running off from upland areas into the lake. No mowed lawns within one metre of the shoreline to create a shoreline buffer.
- Stop the use of pesticides, herbicides and fertilizers to avoid excess nutrients entering the lake.
- Stop mowing lawns within one metre of the shoreline to create a shoreline buffer.
- Use phosphate-free detergents and cleaning agents.

- Work to phase-out the use of two-stroke motors.
- Limit fuel spillage.

10.2 Development Pressure

One of the greatest challenges facing Buck Lake is maintaining the lake's health and rural character while meeting the demands for development and redevelopments. The conversion of cottages to permanent homes is increasing pressure on the lake. The Buck Lake Plan aims to promote sustainable development within the entire watershed. Since Buck Lake is a provincially designated "highly sensitive lake trout lake," development should be undertaken with extreme caution.

What can we do?

- Encourage The Township of South Frontenac (TSF) to strengthen the Official Plan (OP) and zoning bylaws (ZBL) statements to limit development disturbances on waterfront.
- Request that recommendations from this plan be integrated into township planning documents.
- Ensure that shoreline buffer areas and natural areas are protected/enhanced during and following development.
- Ensure that all relevant Conservation Authority regulations are being applied to shoreline development.
- Educate all landowners in the watershed about development pressures and how they can be minimized.
- Encourage TSF to implement tax incentives to encourage shoreline buffer zones and regular (every 3 to 5 years) septic pumping.
- Encourage TSF to implement incentives to replace outdated/defective septic systems (possibly requiring an approved system to be put in place prior to sale of a property or the issuing of a building permit).
- Educate the community on the merits of composting toilets.
- Encourage TSF to implement incentives to construct composting toilets.

10.3 Fish and Wildlife Habitat

Protecting, maintaining, and enhancing fish and wildlife health on the lake was also identified as an important objective in the survey. Respondents were particularly concerned with lake trout, loons, blue herons and osprey. Maintaining a healthy and natural ecosystem will protect fish and wildlife populations, and will preserve an important part of the lake's natural beauty and recreational enjoyment for many users.

What can we do?

- Continue to monitor water quality.
- Ensure sustainable populations of all fish species are maintained.
- Encourage continued fish studies on the lake by MNR and MOE.
- Increase and rehabilitate fish and wildlife habitat.

- Encourage lake residents to plant native species along shorelines and forested corridors.
- Educate the Buck Lake community about the importance of maintaining a healthy indigenous fish and wildlife population.
- Obey posted speed limit signs and afford wide berths around important habitat areas.
- Follow guidelines from section 10.1 on surface water quality.

10.4 Shoreline Health

The shoreline of a lake is the most biologically diverse area of the lake. Shorelines provide essential habitat for waterfowl, fish, reptiles, mammals and insects to breed, find protection, move and feed. A healthy shoreline also helps to stabilize banks, filter contaminants from entering the lake, offers beautiful views and controls soil erosion. Protecting the shoreline, along with adjacent buffer zones and upland areas, is one of the most important steps in maintaining a healthy lake ecosystem and protecting the overall water quality of the lake.

What can we do?

- Educate the Buck Lake community about the benefits of maintaining a natural shoreline.
- Show examples of shorelines that have been maintained, protected or have had action carried out to restore the shoreline.
- Ensure examples are published in the newsletter.
- Create annual stewardship awards where the best example of shoreline stewardship receives a small prize and is published in the newsletter.
- Develop firmer language in the OP with respect to shoreline de-vegetation and other shoreline construction (such as no hardened surfaces within 30 metres of the water).
- No pesticide or fertilizer use within a set distance of the water.
- Prevent spilling of fuels with respect to boats, lawn mowers, ATVs, etc.

10.5 Impacts of Boating

Power boating is a popular recreational activity that many lake residents and users enjoy, but concern about the impacts of boating is growing. Motorized boats can introduce invasive species (such as zebra mussels), pollute the environment through emissions, irritate property owners with excessive noise and present a safety concern to swimmers and other boaters. Boat wake can also accelerate shoreline erosion and impact wildlife by flooding nest sites.

What can we do?

- Educate lake users including day users about how to minimize their impact on the lake.
- Encourage the use of non-motorized watercraft like canoes, kayaks, sailboats.

- Encourage upgrading motors to new, lower emission technology and discourage the use of two-stroke motors.
- Encourage more regular Ontario Provincial Police patrols to enforce existing regulations.
- Post more speed limit signs as well as “no wake zone” signs.

11. Looking to the Future

The Buck Lake Plan will evolve over time as it is implemented, reviewed and updated in order to respond to future changes in the lake environment and community. The lake management planning process will continue to consult and involve the Buck Lake community as we move into the implementation stages of the plan. The plan will also be updated as further studies (loons, lake trout, shore fish, frogs, toads, turtles, other wildlife like bald eagles and osprey, invasive species and other vegetation, and the BioBlitz project) are completed.

Just like the updating of the Township of South Frontenac Official Plan, the Buck Lake Plan will be updated to reflect changes in official policies and zoning bylaws. The implementation of this plan begins now and the members of the Buck Lake community are an essential part of the process. Together it is our responsibility to protect the health and preserve the valued features of Buck Lake for an indefinite number of future generations.

The Buck Lake Association will continue to stimulate vigorous discussion along with education and prevention activities within the Buck Lake community. We will also take our planning concerns and development priorities to those responsible for protecting the interests of the broader community of the township, county and province. To this end, the Buck Lake Association will circulate the Buck Lake Plan both in print and on our website to The Township of South Frontenac, Frontenac County, organizations and government offices at the provincial level, and to other interested parties.

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13. Appendices

Appendix I	BLA Friends of the Lake Terms of Reference
Appendix II	Instructions For Adding To The Buck Lake Plan
Appendix III	Buck Lake Association Planning Survey – Questionnaire
Appendix IV	Buck Lake Association Planning Survey - Report

APPENDIX I

BUCK LAKE ASSOCIATION (BLA) - LAKE PLANNING STEERING (FRIENDS OF THE LAKE) COMMITTEE TERMS OF REFERENCE

February 4, 2008

The primary purpose of lake planning is an educational one, focused on gathering information to inform Buck Lakers about the lake and its environs and the Association's advocacy for Buck Lake with the Township and other governments and agencies whose mandates include management responsibilities over activities bearing on the health of the lake and of our community.

The Buck Lake Association (BLA) – Lake Planning Steering Committee Terms of Reference are:

1. To perform a prominent administrative and leadership role in the implementation of the BLA Lake Plan goals and objectives.

2. To educate the BL community regarding the BLA Lake Plan and its goals and objectives through displays, information sessions and workshops.

3. To advise on the advocacy role that the BLA should play given the information gathered in the Lake Planning activities.

4. To mobilize and recruit members of the BL community to assist in achieving the goals and objectives of the BLA Lake Plan.

5. To coordinate the volunteer lists and activities to ensure an effective and timely use of their work.

6. To coordinate the collection and documentation of lake information through surveys, individual data collection sites and group efforts.

7. To oversee the quality and standards of data collection for entry into the BLA database by BLA directors.

8. To oversee the completion of the data collection and its entry into the database in order for the BLA directors to complete a final report on the exercise.

BUCK LAKE ASSOCIATION (BLA)
FRIENDS OF THE LAKE STANDING COMMITTEE
TERMS OF REFERENCE
February 2, 2011

The primary purpose of Friends of the Lake Committee is to educate the residents of Buck Lake about its environs and how we can enhance our enjoyment of the lake for present and future generations.

The Buck Lake Association (BLA) Friends of the Lake Standing Committee terms of reference are:

1. To take the lead in planning for the future of Buck lake by developing and updating the BLA Lake Plan.

2. To coordinate the collection and documentation of lake information to inform Buck Lakers about the lake and its environs through research, surveys, individual data collection and partnering with various government and non-governmental organizations.

3. To offer lake residents opportunities for taking action to sustain and improve to water quality and shoreline of the lake.

4. To perform a prominent administrative and leadership role in the implementation of the BLA Lake Plan goals and objectives.

5. To educate the Buck Lake community regarding the BLA Lake Plan and its goals and objectives through displays, information sessions and workshops.

6. To advise on the advocacy role that the BLA should play with the Township and other governments whose mandates include management responsibilities over activities bearing on the health of the lake and of our community given the information gathered in the Lake Planning activities.

7. To mobilize and recruit members of the BL community to assist in achieving the goals and objectives of the BLA Lake Plan.

8. To coordinate the volunteer lists and activities to ensure an effective and timely use of their work.

APPENDIX II

INSTRUCTIONS FOR ADDING TO THE BUCK LAKE PLAN

NOTES BY ANTHONY HOMMIK

To: Friends of the Lake Committee and Buck Lake Association at large

List of Abbreviations

- Please add any that I may have missed and any that may come up with subsequent studies and/or revisions to the plan.

Executive Summary

- Please feel free to add to or edit this section either now, or when more is added to the plan.

Introduction

- Feel free to edit as you see fit.

Acknowledgements of Stakeholders

- This is a list of all the people who personally helped me along the way. Please add anyone who has contributed significantly before my time and anyone I may have regretfully forgotten.

Background to the Buck Lake Plan

- This section is essentially a summary of the *Report on Lake Studies* from 2004. I felt this sufficed for the background section, but please feel free to add to this.

What is Lake Planning? / Why Do Lake Planning?

- This material is excerpted from the FOCA *Lake Planning Handbook for Community Groups*, 2010.

Vision Statement and Focus of the Plan

- This section is a summary/synthesis of the information that I was provided in the form of a word document entitled "Draft Lake Plan Vision Statement 041010"

Buck Lake Environs

- This section was written with information from a variety of sources, but my aim here was to precisely detail the location and characteristics of the lake.
- I describe the geologic history, as well as the biological environment of the Buck Lake environs.

- The maps in this section (other then the image of the Frontenac Arch) are in PDF form and can be enlarged substantially.

Social History

- This section was written from a variety of books that have been cited as well as research in the Queen's Archives and Queen's Library.
- I can say with absolute certainty that this section only scratches the surface and it is my hope that more stories and history can be compiled either in the plan or in another document entirely.
- This was as much information as I could feasibly gather in the time I had.
- Scans of the 1860 and 1878 maps will be included with my files.

Development on Buck Lake

- This section was written by reviewing the Township of South Frontenac Official Plan as well as zoning by-laws and building code.
- I consulted with Lindsay Mills, planner with South Frontenac to answer some of my more technical questions.
- This was the section where I encountered the most difficulty and frustration.
    - I asked the Township several times if they could provide me with the number of people living on the lake and I was told to look at frontenacmaps.ca and count by myself.
    - I also consulted with Ralph Wirsig who told me that in order to get the number of tax rolls around the lake, he had to look at all of the rolls in hard copy, one-by-one when the township could easily look this up for us on a computer.
    - I also went to the registry office to look into the history of property ownership, but was told that it costs $8 to look at any one lot.
    - Ralph told me that the township doesn't give out this information for privacy reasons (even though this information should be in the public domain).
    - It is therefore my hope that somehow, with more official standing than my own, the BLA can get access to these valuable numbers to determine how many lots can still be built on to give us a sense of development potential around the lake.
    - I didn't have time, but hopefully someone could consult with the Norman Family to get a better understanding of the timeframe concerning subdivision for cottage lots.

Reports on Findings

- I have set up this section so that whenever a new study is completed, the summary can be added here (as 9.3 Loon Study, for example).

- At the end of each section, I have created a box for key recommendations that have come from the particular study.
- These reports inform the following section.

Future Challenges and Opportunities

- In this section I have identified 5 (so far) areas of focus for education and action.
- I provide a short summary of why we have included these areas of focus and how they relate to the reports on findings.
- This section might need some tinkering to figure out exactly how to make it flow well from the preceding section, but for now it is intended to identify the greatest challenges to the water quality in Buck Lake and what is being done/what can be done to protect the water.

Looking to the Future

- This is just a short section to summarize the purpose of the plan. Feel free to edit/add to as you see fit.

Appendices

- I have indicated that the Friends of the Lake TOR, the executive summary from Reg Genge's water quality study, and the Planning Survey should be included in the appendix.
- Please include anything else relevant.

Bibliography

- This is a list of all resources that I used throughout the summer.

Note:

Everything that I have written is to be the best of my knowledge, so by all means if I have improperly stated something, please correct me.

Anthony Hommik

Summer 2011

APPENDIX III

~ Buck Lake ~

Lake Planning Questionnaire

Completing this questionnaire should take less than 10 minutes. Individual answers will be kept confidential. If you feel uncomfortable answering any question, please disregard it. Please answer the questions on behalf of the entire household.

Note: Household refers to immediate and extended family and other permanent or temporary occupants of the property.

1. What is you connection to Buck Lake?

Principal resident	☐	Renting	☐
Seasonal resident	☐	Staying with family or friends	☐
Own vacant property	☐	Operate a business	☐
Other	☐	Operate a Farm	☐

2. Over the last 5 years, how do you feel the appearance of the shoreline has changed on the lake with respect to the following?

	More	**Stayed the Same**	**Less**	**Don't know**
Lawns	☐	☐	☐	☐
Residential Development	☐	☐	☐	☐
Commercial Development	☐	☐	☐	☐
Forest Cover	☐	☐	☐	☐
Shoreline Structures	☐	☐	☐	☐

Shoreline Naturalization	☐	☐	☐	☐
Wetlands	☐	☐	☐	☐

Other _____

Other _____

3. Values: Please rate how the following values add to your personal enjoyment of Buck Lake. (Please check one box for each of the personal values listed:

	Very important	**Important**	**Not Important**	**Don't know**
Water Quality	☐	☐	☐	☐
Water Quantity	☐	☐	☐	☐
Natural Shorelines	☐	☐	☐	☐
Landscapes	☐	☐	☐	☐
Wildlife & Bird Viewing	☐	☐	☐	☐
Fishing	☐	☐	☐	☐
Peace and tranquility	☐	☐	☐	☐
Swimming	☐	☐	☐	☐
Hunting	☐	☐	☐	☐
Power boating	☐	☐	☐	☐
Non power boating	☐	☐	☐	☐
Star Gazing	☐	☐	☐	☐
Preserving vacant land	☐	☐	☐	☐
Cottage Safety	☐	☐	☐	☐
Retention of Crown Land	☐	☐	☐	☐

Other _____

Other

_____

_____

4. Issues and Concerns: During the past five years how much negative impacts have the following issues and concerns had on the enjoyment of your property?

(Please check one box for each impact)

	Significant Impact	**Moderate Impact**	**Light Impact**	**No Impact**
Water Pollution	☐	☐	☐	☐
Boat Traffic	☐	☐	☐	☐
Personal Water Craft	☐	☐	☐	☐
Daytime Noise	☐	☐	☐	☐
Nighttime Noise	☐	☐	☐	☐
Outdoor Light Pollution	☐	☐	☐	☐
Vegetation Removal	☐	☐	☐	☐
Snowmobiles	☐	☐	☐	☐
Development	☐	☐	☐	☐
All-Terrain Vehicles	☐	☐	☐	☐

Other

_____

_____

Other
_____
_____

Other
_____
_____

5. What do you value most about our lakes? Please list your top five values by priority, number (i.) being the most important:

i. _____

ii._____

iii._____

iv._____

v. _____

6. Please identify the top three actions you believe should be taken to preserve and enhance our lakes for future generations:

i. _____

ii._____

iii._____

7. Please provide any additional information or comments in the space below:

_____
_____

_____
_____

8. Would you be interested in volunteering to help with this project YES ___ NO ___

If so, do you have any particular areas of interest or skills?

_____
_____
_____

_____

If you wish, please provide us your name, address and telephone number below:

Name _____

Address _____

_____

Telephone# _____ Email Address: _____

Thank you for your participation!

Please return the survey to:

APPENDIX IV

Buck Lake Planning Survey:
Overview of methods, findings, and suggestions for the future
By Gigi Foster

Introduction

The Buck Lake Planning survey, conducted in the summer of 2009, solicited information from Buck Lake users about a variety of issues pertaining to the appearance of the lake, aspects of their lake experience that they valued least and most, and ideas they have about preserving and enhancing the lake. This brief report summarizes the findings from this survey, with the aim of crafting some recommendations for future actions to preserve and enhance the Lake for current and future generations to enjoy.

Method

To build the survey instrument itself, sample surveys from other lake associations in the area were used as templates, and the questions and framing were customized to the context of Buck Lake. A Buck Lake Association volunteer (Richard Linley) managed the process of uploading the survey to SurveyMonkey, creating a link from the Buck Lake website to the survey, and managing the response data.

We distributed a print survey to all 457 known property owners on the lake on a late June weekend in 2009, mostly by boat, but also by land to mailboxes. All surveys were wrapped in plastic bags and attached to people's docks, one dock at a time. This time-intensive process was made possible due to the generous assistance of about 15 BLA volunteers, who took the opportunity to meet with property owners and spread the word about other Association activities. Respondents were invited to complete the survey online or mail it in or drop it off at specified sites. By September, the survey was taken offline and results were tabulated. Approximately 33% (150 surveys) of property owners responded either online or via hardcopy.

The survey contained basic identifying information about each respondent, including name and contact information, along with scaled response items (scored on standard agree-disagree scales) and questions asking for free-form answers. Information about whether each respondent resided on the North or South branch of the lake was merged in following further due diligence after the survey had been administered.

The design of three core questions in the survey was built around a general stimulus followed by a list of items, each of which was rated by the respondent on a customized rating scale. The first stimulus was “Over the last 5 years, how do you feel the appearance of the shoreline has changed on the lake with respect to the following?” This stimulus was followed by a list of items, each of which the respondent rated on a scale where the (mutually exclusive) options were “More, “Stayed the Same, “Less,” and “Don’t Know”. The second stimulus was, “Values: Please rate how the following values add to your

personal enjoyment of Buck Lake." This stimulus was followed by items to be rated on a scale whose options were "Very Important," "Important," "Not Important," and "Don't Know". The next stimulus was "Issues and Concerns: During the past five years how much negative impact have the following issues and concerns had on the enjoyment of your property?", where the items were ranked on a scale whose options were "Significant Impact," "Moderate Impact," "Light Impact," and "No Impact". Finally, the following relatively unstructured question was included: "Please identify the top three actions you believe should be taken to preserve and enhance our lake for future generations." The free-form answers to this question were coded into categories for analysis, as described below. Other questions on the survey solicited information not directly relevant to the health of the lake or the experiences and preferences of its users.

The data obtained from the questions described above were analyzed using several different techniques. Frequencies and Chi-squared tests were used to determine the overall distribution of answers on each item as well as the statistical significance of any differences in answers by respondents' branch (North or South) or type (seasonal or year-round) of residence. Most free-form answers to the question regarding the top three suggested actions were able to be coded as belonging to one or more of five categories: those dealing directly with water quality (e.g., algae, pollution, septic tanks, fertilizers, etc.); those dealing with building, infrastructure and technology (e.g., development restrictions, by-laws and regulations regarding building, improvement of culverts/ramps/parking, etc.); those dealing with boats and noise (e.g., powerboating limitations, all-terrain vehicle restrictions, etc.); those dealing with conservation-type issues (e.g., preserving landscapes, nesting sites, fish, preventing erosion, etc); and those dealing with community-building issues (e.g., education, outreach, association strengthening, etc). Finally, a small number of regressions were run to determine the associations between stated preferences, suggestions for future actions, and respondent characteristics.

Results

First and far above all other results obtained from the survey in terms of its clear importance and statistical strength, all respondents value water quality, and the vast majority value it very highly. Of the 134 respondents who answered the question of how important water quality was to them, none said anything but "Important" (7 respondents) or "Very important" (127 respondents). While stated preferences and beliefs in regard to many items were varied, water quality was unanimously important. This concern was also strongly in evidence throughout the free-form answers suggesting actions to preserve and enhance the lake into the future. Excerpted below are some verbatim quotations taken from respondents' first suggested action in this section that relate directly to water quality.

> "continue to monitor the quality of the water"
> "encourage proper disposal of grey water"
> "inspect septic systems"

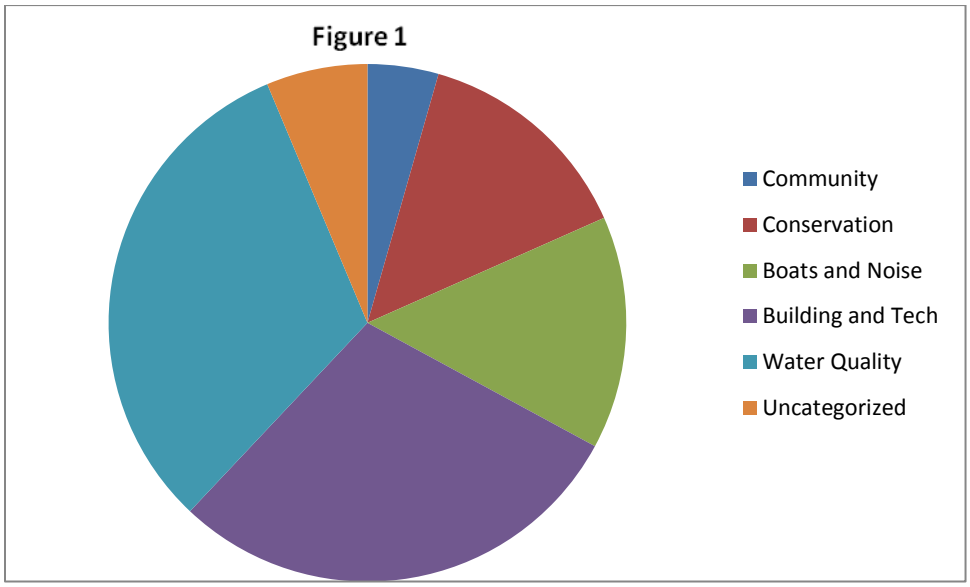
"up grade of septic systems"
"no fertilizers anywhere"
"continue water control monitoring"
"Deal with lake pollution - algae bloom very bad this year"
"Research the cause of the algae"
"Septic Inspections and lake pollutions from lawn, grey water etc."
"Every boater or cottager needs to be mindful of how they use the lake and leave no pollution"
"Grant to hire a student to wash boats at culvert before they enter Buck Lake"
"ensure our water is clean/ weed free"
"education on preserving water quality"

Other widely-held preferences include some level of concern about development (88% of respondents) and some level of enjoyment of non-powerboating (87% of respondents). These concerns can also be interpreted as indirectly relating to water quality. Higher development levels would be associated with more people (hence more potential for lake pollution); and the enjoyment of non-motorized boating would probably be lower if the lake were more polluted. It also may be that those who enjoy muscle- or wind-powered boating choose it and/or enjoy it in part because they know they are not contributing to water pollution via their choice of transport. In support of this theorized connection between boating and water quality concerns, a simple ordinary least squares regression estimated on 51 useable responses indicates that respondents who report a significant or moderate negative impact from personal watercraft and/or boat traffic are statistically significantly more likely to suggest actions related to water quality, even after controlling for the effects of branch, residency type, concerns about noise and development, and personal enjoyment of boating and hunting. Finally, for the vast majority (85%) of respondents, hunting is not important.

In order to isolate preference patterns and significant differences in answers by branch of type of residence, respondents were categorized into the following groups: liking powerboating; liking non-powerboating; being concerned about boating; being concerned about vehicles; liking fishing and/or hunting; being concerned about noise; and being concerned about development. Chi-squared tests indicated that those respondents who value powerboating tend to report less of an impact of water pollution, and to feel less of a negative impact from personal watercraft, than respondents who do not value powerboating. Similarly, responses regarding the degree of negative impact of boat traffic and/or ATVs were highly associated with responses regarding the degree of negative impact of daytime noise (and nighttime noise, for some respondents, in the case of responses about ATVs). The degrees of reported negative impacts of snowmobiles and daytime noise were also correlated.

Responses indicate that seasonal and year-round residents are quite similar in their preferences, although respondents from the South Branch were statistically more likely to be seasonal residents than respondents from the North Branch.

The overall importance across all respondents of each of the five areas into which free-form suggested actions were coded was gauged by calculating the sample-wide percentage loading onto each of the five areas by the first action that each respondent suggested. Each action could be counted in multiple categories. Figure 1 displays the results from this procedure, which again demonstrate a strong emphasis on water quality related concerns and also show the perceived importance of building, infrastructure and technology, with secondary emphasis on conservation activities and boats and noise.



Finally, a few full quotes from our respondents in the More Comments section of the survey help to demonstrate the types of concerns and the heterogeneity of views present in our community:

> "We don't want too much Big Brother - we like activity and enjoy boats and watercraft of all types!"
> "Not that I'm not opposed to powerboats, just dirty/smelly/loud boats on a small lake where most users/owners value peace and quiet, and many drink the water. The standard rules as to near-shore speed limits are totally ignored as far as I can tell. Motors that release oil into the water should be prohibited completely: if it's not OK to just pour the oil from the can directly into the lake, why is it OK to have the motor do it?"
> "Many good education moments have been presented by various experts, but only a few dedicated souls attend. Getting more of this information to all residents would be a good thing to do."
> "The survey is useful. It's a good way to identify shared concerns around the lake."

Conclusion

In summary, Buck Lake residents strongly value water quality. The strongest recommendations for future action based on this survey are education and training

initiatives around infrastructure and behavior related to water quality, including septic systems, conventional motor use, fertilizer use, boat washing, and grey water disposal.

Secondly, building and development are generally perceived by residents as being or relating to problems for the Lake, indicating that additional development should be undertaken only very cautiously. We also found that there are clear connections between noise and water pollution and negative feelings about powered craft, indicating the need for education around the diversity of residents' preferences so that those using noisy and/or polluting craft recognize the need to be sensitive to others' preferences (by obeying shoreline-area speed requirements, for example). Hunting as a recreational activity is not valued by residents, and given respondents' comments indicating support for preserving the natural environment of the Lake, a final recommendation is to discourage hunting in the Buck Lake region.

www.bucklake.ca/