Jack Lake Sustainability and Stewardship Plan

Background

Final Draft for Ratification

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Section 1 Introduction

Over the years the watershed surrounding Jack Lake has had many changes: highway improvements, property development, an increasing population, and demand for recreational opportunities. These changes have had a cumulative effect on Jack Lake. The day of the small family cottage and boats with low horsepower is being replaced with more urban landscapes, larger four season cottages, high-speed boats and personal watercraft. The traditional way of life on the lake has changed substantially. However, the lake still remains a highly desirable place to live and this is evident by the rising property values of today's market.

Why do people want to live on Jack Lake? In the past, the lake was simply the most practical place to live as it provided the essential elements for existence: fresh water for consumption, cooking, and cleaning; a source of food; and a medium for transportation. In current times these essentials are obtained without direct access to the lake and the reason for living on or near the lake has changed.

So, why do people now want to visit or live beside Jack Lake? This was the question that the Lake Plan Committee needed to answer, and that led to an examination of the values of present lake users. The intent of the Stewardship Approach to a Jack Lake Plan is to identify important natural habitat, physical elements and social values that support the current quality of life on the lake and to recommend ways to protect and, if needed, rehabilitate them.

Over the years there have been discussions between the Jack's Lake Association, the Townships and the landowners to protect the natural lake environment. Areas of concern have been the diminishing fish stocks, a by-law for minimum waterfront lot sizes, protection of the Peterborough Crown Game Preserve, the existence of boathouses on the lake, and sewage system maintenance inspection.

The objectives of the Jack's Lake Association (JLA) according to its constitution are:

- Advance the cultural and social interests of seasonal and permanent residents in the area of Jack Lake.
- Promote the common interests of all persons owning, occupying or using property on the lake and to advance plans and proposals to the appropriate government bodies for the benefit of the said inhabitants.
- Promote aquatic and other social and physical activities among people.
- Plan and promote the quality of the natural resources to prevent wanton waste and deterioration of the natural beauty of the environment.
- Plan and promote protection of the safety of persons and property.

Based on JLA data, 63% of shoreline property owners and campers/cabin renters were members of the Jack's Lake Association in 2005-06, and 72% in 2008.

The Purposes and Geographic Scope of the Stewardship Approach

The purposes of this plan are to:

– recognize and protect the **unique** character of Jack Lake and its immediate watershed;
– develop specific objectives for long-term protection, maintenance and restoration of the lake and its watershed; and
– identify stewardship actions and communication and education initiatives to protect these values.

The Lake Plan will focus on shoreline areas and areas immediately surrounding the lake, as well as the water surface and islands in Jack Lake.

The general scope of the watershed includes all lakes and streams that flow into and out of Jack Lake. The inflowing waters include: Apsley Lake, Lower Apsley Lake, Apsley Creek, (Jimmie's Creek), Redmond Creek (Hall's Creek), and Sucker Creek. The outflowing water flows through Jack Creek and Little Jack Lake. Other lakes and creeks within the watershed are: Bow Lake, Little Bow Lake, Sugarbush Lake, Little Sugarbush Lake, St. Charles Lake, Grassy Creek, Ties Lake, Little Lake, and McGinnis Lake.

According to the map from MNR Bancroft, the watershed borders close to Little Chandos Lake and Lasswade Lake in the north, Methuen Lake in the east, Hall Bay of Stony Lake in the south and Eels Creek and the south part of the village of Apsley in the west. The Jack Lake watershed is within the Trent Severn Waterway watershed boundary.

"The Land Between" – a Regional Context

Recently in Ontario, the Jack Lake watershed has been referred to as "The Land Between", a transitional area between two ecological systems. The Lake is between the Southern Ontario and Canadian Shield eco-systems which explains why the Jack Lake watershed supports a broad diversity and abundance of plant and animal species. The Land Between corridor runs from Georgian Bay to the Frontenac Arch, with the middle third of the area being within the Kawarthas.

Planning Approach

The purpose of this section is to provide details on how the Stewardship Approach for the Jack Lake Plan was prepared and to identify the steps that were undertaken. Templates from the Huntsville Lakes Council, French Planning Services, and an amendment from the County of Peterborough's Official Plan were used to guide the development of this document.

At its Annual General Meeting in June 2005, a preliminary survey was conducted by the JLA to determine the values and interests of its members. This aided in developing a detailed property owner survey, a renters' survey, and a commercial operators survey that were conducted the following year. Results of the survey are referred to throughout the stewardship strategy/lake plan.

The intent of the community consultation was to:

– engage residential and commercial community members to provide information about the values that support their quality of life, and the issues and concerns that impact these values;
– prepare a strategy of actions to protect the elements which support this quality of life.

Steps taken to complete the Lake Plan:

– conducted surveys of property and cottage owners, renters and commercial entities
– collected and analyzed background information
– conducted three workshops for lake residents and stakeholders to gather feedback on the first and second drafts of the plan
– compiled information from government and university sources

Principles and Targets – confirmed at a stakeholder workshop

Principles:

1. protect lake character
2. focus plan on end results achieved by communication and education
3. implementation approach will favour educational processes and voluntary compliance

Targets:

1. water quality
2. fish and wildlife
3. natural landscapes/visual environmental integrity/shoreline vegetation
4. recreational life
5. water levels

The types of information that were collected include:

Natural elements	water quality and quantity, wetlands, streams, wildlife habitat, fish habitat, nesting sites, vegetation, rare/endangered species, and exotic/invasive species
Physical elements	narrow water bodies, water levels, soils, steep slopes, access, watershed considerations, mineral and aggregate resources, and forestry
Social elements	landscapes and visual environmental integrity, historical development, cultural sites, recreation, and boating
Land use data	official plans, Crown land policy and legislation

Existing documents that provided detailed information included but are not limited to:

Previous consultants' reports from the Condominium Badeau Property
Unpublished water quality data collected by David Lean
MOE water quality reports
MNR reports on fisheries, forestry, land use
Municipal and county official plans
Septic system reports from MOE 1992-93

New Information Sources

New information was collected, involving the following:

A survey was sent to every shoreline resident and commercial operator in December 2005 and early spring of 2006. Survey forms were also made available at the trailer parks and resorts. (See Appendix for survey samples.) The purpose of the survey was to identify the ideas, perspectives, issues, concerns and aspirations of the Jack Lake waterfront residents, renters and commercial operators. The survey obtained information on property size, buildings, features, use, resident occupancy, activities, observations, perceptions and concerns.

In all, 251 residential survey forms were completed and submitted, and based on a total of 555 shoreline properties, this represents a 45% return; (several seasonal dwellings and vacant lots on the lake are owned by the same families.) Eight commercial survey forms were distributed, and one was submitted, which represents a 12.5% return.

Two boating surveys were conducted by a group of volunteers on Aug. 13, 2006, and July 28, 2007. The purpose of these surveys was to assess the frequency and style of boating that occurs on certain sections of the lake.

Report Structure

Section 1 identifies the purpose and scope of the Lake Plan, the process used, and the type of information collected. It also identifies the community targets. Sections 2 to 6 provide a description of the natural, social, physical and land use regulations, and contain observations thereon. This is followed by An Appendix containing supportive material, and the Action Plan with a summary of Recommendations.

Major observations and keys to recommendations are provided thoughout the document. The observations are based on the information that has been collected, and the recommendations had input from the lakeside community and the JLA. In the Action Plan, the recommendations will be prioritized into two groups in the final draft. The grouped recommendations will be those that are:

- essential to sustaining the quality of Jack lake and which need to have the support of the lakeside community; and,
- those requiring further study and awareness.

Section 2 Lake Description

Historical Development

The recorded history of Jack Lake has been undergoing planning and research for 20 years, and remains an ongoing project of the Jack's Lake Association. Interesting stories, notes, photographs and memories about the people and events that helped shape Jack Lake have been and will continue to be collected. The intention is to eventually produce an illustrated book, for sale to anyone with an interest in the lake and its stories.

From the standpoint of recording important details in an organized fashion for posterity as well as current interest, there are basically four semi-overlapping periods that make up the lake's chronology: natural history and the time of the native peoples; the era of exploitation of natural resources by Europeans; the advent of fishing camps and cottageing; and the gradual build-up to today's primarily recreational environment. The latter two periods are probably of most relevance to lake planning because they have the most influence on what the lake is today, and what its stakeholders hope and expect it will be tomorrow.

To begin with, the name of the lake is a matter of some debate.

Officially, *i.e.* according to the *Gazetteer of Canada*; the *Canadian Geographical Names Data Base*; and the *National Topographic Systems* maps, the body of water immediately south of Apsley, Ontario, is named **Jack Lake**.

However, older and long-term lake residents and their families tend to use the possessive **Jack's Lake**, based on an eponymous connection with a local native chief called "Handsome Jack", who died in 1835; (and whose English name may in fact have been a backhanded nickname for an unpleasant looking fellow.)

Delving deeper, we find that in the latter half of the 19th century, the water body we know as Jack Lake was labelled **White Lake**. This is recorded in the Rand McNally & Co. map collections entitled *National Atlas Ontario No. 2*, 1879, and *Indexed Atlas of the World*, 1897.

The dues-funded representative group for lake stakeholders, founded in 1950, has the registered name "Jack's Lake Association" (JLA). For many years it also used the title "Jack's Lake Cottagers' Association" (JLCA), which is formally referenced in the Association's 1986 by-laws. Though still a legitimate corporate name, JLCA is being phased out to reflect both the correct "legal" appellation as well as the fact that today's membership includes permanent residents, businesses, and regular renters in addition to cottage owners.

The Lake Plan uses the official geographical feature name **Jack Lake** throughout, for simplicity and clarity.

The dam – It is fair to say that Jack Lake is defined by the concrete dam at its south end, for without that permanent obstruction the lake would be smaller and familiar physical features such as islands, points and bays would look much different. In a very dry year the lake might even split into two, connected at the Narrows by a small stream.

By the end of the 19th century, temporary log and rock dams had been built across the entrance from the lake to the creek leading down to Little Jack Lake. The barriers, along with a system of wooden slides built in the creek, were to facilitate log drives between Jack Lake and Stony Lake, through Little Jack.

The double-sluice, 650 ft. concrete dam in position today was built in 1910, some four years after the federal government took over the Jack Lake watershed as a reservoir for the Trent Canal system .

Since 1926, Jack Lake had been filled from snow melt each year to a maximum level of 6.33 ft. above the sill of the east sluice in the dam. By late fall the lake can be down to its natural low level, which is 1.25 ft. above the sill, and is left at that level over winter as a flood control measure for the following spring snow melt.

Construction of the dam in 1910 would have been quite a feat. There was no road access, so all materials would have to have been barged to the site in summer or brought in by horse-drawn sled over the ice in winter.

The builders overcame the transportation problems, but by modern standards the structure was constructed poorly. There is no evidence of reinforcing steel, and one belief is that the sand aggregate used with the cement came from Hatton Bay and was “half sand and half dirt”. Certainly, nearly a century after it was built, the dam shows signs of deterioration, including several minor leaks.

Control and maintenance of the Jack Lake dam is the responsibility of the federal government agency, the Trent-Severn Waterway, which has a responsibility to maintain specified minimum water levels for users of its lengthy navigable system, using Jack Lake as one of its over 50 feeders.

Other influences – One of the defining aspects of the lake’s history is an abiding interest in water quality and natural setting for a majority of residents, seasonal visitors, and developers.

Witness the formation in 1956 of the *Jack Lake Land Company* (JLLC) which advertised “unspoiled vacation estates an easy two hours from Toronto,” and whose purposes included the exclusion of any buyer who might do anything to spoil the lakeshore.

The clean water, sheltered bays, and myriad islands of Jack Lake originally offered an uncommon setting for native fishers and hunters, and eventually for fishing camps and a population of rustic-minded cottagers.

However, with greater popularity came greater environmental risk. And that is why the Jack Lake Land Company was founded. Its mandate was simple: acquire the remaining undeveloped land on Jack Lake so that the JLLC directors could oversee “appropriate” development of the resulting saleable cottage lots.

The JLLC principals had a vision of a growing cottage community on an unspoiled lake, to be supported by a solid commitment to prevent the hyper-development and over-commercialization that was becoming apparent on many Southern Ontario lakes in the '50s.

The Land Company's goals were to: "protect land by restriction of sales of lots to people of good character and reputation for their immediate family, by permitting one main building…one sleeping accommodation…one boat house…[and] by limiting the lots to a minimum of about 500 front feet, and by maintaining right of supervision over all building and lot usage plans." In all, the JLLC acquired enough mainland property to create almost 60 large lots, as well as having more than 30 islands on the books.

It is not known how the JLLC actually enforced its property purchase and development rules, but a key tenet was to encourage buyers among like-minded people whose vision of a cottage community was consistent with current residents. "It is the wish of this Company to offer this property to people of discriminating taste, who appreciate the beauty of nature, and who will enhance its beauty with suitable dwellings properly maintained."

During the Land Company's tenure, a number of related activities were undertaken to ensure the protection of the environment and appropriate land usage. For example, a development and pollution impact study was initiated in 1969.

The Land Company's final bulk sale of its remaining lots occurred in 1974. The buyer, a developer, agreed that it would be bound by the same "regulations" of any earlier purchaser, and, for good measure, confirmed that it was not its intention to "develop backlots, pollute the lake, cut down all the trees or create overcrowding." (*B. Smith, 2003, Jack Lake History notes*.)

The paternalistic, controlling, even meddling nature of the Jack Lake Land Company would not be acceptable today. However, it may be said that largely as a result of the efforts of the Company, urban-flavoured "progress" was slowed on Jack Lake. This is seen as a benefit for cottagers then and now, though it must be acknowledged that not all current property owners would agree with this. Nevertheless, it is a fact that many visitors to Jack Lake enthusiastically comment on its relatively subdued shoreline, comparatively modest boat traffic, and pristine waters.

Observations – Historical Development

- *One of the defining aspects of the lake's history is a continuing interest in water quality and natural setting among a majority of residents, seasonal visitors and developers.*
- *Efforts to produce a written history of Jack Lake began in 1988, and it is and ongoing project of the Jack's Lake Association.*
- *Interesting stories, notes, photographs and memories about the people and events that helped shape Jack Lake have been and will continue to be collected.*

General Location and Characteristics

The Jack Lake watershed is in the County of Peterborough, with about three-quarters of the lake situated in the Township of Havelock-Belmont-Methuen and one-quarter in the Township of North Kawartha south of the village of Apsley, seat of the North Kawartha municipal government. Most of the watershed is within the Peterborough Crown Game Preserve. It is east of the Kawartha Highlands Signature Site Park, and the Sharpe Bay Fen Conservation Reserve, and includes a portion of the eastern part of the Petroglyphs Provincial Park.

The watershed is classified as being “The Land Between”, a transitional area between two ecological systems: Southern Ontario, and the Canadian Shield. It is also part of the Trent-Severn Waterway Watershed Boundary.

Jack Lake has recently been classified as a warm water deep lake. It is also mesotrophic (moderately enriched with phosphorous levels between 0.01-20 mg/L,) bordering on oligotrophic (mildly enriched with phosphorus levels less than 0.01 mg/L,) with abundant humic acids and assorted tea-stained water (especially in Brooks Bay) that reduce light penetration and contribute to reduced weed growth and productivity. The lake’s high retention time and its mesotrophic nature make it prone to anoxia. It has a warm to cool thermal regime.

In the 1979 Ministry of the Environment report *Water Quality Survey of Lakes in the South Link Planning Area of Peterborough County*, Jack Lake was rated as a “most sensitive” category for its relative sensitivity to further unrestricted shoreline development.

The total surface area of Jack Lake is 1346 hectares (ha), excluding all island areas. The maximum depth is 51 metres (in Sharpe Bay) and the mean depth is 10 metres.

There are two basins within the lake that are used for water quality modelling purposes (information from MOE Kingston on dissolved oxygen levels 1995.)

North Basin – The surface area of the north basin, north of Rathbun Bay, is 528 ha excluding all island areas. The land base of the islands north of Rathbun Bay is 15 ha, and wetland/island is 8 ha.

Jack Lake has an irregular shoreline, with many islands and bays. This character enhances its value as a recreational destination. The length of shoreline, excluding islands, in the north basin is 34,170 metres; and including island shoreline it is 45,847 metres, according to the County of Peterborough’s GIS Department. The basin has a maximum depth of 22 metres and a mean depth of 5.5 m. Perimeter and shoreline length are important for determining the extent of shoreline development, identifying areas of important fish and wildlife habitat, and the visual environmental integrity of the lake.

The north basin, according to the MOE Water Quality of the Lakes in Peterborough County, 1979, Part 2, thermally stratifies and oxygen levels decrease in the bottom waters, becoming anoxic by mid-summer. This has been observed since 1971. The type of decline has been known to be caused by the decomposition of organic matter and the oxygen demand of the sediments, or septic seepage from poorly maintained systems.

South Basin – The surface area of the south (or southwest) basin, south of Rathbun Bay, is 817.4 ha, excluding all island areas. The land area of the south basin classified as islands is 162.4 ha, and land classified as wetland/island is 16 ha.

The length of shoreline excluding island shoreline in the south basin is 45,528 metres, and including islands it is 88,472 metres, according to the Peterborough County GIS Department. The basin has a maximum depth of 51 metres and a mean depth of 12 metres. Cold water fish need depths greater than 20 metres to survive during the warm summer months.

In the south basin, the dissolved oxygen distribution showed a pronounced maximum increase in concentration with the thermocline. The maximum is believed to be due to the production of oxygen by phytoplankton inhabiting that layer of water. This natural source of oxygen is dependent on continued good water clarity. Gradual decreases in dissolved oxygen concentration were noted in the bottom waters. This is common in mesotrophic lakes.

The Flushing Rate (times per year) is 6.10E-01, the Retention Coefficient (anoxic) is 6.86E-01, and the Response Time (yr) is 6.96E-01, according to lake capacity calculations included in the Niblett Environmental Associates Inc. Environmental Impact Study, Feb./2005, done for Mr. Brad Badeau. The size and depth of the lake are intimately related to the lake's flushing rate, which affects the removal of waste and other deleterious materials.

Latitude and longitude coordinates are 44.7 degrees N by 78.017 degrees W. These give an accurate location and provide insight into the type of climate regime in the Jack lake watershed.

The bathymetry map indicates the lake's depths. The Bancroft MNR office provided the map that was produced in the 1970s. (See Appendix.)

Height above sea level and the drainage area provide information on watershed delineation and the movement of water through the lake.

Figure 2.1 – Jack Lake's Physical Characteristics

Latitude	44.7 degrees North	Longitude	78.017 degrees West
Drainage Area	83 km^2	Surface area	1237 ha (MNR) 1346 ha (GIS County of Peterborough)
Length	n/a	Perimeter	34,858 m
Mean Depth	10 m	Total Volume	2.79E+07 m^3
Outflow Volume	n/a	Flushing Rate	6.10E-01 /yr
Littoral Zone	n/a	Max. Depth	51 m

Source: GIS Dept. County of Peterborough; Jack Lake MNR Map (1970)

Watershed

A watershed is the area of land from which water drains and is eventually stored in a reservoir or basins of water, such as a lake. Precipitation, including rain and snow, and ground water are the primary sources of fresh water in a watershed. Rivers and streams transport the water across the landscape, and various reservoirs or wetlands, such as lakes, marshes, swamps, fens and bogs help to filter and store the fresh water for use.

The topography, climate and type of land use features, including natural daily and seasonal climatic changes, stochastic events such as droughts, floods, volcanic eruptions and global warming, plus human-made changes to the landscape such as dams, urbanization, deforestation and flood control structures, directly influence the water cycle by controlling and/or

altering the quantity and quality of water available, as well as its distributional pattern, across the landscape.

The map of the watershed provided by MNR Bancroft is important to understand the source of Jack Lake water and outflow. The map indicates the boundaries of the Jack Lake watershed and provides a detailed identification of all lands, lakes, rivers and streams that are upstream of Jack Lake. These areas contribute directly to the quality and quantity of water that flows into the lake, and together with ground water resources, springs and precipitation, directly affect the flushing rate of the lake. (See Appendix for a map of the Jack Lake watershed.)

Observations – Watershed

- *Jack Lake is a headwater lake for Stony Lake which is on the Trent-Severn Waterway.*
- *What happens in the watershed will ultimately affect Jack Lake.*
- *Jack Lake is fed from a small number of streams in Brooks Bay and Redmond Bay in the north basin. Sucker Creek in the south basin is close to the Sharpe Bay Fen. In addition there are several springs feeding the lake that may not freeze solidly, depending on the severity of the winter. The outflow from Jack Lake through Little Jack Lake and Jack's Creek runs directly into Hull Bay of Stony Lake. Jack's Creek marks the south east corner of the Petroglyphs Provincial Park.*
- *The Jack Lake watershed is in the centre of the Land Between, a transitional area between the Southern Ontario and Canadian Shield ecological systems. This explains why our waterhsed supports a large diversity and abundance of plant and animal species. Many species are at their southern or northern range limits along this transition zone.*

Water Levels

Water Management – The artificial manipulation of the Jack Lake water level has occurred for over 100 years and the flora and fauna have adapted to the fluctuating levels during this time. Water level is incredibly important, not only for access to water-access-only properties, but also for fall spawning fish and hibernating reptiles and amphibians. Because of the dam-controlled water level, the lake has a higher retention time and thus is more prone to anoxia.

"Water management" is the regulation of water levels and flows to:

– permit safe boating
– lessen flooding of residential and commercial property
– provide water for recreational activities and commercial operators
– protect fish and wildlife habitats during critical times of the animals' life cycle
– help maintain water quality
– allow the spring "flush" of the lake

The Trent-Severn Waterway (TSW, Parks Canada) is an interconnected series of lakes, modified river channels and artificial canal cuts stretching for 386 km through south- central Ontario. The water in the system comes from two major watersheds, the Trent and the Severn.

When establishing water flows and levels, TSW staff must weigh the risks and requirements of the various uses to arrive at optimal levels. They must also take into account variables over which no control is possible, such as topography, and allow for variations in climatic conditions based upon records of trends, extremes and averages. Daily readings from automatic water level recording stations and from stream flow and precipitation gauges are evaluated at Waterway headquarters to guide the engineers' decisions about dam settings, levels and flows. Directions are then communicated to operation staff in each of the four administrative areas that make the agreed changes at the dams. The four administrative areas are Campbellford, Lakefield, Kirkfield and Haliburton, with headquarters in Peterborough.

During fall and winter the Kawartha Lakes are lowered. This drawdown prepares the lakes for spring snowmelt and reduces the threat of high water and ice damage. Snow course sites throughout the Trent drainage areas are surveyed regularly beginning in January. Information about the depth and water content obtained from these surveys aids in forecasting total volume and peak runoff for the upcoming spring freshet.

Spring is a critical time for TSW hydrologists to assess the melting snow and rain. Both heavy rain and prolonged warm temperatures will cause rivers and lakes to rise suddenly. The historical record shows this happens in more than one peak during spring freshet. Efforts to control this flooding are hampered by narrow channels, insufficient storage capabilities in some lakes and differing abilities of soils throughout the drainage basins to absorb water. While flood mitigation is a primary spring time concern of waterway staff, care is taken to ensure that water flows and levels are adequate to protect fish spawning sites and for use in the summer.

During summer, water levels and flow are the main concerns. Navigable depths on the waterway must be maintained while minimizing the requirement for water from the reservoir lakes. The weather, particularly temperature, humidity and rainfall, determines the rate at which water from the reservoir lakes is needed. Climate change may be having an effect on evaporation on the TSW. Budget constraints may be another factor. While summer water management generally means conserving water supplies, unusually heavy rainfall at any time during the season can increase the risk of flooding. At these times, levels rise and flows are increased to move water out of the system. With the growth of cottage development in the Haliburton basin, the TSW devised a procedure for drawing water. Water is drawn from each of the lakes on an equal percentage basis according to the storage range established for each lake. For example, when a lake with a relatively large storage range of 3.0 m is drawn down 50%, its level will be at 1.5 m above its minimum depth, while a lake with 1.0 m of usable storage will be lowered to 0.5 m above its minimum. (The Jack Lake minimum is at the lower edge of the dam outlet sill.) Several times a week, staff read the levels at the dams and make the necessary stop-log changes to ensure that the lowerings are proportional.

The level in Jack Lake is measured by a sensing device mounted on a steel tripod which is located in the water in front of the Anchorage Marina and then transmitted to a data logger on the side of the marina building. This data is transmitted to the Trent-Severn Waterway. The sensor determines the water level based on the pressure pushing on it. The maximum possible drawdown for Jack Lake is 1.93 meters. The TSW monitors the levels in Jack Lake daily.

The following is a monthly average of the storage capacity from data collected for Jack Lake from 1988-2005, expressed as a percentage of the capacity retained and used.

Average Storage Capacity 1988-2005

Month	% of storage retained	% of storage used	average drawdown (m)
January	59.0	41.0	.791
February	60.3	39.7	.766
March	66.4	33.6	.648
April	85.4	14.6	.281
May	94.0	6.0	.115
June	96.4	3.6	.069
July	89.1	10.9	.210
August	79.0	21.0	.405
September	66.7	33.3	.642
October	59.5	40.5	.781
November	56.6	43.4	.837
December	58.4	41.6	.802

According to the TSW, the maximum drawdown has never exceeded 43.4% of the storage capacity during this period, making that the historic maximum. (See Appendix for JLA presentation to the Panel on the Future of the TSW.)

Observations – Water Level

- *Jack Lake water levels are controlled by the Haliburton office of the Trent-Secern Waterway (TSW). Daily readings are monitored remotely by the TSW at its Peterborough headquarters.*
- *The control dam has been in place for nearly 100 years and the Jack Lake ecology and residents have adapted to the systematic drawdown throughout the boating season.*
- *TSW staff monitor the condition of the dam when they add or remove the stop-logs.*
- *The maximum normal historical drawdown is 43.4% of the storage capacity.*
- *Drawdown is done on an equal percentage basis at all the reservoir lakes on the system.*
- *The dam-controlled water level may have helped contribute to the lake's high retention time, which can lead to a lack of oxygen (anoxic) at lower depths. This is **unique** in Havelock-Belmont-Methuen.*
- *When and if actioned by the federal government, the recommendations of the Trent-Severn Waterway Review Panel of 2007-8 may remedy many of the problems and concerns Jack Lake has as a reservoir, especially water level fluctuations.*

Access

The current level of development on Jack Lake is indirectly related to distance from urban centres and to accessibility, whether by public highways, year round municipal and private roads, or by boat. The private roads around Jack Lake have many curves and hills, so although they are currently ploughed year round, they are still unpredictable and tricky to navigate in the winter. Very few cottages on Jack Lake are on County roads which explains the reason for relatively low level of year-round use and permanent residences.

Jack Lake is open to public use and the maintenance of water access points can sometimes be a controversial issue. The responsibility for the maintenance of the access point at the public launch is in question. The municipalities are responsible for the road leading to the public launch.

Observations – Access

- *The main roads in the watershed include:*
  Primary – Highway 28, County Roads 620A, 504 and 52
  Secondary – James Rd., Jack Lake Rd., Shady Lane
  Private – parts of McCoy Rd. and Narrows Point Rd.
- *There are public water access points beside Forest Glen Marina and in parkland on the west shore of Sharpe Bay at FR52A. At the Anchorage Marina, Jack's Lake Tent and Trailer, and Miller's Timber Sands Resort there are private commercial boat launches. These access points service the many cottagers who have water-access-only cottages, as well as the cabin and trailer site renters, plus contractors, government agency personnel, service/utility providers, and day users.*
- *There is a sign on preventing the spread of invasive water species at public launch sites and on the McCoy Road.*

Ownership

The purpose of this section is to help identify those key property owners and agencies that will play a significant role in the maintenance of natural shorelines and/or the conservation of Jack Lake's natural heritage.

All land use planning decisions on private lands are under the authority of the local municipality (e.g. Township, County, District,) pursuant to the Planning Act and Municipal Act, and Crown land is administered by the Ministry of Natural Resources, pursuant to the Public Lands Act.

According to the GPS group at the County of Peterborough, Jack Lake has 43.6% of its shoreline that is Crown Land. Chapter 413, Part 1 and 3 of the Public Lands Act states that 25% of all Crown shorelines will be set aside for public recreation and access. MNR Bancroft will determine whether there is any remaining original shoreline road allowance that has been granted to our municipalities. The municipalities have by-laws that give them the option to permit the sale of these lands to the adjoining property owners.

See Appendix for a Map of Land Tenure, which shows the following:

- all private land
- all Crown land within the lake's watershed; the dam area
- Petroglyphs Provincial Park, Peterborough Crown Game Preserve, and the Kawartha Highlands Signature Site Park. (Sharpe Bay Fen is very close to our watershed.)

The Land Tenure map was scanned from the MNR Crown Land map. The green areas are Crown land and the white are public land.

Observations – Ownership

- *It is **unique** that most of the Jack Lake watershed is within the Peterborough Crown Game Preserve, except for the north east corner. This leads to the broad species diversity. Another of the **unique** features is the large amount of land remaining in Crown ownership. This undeveloped land helps sustain the health of the lake and the naturally vegetated shoreline buffer zone around the shore. According to current MNR maps, approximately 55% of the shore is under private ownership; however, many property owners have not purchased the waterfront road allowance from the MNR, so this figure is not entirely representative of the amount of developed land. Once the MNR maps of Crown land have been updated it will likely be found that there is much more developed land.*
- *Brooks Bay has the densest population due to the number of trailer and cabin sites, marinas and cottages. As a result, the shoreline and water quality around Apsley Creek and other densely used shorelines in the area should be monitored.*

Section 3 Social Elements

The purpose of this section is to identify and describe the social elements that contribute to the quality of life on Jack Lake. Very little existing information is readily available on social elements other than historic and cultural sites, which eventually could be researched at the local library. Information for this section was gathered from the Resident and Commercial Surveys and the Boat Traffic Survey.

Social elements enhance the quality of life on the lake. According to many shoreline residents, “a lake environment is a place where you can relax, recreate and get away from it all”. For a growing number of people, it is a natural environment in which to enjoy retirement. For others, it is a place of business to create recreational opportunities that service seasonal visitors. This latter group includes commercial property owners of marinas, general stores, trailer sites and cabin/cottage rentals. This diversity makes social elements difficult to identify and protect, but they are some of the most important elements that contribute to one’s experience on the lake.

According to the stakeholder survey of 2005-06, the prime recreational activities that users enjoy include: swimming (91%), viewing wildlife (71%), canoeing (67%), fishing (67%), walking (65%), tubing/wakeboarding/water skiing (56%), socializing (49%), star gazing (43%), power boating (41%), hiking (37%), bird watching (36%), and kayaking (28%). The main reasons given for being at the lake were: for peace and quiet/rest (84%), the rural, natural setting (70%), outdoor recreation (70%), family/heritage (43%) and socializing (27%).

Not all residents and visitors have the same social values. Some property owners bring urban planning designs and landscape ideas to the lake, and to others on the lake these values may be out of character with the natural elements and landscape that is the basis of their own enjoyment.

Recreational Boating

The purpose of this section is to identify and report on issues related to recreational boating. It should help to understand any boating impacts on the area and to make recommendations to lessen these impacts for the benefit of the environment and users of the lake. Some of this information comes from the surveys and from research on the internet with respect to boat pollution and conduct.

The Jack’s Lake Association (JLA) conducted two one-day recreational boat traffic surveys during the summers of 2006 and 2007 to determine the volume of traffic and types of recreational boating that occurs on Jack Lake. At some point, this baseline information could be used to determine a recreational capacity study for the lake.

Before the road systems were in place, most cottagers came by boat to their properties. There are still many island and water-access-only cottages on Jack Lake. Boating is for many an essential component of living on the lake. Boats provide transportation for people, supplies, and building materials. It is key to many recreational activities like pleasure boating, fishing, sailing, and kayaking. Many commercial and public utility services are provided or facilitated by the use of watercraft.

Boating Use

Boating is the most popular recreational activity on Jack Lake, with swimming a close second. Determined by survey, 67% prefer canoeing, 58% waterskiing/tubing/wakeboarding, 41% power boating, 28% kayaking, 21% sailing/windsurfing and 5% jet-skiing. All types of vessels are present on the lake from non-motorized boats such as kayaks and canoes, to large inboard motorboats, as Figures 3.1 and 3.2 show. On average, each household on the lake has about four boats, with more non-motorized boats than motorized.

Figure 3.1 – Total Boats on Jack Lake

Type of Boat	No. of Boats	% of Boats	Boats per Household
Non-motorized	540	54	2.15
Motorized	462	46	1.8
Total	1002	100	3.95

Source: Jack Lake Resident Survey, 2005-06

Figure 3.2 indicates the percentage of households with boats by type; as sub-sets, 76% of all households have a canoe, and 24% have paddleboats.

Figure 3.2 – Types of Boats

Type	Number	Per cent
Canoe, kayak, rowboat, paddleboat	452	45
Sailboat/windsurfer	88	9
Skiff (outboard, throttle-grip steering)	178	18
Powered pleasure craft (steering wheel)	222	22
Personal watercraft (jet ski)	19	2
Pontoon boat, float boat	43	4

Source: Jack Lake Resident Survey, 2005-06

Boating is a very popular activity and based on the resident survey there are several related issues raised by the respondents. These include: safety, speed, reckless operation, closeness of boats and water-skiers to swimmers and small vessels like canoes and kayaks. There are also potential environmental concerns, which include damage to shorelines and wildlife habitat, particularly bird nesting areas and fish spawning grounds. There is also the potential of wake damage to property frontage, docks and docked boats, and increased intrusive noise from the vessels' engines, their sound systems, and the occupants of the boats.

Recreational Boating Issues

Some of the more common issues that many lakes share:

Personal Water Craft (PWC) and Wake Boats – The operation of these types is often one of the greatest boating concerns of shoreline residents. The main concern with PWCs and wake boats appears to be the uncaring attitude of a limited number of operators, which causes them all to be branded as irresponsible. In consequence, the operators are being encouraged, through articles in *Smoke Signals* and otherwise, to go to the middle of the larger bays around the lake so shorelines, moored boats and docks are not damaged.

Speed – The environmental impacts of inappropriate boat speeds and wakes can be large and can have long term or permanent negative effects on wildlife and vegetation. Erosion of the shoreline has not only negative visual impacts but along with propeller driven boats venturing into shallow waters, increases turbidity and damages weed beds, resulting in the loss of fish habitat. Disturbance of nesting waterfowl is also a problem, which results in unsuccessful brooding efforts and abandonment of nests and/or nesting sites. The long-term effects include a reduction in fish because of loss of habitat, which means reduced food supply for some waterfowl. Eventually, this may result in a reduction of the local wildlife population.

In most cases, speeders are long gone by the time the police can reach the scene, so the OPP say it is necessary to educate the public about how to assist them by using community based policing. It is important if filing a complaint that boat registration numbers and descriptions of the drivers of the offending vessel be recorded. Eyewitnesses would have to be willing to testify in court, and video recordings are extremely useful as evidence.

Pollution – There is an increasing amount of information on the use of old two-stroke vs. newer four-stroke and high efficiency two-stroke engines. Environment Canada's Environmental Technology Centre tests show that older traditional two stroke outboards produce 12 times as much benzene, toluene, ethylbenzene and xylenes, and five times as much oil and grease as four-stroke outboards. These emissions produce smog.

Navigation Aids (Buoys, Signs and Lights)

On small inland lakes like Jack Lake, where historical commercial navigation routes were never established, the lake association frequently provides navigational safety services. The JLA publishes a map of some of the shoals and all of the buoys indicating the general area of the main shoals. These buoys are numbered and moved by the Association as the seasonal water levels vary. Yellow lights on certain islands and a white floodlight at the Narrows north entrance help with night navigation on the route from Brooks Bay to Sharpe Bay.

Signage is also an integral component to ensuring safe boating conduct. After a fatal boating accident on the lake and another serious personal injury accident, the OPP recommended to the township of Havelock-Belmont-Methuen that 10km/hr speed signs be positioned at the entrances to the Narrows between the north and south basins. This speed is now enforced by the Marine Unit of the OPP.

Enforcement and Regulations

Over the next several years, implementation of the new Operator Competency Regulations should help to remind boaters of speed and safety restrictions. Operator Competency Regulations are now in effect for powered recreational vessel operators. Since 1999, any operator under the age of 16 was required to have an Operator Efficiency Card. As of September 15th, 2002, all operators of powered recreational vessels under 4 metres (13.1 ft,) including personal watercraft, regardless of age, must be certified. The final phase of this legislation, effective September 15th, 2009, mandates all powered recreational vessel operators to have a competency card.

There are courses available through the Canadian Power and Sail Squadron and the Canadian Coast Guard. Information is available on the web sites **http://www.ccg-gcc.gc.ca** and **http://www.cps-ecp.ca** or by calling the Boating Safety Information line at 1-800-267-6687.

Historical Accidents and Incidents

The OPP Marine Unit provides regular patrols of Jack Lake. In 2006, there were three separate personal injury accidents, one near Flower Pot Island, one near FR52B and one on the shoal north of Robbins Bay. Two of the three accidents involved serious injuries by propellers. Two of the three involved alcohol, one boat did not have its navigational lights on, and one driver got disoriented in the dark and hit a shoal at speed.

In 1983, a fatal accident took place at the south end of the Narrows when driver error was responsible.

Most of the other incidents that the OPP are involved with are alcohol related incidents on the water. In the summer of 2006, the Marine Unit was on the lake twelve times. Of the 28 people formally arrested by the unit in Peterborough County, three people were taken into custody on Jack Lake. In addition, of the 32 tickets issued on Jack Lake, half were for liquor infractions.

Boat Traffic Survey

The purpose of boat traffic surveying was to gather relevant information on the frequency and style of boating that occurs on Jack Lake. A survey was performed on Saturday, Aug.12, 2006, at the mouth of Brooks Bay and in Centre Bay. On Saturday, July 28, 2007, the surveyed sites were at Robbins Island and the north entrance to Williams Bay. Based on an understanding of historical traffic patterns, these locations were selected to provide a good cross section of boating activity in the area. These areas were bounded wherever possible by natural boundaries, identifiable points/structures, or visible navigation features. At each of these locations, volunteers used score sheets to track the boating activity in 15-minute intervals from 9:00 a.m. to 7 p.m. The results of these surveys and information sheets were compiled and examined to determine the volume of boat traffic on the lake.

The results provided a baseline, so in a few years, another boat traffic count can compare results to determine if the volume is increasing or decreasing. When considering lake capacity in the future, this information may prove to be useful.

Boat Traffic by Type of Boat and Location

Summary of findings:

The most active time of day for motor boating in Centre Bay and Robbins Island is 3-5 p.m.; in Brooks Bay it is 11a.m.-1p.m.; and in Williams Bay it is almost the same between 3-5 p.m. and 5-7 p.m. Because Brooks Bay is the commercial part of the lake, users of the lake may be going there to run errands relatively early in the day.

The most active time of day for non-motorized boating is from 5-7 p.m.

Clearly runabouts (1,046 counted) are the most used boat type, followed by skiffs (387), PWCs (205), and then pontoon boats (137).

Observations – Boating

- *From the 2005-06 personal survey, the proportion of respondents who frequently participate in the following boating activities are – canoeing 67%, kayaking 28%, power boating 46%, sailing 21%, waterskiing/tubing/wakeboarding 56%. Respondents have on average four boats per household. There were more boating-related anecdotal comments than for any other topic in the survey.*
- *Serious boating accidents involving personal injuries have occurred in the past on Jack Lake. A significant number involved boating while under the influence of alcohol.*
- *There are several boating safety related issues including: excessive speed, reckless operation, closeness of towed-sport boats to swimmers and small non-motorized vessels. Jack Lake has a large number of islands and numerous shoals, so the potential for recreational boating accidents, especially in narrow sections, is increased.*
- *Additional boating-related concerns include: damage to shorelines due to wake action, especially in narrow sections; damage to wildlife habitat, particularly bird nesting areas and fish spawning grounds; wake damage to docks and docked boats; and intrusive vessel noise (engine, voices, music, etc.) The churning of shallow water by boat passage or wake stirs up any e. coli present in these areas as would a storm.*
- *The OPP is responsible for regulating safe boating practices. The JLA supports the OPP and will assist in education promoting safe, environmentally responsible boating practices.*

Other Recreational Activities

Hunt Camps: The Ketchecum Hunt Camp is located on three separate parcels of land outside the Peterborough Crown Game Preserve. There are 600 acres in North Kawartha by McCoy Road, 400 acres closer to Apsley and 200 acres by Redmond Creek.

Snowmobile Trails**:** The clubs in the Jack Lake watershed area include the Paudash Trail Blazers and the Stony Lake SnoRiders. The Paudash Trail Blazers have 464 km of trails

around Apsley, Coe Hill and Kawartha Highlands, and the Stony Lake SnoRiders have 240 km of trails around Stony Lake, Haultain and Nephton. (See Appendix for a map of the trail systems operated by the Ontario Federation of Snowmobile Clubs.)

An all terrain vehicle (ATV) licence allows the owner to have use of Crown land, including the Peterborough Crown Game Preserve.

Social, Cultural and Historic Sites

The purpose of this section is to identify and describe the social, cultural and historic sites that contribute to the social fabric of Jack Lake. Cultural and historic sites are essential elements that maintain and improve the quality of the social and living environment and, where appropriate, these sites should be protected and enhanced. The Jack Lake watershed has some important sites, areas or features representing values that contribute to the character, culture and history of the lake. Many of the historical sites are in private ownership and some have deteriorated over time. Private stewardship of these sites is therefore desirable.

The lake community has identified the following sites as having historical or cultural significance; (the first three were identified in the Lake Plan survey):

1. the Jack Lake dam
2. the walking path along Jack Creek and adjacent forest leading to the waterfalls for its **unique** plant species
3. the picnic area by the waterfalls at Little Jack Lake
4. the loon and osprey nesting sites and fish spawning grounds
5. Hatton's Farm is an original property; Robbin's estate is historical
6. all identified significant wetlands
7. The Anchorage, first marina on the lake

Observations – Social, Cultural and Historic Sites

- *The Jack Lake dam was built in 1910. Maintenance of this dam is vital to the two-basin lake's water level. The dam is a destination for visitors and cottagers to enjoy and experience a different area of the lake.*
- *Social and cultural sites should be identified by interested members of the lakeside community, while historic sites need to have an expert to confirm their authenticity and significance.*

Landscapes and Visual Environmental Integrity

The purpose of this section is to identify the most significant landscapes and characteristics that contribute to the natural beauty of Jack Lake. It is important to emphasize the value of maintaining the visual environmental integrity of the lake's shoreline, islands and viewscape. Visual environmental integrity of a landscape is what enhances the lake's intrinsic value.
Note: *The County of Peterborough's 2006 Official Plan now recognizes this.*

Some of the amenities that are invaluable to a lake community are the physical landscape and natural vistas of the environment (irregular shoreline, islands and bays). These elements

include features such as natural shoreline vegetation, the skyline or horizon, the relatively un-built appearance of the shoreline as well as the natural beauty, views and a balance of landscape types (forest, wetland, open view).

There are two important landscape lines where development can impact the natural setting of the lake: the shoreline and the tree line or horizon. When viewing the opposite side of the lake, our eyes are immediately drawn to these two lines and anything that stands out on these lines can greatly impact the natural character. As a result, any development that occurs on these landscape lines will directly affect the natural setting. The main source altering the visual environmental integrity in these areas is the construction of buildings and structures and the removal of vegetation.

In order to maintain the natural appearance, the horizon needs to have minimal disturbance and shoreline activity areas (boathouses, docks, recreation areas) should be kept to a minimum. High profile development that stands above the tree line or the horizon draws immediate attention to the structure and diminishes the visual environmental integrity of the landscape. Tall buildings and communication towers (e.g. Rogers' tower on the west side of Sharpe Bay) that stand above the tree-line will have a visual impact and should be kept to a minimum. Hillsides facing the lake should remain treed and protected from commercial logging.

The issue of maintaining the visual environmental integrity is an important one for some lake residents who are concerned with having other residents tell them how to develop their private land. A stewardship approach to a lake plan is not designed to tell people what to develop and how, but to educate and encourage property owners and commercial enterprises to make development decisions that will protect the natural and heritage beauty of the lake's environment.

People visit or reside in and around a lake environment because it provides a specific set of aesthetics and values – rural natural environments, fresh air, aquatic recreation, low noise, subdued night lighting, wildlife, and a relaxed lifestyle – which are contrary to the aesthetics and values provided by an urbanized centre. The lake stewardship plan is designed to educate lake visitors, commercial operators and property owners to make wise and moderate life-style choices that encourage the conservation and protection of our environment and lakeshore living.

From the residential and commercial surveys, 69% indicated that the rural/natural setting is the main reason to live at or visit Jack Lake. This is an important value because it contributes to the natural health and beauty of the lake. Maintaining a natural landscape is dependent upon the protection of such features as the shoreline and the horizon as well as the maintenance of a range of landscape types such as forest, wetland and open views.

Observations – Landscapes and Visual Environmental Integrity

- *The skyline and shoreline around Jack lake is very picturesque, rural and natural, and is valued by 69% of respondents in the 2005-06 survey, who identified that as the main reason they live on or visit Jack Lake.*
- *There are numerous areas comprised of steep slopes, treed hillsides and hill tops surrounding Jack lake. (See Appendix for topographical map of Jack Lake.)*

- *Through education we must encourage compatibility with the natural landscape for any land development, site alteration, and resource extraction activities within the lake's viewscape.*
- *The lake should be protected from development involving excessive clearing of land which increases erosion, impacting fish habitat and water quality. Natural landscapes provide an ambience that is an integral part of the quality of life at Jack Lake.*

Lighting

Light pollution is a human-made impact that affects many shoreline residents, notwithstanding the fact that strategically located shoreline lighting has traditionally aided navigation.

The brightening of the night sky is an urbanization symptom that continues to grow – the popularity of landscape lighting, plus string, spot and garden lighting of all types, adds to the unnatural level of light around the lake. Research has proven that nocturnal insects that congregate around light sources are at greater risk of predation. Bats, which consume 30-50% of their body weight in insects each night, feed on insect masses found at light sources. Insects which are important pollinators and food sources for many species, and those that are unable to detect bats, are reduced from the local food chain, decreasing the local biodiversity. Unless some initiatives are taken to inform the public and local business about the effects and costs associated with high-impact lighting, viewing the stars at night and conserving the local biodiversity will become more difficult.

From the Lake Plan survey of 2005-06, 31% report that in the past five years night time artificial light has increased, while 66% say it has stayed the same.

Observations – Lighting

- *In the 2005-06 survey, people who enjoy star gazing comprised 43% of respondents answering this question.*
- *Night artificial lighting is increasing, as noted by one third of survey respondents. Many have reported safety concerns for boaters visually impaired by bright lights on the shore. Excessive, poorly designed or improperly positioned lighting impairs night navigation or makes it more difficult and dangerous than it already is.*
- *Some night lighting may be required for safety, or personal and property security, and users should therefore have access to information on least-invasive techniques.*

Lake Partner Program and Jack Lake Water Monitoring History

The goal of the Lake Partner Program is to protect the quality of Ontario's inland lakes by involving citizens in a volunteer-based water quality monitoring program. The Lake Partner Program is coordinated and funded by the Ontario Ministry of the Environment. The Lake Partner Program is a province-wide, volunteer-based, water-quality monitoring program. Volunteers collect total phosphorus samples and make monthly water clarity observations on their lakes. This information will allow the early detection of changes in the nutrient status and/or the water clarity of the lake due to the impacts of shoreline development, climate change and other stresses.

Our Involvement

Volunteer involvement requires the collection of one water sample for total phosphorus in May for lakes on the Canadian Shield. These samples are returned postage paid to the Dorset Environmental Science Centre for analysis. In addition, volunteers are asked to make a minimum of six (monthly) water clarity observations using a Secchi disk. These observations are mailed to Dorset at the end of the summer. Participating lakes and all the measurements are available on: http://www.ene.gov.on.ca/envision/water/lake_partner/index.htm

At the above website, Jack Lake data is located on:

Results of Total Phosphorus prior to 1996 to 2001 – page 19
Results of Total Phosphorus after 2002 to 2007 – page 101
Results of Secchi measurements 1996 to 2007 – page 57

Total Phosphorus

Total phosphorus (TP) concentrations are used to interpret nutrient status since phosphorus is the element that controls the growth of algae in most Ontario lakes. Increases in phosphorus will stimulate algal growth and decrease water clarity. In extreme cases, algal blooms will affect the aesthetics of the lake and may cause taste and odour problems in the water.

Many limnologists place lakes into three broad categories with respect to nutrient status. Lakes with less that 10 µg/L TP are considered oligotrophic. These are dilute, unproductive lakes that rarely experience nuisance algal blooms. Lakes with TP between 10 and 20 µg/L are termed mesotrophic and are in the middle with respect to trophic status. These lakes show a broad range of characteristics and can be clear and unproductive at the bottom end of the scale or susceptible to moderate algal blooms at concentrations near 20 µg/L. Lakes over 20 µg/L are classed as eutrophic and may exhibit persistent, nuisance algal blooms.

Other Sources of Water Quality Information

Jack Lake water quality has been monitored, analyzed and studied by other agencies and institutions over the years including: Environment Canada, Ontario Ministry of Natural Resources, Trent University, and the University of Toronto.

All these various sources of information have been compiled together which provides a very good set of data indicating several trends. Three bays have been studied the most and offer the most complete data to make observations.

Brooks Bay – Maximum depth is approximately 12 metres. Average water temperature measurements reflect that the water temperature warms up faster and stays warm longer. Oxygen concentration is only good in the upper levels of the water column. Below the thermocline, oxygen is virtually non existent. Water clarity has increased in recent years. This may be due to an increased population of striped mystery snails found in the northern basin of the lake. However, pH (acidity measurement) and conductivity have remained virtually unchanged. There has also been an increased amount of aquatic weeds observed throughout the northern basin of Jack Lake. Eurasian milfoil has been spreading quickly in the back bays and quieter areas, which may also be having an impact on the water clarity. Total phosphorus measurements over the years would place Brooks Bay in a mesotrophic level which generally means an intermediate level of productivity and medium levels of nutrients available to promote and support plant growth.

Sharpes Bay – Maximum depth is approximately 51 metres. Water temperature through the ice free season has remained consistent from year to year, however, there is a recent trend that the water reaches a maximum temperature earlier in the summer and stays warmer longer. Oxygen concentration is good throughout the entire water column and is sufficient to sustain lake trout and other cold water species of fish at their optimum temperature range. Water clarity, pH and conductivity have remained virtually unchanged over the years. Total phosphorus measurements would place Sharpes Bay in the upper end of an oligotrophic level which generally means lower productivity as a result of a low concentration of nutrients.

Williams Bay – Maximum depth is approximately 22 metres. As in the other bays, average water temperature measurements reflect that the water temperature warms up faster and stays warm longer. Oxygen concentration is only good in the upper levels of the water column. Below the thermocline, oxygen is virtually non-existent. Water clarity, pH and conductivity have remained virtually unchanged. Total phosphorus in Williams Bay has not been measured as part of the Lake Partner Program.

Major Water Quality Concerns for Property Owners

The purpose of this section is to provide information regarding health concerns and important environmental parameters associated with water quality, as well as examples of human activities that affect the lake's trophic status and compromise the health of the ecosystem.

Turbidity (Siltation)

Reduction of the sun's ability to penetrate the water column (i.e. turbidity) is the result of the suspension of fine particles, such as clay, in surface water. Turbidity affects the entire food chain by inhibiting the growth of phytoplankton (small floating plant life); creating lower oxygen levels, which interferes with respiration of fish and benthic macro-invertebrates (small animals living on the bottom of a lake); impairing the visual range of fish, which impacts their ability to feed; and degrading fish spawning beds. Factors that influence and increase lake water turbidity include:

1. Landscape activities – large and small scale development activities, including unprotected placement of fill or disturbance of soil at or near the shoreline, create the opportunity for fine soils to enter the lake water, particularly during spring run-off and rain storms;
2. Riparian disturbance – erosion created by the alteration or removal of natural shoreline structures causes fine soil particles to be washed into the lake rather than being filtered or captured by the vegetation;
3. Impervious surfaces – non-vegetated or developed surfaces such as parking lots and site-specific storm water management systems (larger developments and roads) create greater opportunity for fine soil particles and storm water run-off to be washed into a lake; and
4. Recreational impacts – some modern boating activities cause shoreline erosion through excessive or unnatural wake action and disturbance of the clay and silt on the lake bottom, called scouring.

Nutrient Enrichment

An increase in nutrient loading, particularly in phosphorus levels, may accelerate the eutrophication (gradual nutrient enrichment) process and increase the growth of algae and aquatic plants in a lake. Phosphorus and nitrogen are both essential nutrients for plant and animal growth, and there are many natural and human sources of these nutrients in the environment, including phosphate and nitrate found in soils and rocks, wastewater treatment, leaking septic systems, and runoff from fertilized land and manure storage areas. Increased levels of phosphate and nitrate encourage the growth of aquatic plants and algal blooms, which in turn elevate temperature and alter other important water body characteristics such as concentrations of available dissolved oxygen. Several factors help to create or increase nutrient enrichment of lakes including:

1. Natural nutrients, in particular phosphorous, from surrounding land during spring runoff.

Phosphorus is a natural, geological element found in rocks and is made available to aquatic systems through the erosion of rocks from ground water sources in streams, which flow into lakes, and from soil runoff, as well as being generated from human sources (laundry detergent, fertilizers and human waste.)

2. Fertilizers used on lawns and gardens that border the lake introduce nutrients through run-off or groundwater.
3. Septic systems that may be poorly designed, out of date, not operating properly, capacity exceeded or not pumped out regularly contribute to the nutrient loading of a lake.
4. The low attenuation of the soil due to the underlying granite bedrock increases the contamination of ground and surface water, compared to soils of greater depth and absorption rates.
5. Drainage from roads and cleared lots, which also contributes to erosion and the concentration of suspended sediments near shore, increases aquatic chloride and sodium concentrations.

High nitrate and phosphate levels in drinking water (>1 mg/L) degrade the water quality, which poses a threat to human health. Nitrate levels at <0.05 mg/L are excellent and < 0.1 mg/L is good. Phosphate levels at <0.008 mg/L are excellent and <0.025 mg/L is good. For lakes and reservoirs, phosphate levels should remain between 0.005-0.05 mg/L and nitrate levels should remain between 0.10-0.5 mg/L to prevent eutrophication.

Fecal bacteria (Escherichia coli) measurements indicate the possible presence of disease causing bacteria, viruses and other microorganisms, which can cause other impacts such as cloudy water and unpleasant odours. Sources of fecal contamination of surface waters include wastewater treatment, septic tanks, and domestic and wild animal feces. Human factors include discharge of grey and black water from large boat holding tanks.

The Provincial Water Quality Objectives (PWQOs – numerical and narrative ambient surface water quality criteria) for E. coli indicate that bacteria concentrations should not go above 100 counts per 100 ml for fecal coliform and 1000 counts per 100 ml for total coliforms in drinking and recreational waters.

The JLA does not monitor the lake water E. coli for the purpose of determining its suitability as drinking water, and has received no reports of drinking water contamination. In any case, it is *not* recommended to use untreated lake water as a source of drinking water.

Surface water samples were collected at various locations around Jack Lake in 2008. Results indicated an insignificant presence of E. coli bacteria in many samples; however, these results only reflect conditions at a specific place at a specific time and cannot be extrapolated to determine the quality of the water.

Watershed runoff from roads and other impervious surfaces increase the chloride ("salt") influx into the aquatic system. Excessive levels of chloride (ions) in the water can have serious biological implications (metabolic complications) on intolerant aquatic species, so many municipalities have investigated the use of sand instead of salt on roads during the winter months.

For more information regarding Ontario's Provincial Water Quality Objectives (PWQO): http://www.pscanalytical.com/ce/guidelines/pwqo.htm. Environment Canada has developed a Code of Practice to be adopted by municipalities to reduce the amount of salt used during the winter: http://www.ec.gc.ca/nopp/roadsalt/cop/en/rs_main.htm

Toxic Substances

A toxic substance is generally defined as a substance that causes harm to the environment or human beings. Many toxins are synthetic and include polychlorinated biphenyls (PCBs), pesticides, dioxins, and furans. Other substances, such as mercury, a by-product of human industrial activity, may originate outside the catchment area of Jack Lake and be a contaminant, or may be a natural occurrence. Toxins present in lake water accumulate in long-lived biological organisms such as fish and ducks and, accordingly, can present a danger to humans when these animals are consumed.

The MOE *Guide to Eating Ontario Sportfish 2007-2008* states walleye consumption for the general population should be limited to two meals per month for fish larger than 28 inches (70 centimetres) and four meals per month for fish longer than 22 inches (55 centimeters). For women of childbearing age and children under age 15, walleye larger than 20 inches (50 centimetres) and smallmouth bass larger than 16 inches (40 centimeters) should not be consumed. Fish lengths are measured from the tip of the nose to the tip of the tail. See http://www.ene.gov.on.ca/envision/guide/index.htm

Fish are analyzed for a variety of substances, including mercury, PCBs, mirex, DDT and dioxins. The results are used to develop the tables in the *MOE Guide*, which give size-specific consumption advice for each species tested from each location. This advice is based on health protection guidelines developed by Health Canada.

Environmental factors that create or increase toxic upload and radionuclide contamination from soil leaching or runoff into the lake include:

1. Mercury, which naturally occurs in trace amounts in the air, water, rocks, soil, plant and animal matter, can be leached out by the acidity in the water.

Naturally occurring mercury anomalies are associated with fault zones in the bedrock, and ground water seepages in streams. These are a source of mercury entering the lake. Other sources of mercury may come from wetlands, surface runoff and atmospheric deposits.

2. Toxins were once regularly used in, and were by-products of, area industries. That, and improper use and storage of chemicals (pesticides, fertilizers and herbicides) by cottagers and other lake users was common until the 1970s.
3. Pesticides, herbicides and fertilizers used at or near the waterfront can enter the watershed;
4. Soaps and cleaners containing phosphates and other chemicals used in the vicinity of the lakeshore.
5. Untreated storm water run-off entering the watershed will transport all manner of toxins into the lake – the concentration levels of these contaminants are dependent upon the attenuation of the local soil and site drainage regime.

Observations – Water Quality

- *Jack Lake is a mesotrophic lake bordering on oligotrophic. Some bays at certain times of the year may lack certain nutrients (common for northern lakes); however, other bays at certain times of the year demonstrate that excessive nutrients are present. Oligotrophic lakes are more susceptible to acidification (lack of calcium ions to neutralize the acid precipitation); however, Jack Lake has a fairly high alkalinity level and is more resilient to acidification than other lakes in the vicinity.*

- *The Fisheries Act, Section 35(1), prohibits the harmful alteration, disruption or destruction of fish habitat, and Section 36(3) prohibits the deposit of deleterious substances into waters frequented by fish. The Public Lands Act, administered by MNR, regulates the activity and deposit of material on public lands (i.e. Crown land.) It*

has the authority to require permits for those who change or interfere with watercourses/wetlands or undertake development in areas where the control of flooding, erosion, dynamic beaches, pollution or the conservation of lands may be affected by the development. Permits are also needed for removing aquatic weeds and depositing stones and sand in the water.

- *The JLA has been involved in the Lake Partner Program for many years. It's purpose is to monitor phosphorous levels and water clarity. These are indicators of water quality. The deeper the Secchi depth, the clearer the water. In a lake that does not have the invasive species, zebra mussels, water clarity may be affected by algae, sediment and/or water colour. A study done in Maine, identifies that property values begin to decrease as Secchi measurements fell below four metres.*

- *The results of the Bancroft Stewardship Ranger preliminary, basic benthic study (bugs in the mud) at Apsley Creek in August 2007, reported that this could be an advisable program to indicate declining water quality at an early stage.*

Vegetation

An environmental impact study conducted by Niblett Environmental Associates Inc. (NEA Inc.) for Jack Lake Development in 2004 gives an overview of vegetation on the south side of Brooks Bay. The communities and species present in this area are typical of vegetation generally found in the Jack Lake area.

NEA Inc. counted a total of 10 vegetation communities on the subject property and a total of 156 species of plant were identified. The Jack Lake watershed is part of a larger Ontario eco-system transition zone that recently has been classified as "The Land Between". Many plant species are at their southern or northern range limits along this zone.

Community 1
Dry-Fresh sugar maple deciduous forest (ELC code: FOD5-1)

Many properties around Jack Lake are dominated by a mature sugar maple (Acer saccharum) forest. The topography is often one of rolling hills with steep slopes and rock outcrops and ledges indicating a range of soil depths.

Other species present in small numbers are basswood (Tilia americana), ironwood (Ostrya virginiana), white ash (Fraxinus americana) and white birch (Betula papyrifera).

The forest was most often of an even-aged stand with little or no understory or regeneration over large parts of the community due in part to the intensive browse by the resident deer population. Typical ephemeral species, fern stands and thick leaf litter layers are usually not present. The heavy grazing has often eliminated the usual flora associated with mature sugar maple forests.

Small pockets of herbaceous plants such as round-lobed hepatica, rock polypody, marginal wood fern, white trillium, herb robert, Virginia spring beauty, wild columbine, fringed polygala, Canada mayflower and helleborine can be found along ledges and steep slopes.

Community 2
Fresh-moist white cedar-hemlock coniferous forest (FOC4-2)

Many shorelines along Jack Lake are dominated by eastern white cedar (Thuja occidentalis) and eastern hemlock (Tsuga Canadensis) and also contained a mixture of eastern white cedar, eastern hemlock, eastern white pine (Pinus strobus), balsam fir (Abies balsamifera) and white spruce (Picea glauca). Groundcover in general was sparse due to the dense leaf litter and shade. Open areas contained similar species to community 1.

Community 3
White cedar-hardwood organic mixed swamp (SWM4-1)

These communities are relatively open with scattered cedar on hummocks in ponded portion. Some portions contain denser stands of cedar with scattered balsam fir, yellow birch (Betula alleghaniensis) and silver maple (Acer saccharinum). Ponded areas contain a diversity of emergent and floating wetland plants. Water depth aare variable with shallowest levels in the late summer. Depth often ranged from a few centimeters to 30cm in organic sediments.

Vegetation is dominated by lake sedge (Carex lacustris), fowl meadow grass (Poa palustris), water parsnip (Sium sauve), wild calla (Calla palustris), marsh fern (Thelypteris palustris) and pockets of broad-leaved cattail (Typha latifolia). Other species included mermaid weed (Proserpinaca palustris), liverworts (Marchantia polyphora), broad-leaved meadowsweet (Spiraea latifolia), wood nettle (Laportea canadensis) and enchanter's nightshade (Circaea quadrisulcata).

Community 4
Forb organic meadow marsh (MAM3-9)

Wetland pockets are dominated by sedges with stands of sensitive fern (Onoclea sensibilis), marsh fern (Thelypteris palustris) and water parsnip in the shallow perimeter pools. Other wetland species included square-stemmed monkeyflower (Mimulus ringens), marsh bedstraw (Galium palustre) and swamp-fly honeysuckle (Lonicera oblongifolia).

Community 5
Cattail organic shallow marsh (MAS3-1)

The Jack Lake area contains a number of wetland types including marsh, swamp. e. Outer edges are predominantly a cattail organic shallow marsh with a transition to willow thicket organic swamp and fen-like communities. The wetland usually contain a dense matt of mosses in most portions.

Dominant species included broad-leaved cattail (Typha latifolia), narrow-leaved cattail (Typha angustifolia), spotted joe-pye-weed (Eupatorium maculatum), Canada bluejoint grass (Calamogrostis canadensis), spotted jewelweed (Impatiens capensis), and sedges. Other wetland species included marsh fern (Thelypteris palustris), jack-in-the-pulpit (Arisaema atrorubens), fowl meadow grass (Glyceria striatus), crested wood fern (Dryopteris cristata), wild calla and bulb-bearing water hemlock (Cicuta bulbifera). Small ponded areas are scattered throughout the communities with larger patches containing submergent and floating plants such

as sago pondweed (Potamogeton pectinatusi, water smartweed (Poiygonum amphibium), yellow water lily (Nuphar variegatum), pickerel weed (Pontederia cordata), floating bur-reed (Sparganiumfluctuans) and floating-leaved pondweed (Potamogetan natans).

Community 6
Bluejoint organic meadow marsh (MAM3-1)

This type of community is dominated by dense Canada bluejoint grass and sedges. Other wetland plants included American stinging nettle (Urtica dioica subsp. gracillis), small-flowered buttercup (Ranunculus abortivus), fowl meadow grass, blue flag (Iris versicolor), spotted jewelweed (Impatiens capensis), bulb-bearing water hemlock, bebb's sedge (Carex bebbii) and swamp-fly honeysuckle.

Community 7
White cedar-hardwood organic mixed swamp (SWM4-1)

These types of wetlands are dominated by eastern white cedar. Scattered balsam fir, red maple, silver maple, balsam poplar (Populus balsamifera) and black ash (Fraxinus nigra) are also present. The wetlands are hummocky with dense moss cover and cedar on the hummocks and pools of standing water scattered throughout. Wetland plant species included sensitive fern, water horsetail (Equisetum palustre), blue flag, sedges (Carex lacustris, C. lupulina, C. interior, C. stipata), maddog skullcap (Scutellaria lateriflora), cut-leaved water horehound (Lycopus americanus), wood nettle (Laportea canadensis) and broad-leaved cattail.

Community 8
Dry-fresh white cedar coniferous forest (FOC2-2)

Jack Lake has many dense stands of eastern white cedar (Thuja occidentalis). Understory is sparse with hummocky topography, moss carpeting the ground and scattered herbaceous plants. Species included Canada mayflower (Maianthemum canadense), bulbet fern (Cystopteris bulbifera), marginal wood fern, starflower (Trientalis borealis), helleborine, wolfs-paw clubmoss (Lycopodium clavatum) and partridgeberry (Mitchella repens).

Community 9
Fresh-moist white cedar-hemlock coniferous forest (FOC4-2)

Pockets of coniferous forest are present. The cooler conditions and deeper soil depth often allow a stand of cedar, eastern hemlock, white pine and white spruce to develop. The groundcover is moderate with bulbet fern, marginal wood fern, Canada mayflower (Maianthemum canadense), white trillium and wolfs-paw clubmoss.

Community I0
Dry-fresh white pine-sugar maple mixed forest (FOM2-2)

High ridges are often dominated by a mixed forest. Species included white pine, sugar maple, white spruce, balsam fir, eastern hemlock, American beech, basswood and ironwood. Groundcover species include starflower, Canada mayflower, wolfs-paw clubmoss, marginal wood fern, helleborine, partridgeberry, white lettuce (Prenanthes altissima), false Solomon's-

seal (Smilacina racemosa) and leafy spurge (Euphorbia esula).

Jack Lake stakeholders are concerned that many areas around the lake are seeing significant changes to the natural shoreline. Destructive activities that negatively impact the shoreline include: the removal of the riparian areas' shoreline native vegetation; adding sand, rocks and retaining walls to artificial shoreline beaches; planting non-native or ornamental plant species such as Kentucky bluegrass, Norway maple. In neighbouring Kashabog Lake, the non-native aquarium plant fanwort is invading, and the species may now be in Little Jack Lake.

Observations – Vegetation

The recognized benefits of retaining 75% of a cottage shoreline property as a naturally vegetated shoreline include:

- *Reducing soil erosion and loss of landmass by wind, waves and rain. The vast rooting systems and foliage of a naturally vegetated shoreline contribute natural cover to anchor soils and to prevent the runoff of sediments into the lakebed that also protect spawning beds;*
- *Reducing the fertilization of lake water and sediments by trapping the nutrient rich precipitation and runoff;*
- *Shading and cooling the lake water which reduces the growth of invasive species of aquatic weeds and allows fish to spawn undisturbed;*
- *Preserving the ecological integrity of the ecosystem; and*
- *Increasing the natural beauty of the surrounding landscape.*

Wetlands

Wetlands are land types such as areas of shallow open water, swamps, marshes, fens and bogs (peat lands). They occur intermittently across the landscape along lakes, rivers and streams, or in any area where the ground water table is close to the surface. Wetlands provide substantial ecological, social and economical value to any lake through the maintenance and improvement of water quality, the attenuation or detention of rain and runoff that assists in controlling flooding, and important habitat for wildlife, including heronries, fish spawning sites and turtle nesting grounds, as well as conditions to support a wide variety of vegetation including rare and **unique** species. These "special features" result in substantial social and economic benefits and opportunities for the local residents including fishing, boating, other recreational activities, wildlife viewing, and an overall appreciation for nature.

The Ministry of Natural Resources developed a wetland evaluation system to provide scientific criteria to determine the significance of a wetland in comparison with other wetlands in Ontario. The wetlands in Methuen had not been evaluated before amalgamation. According to the HBM Zoning Map, the following shoreline wetlands are designated environmental protection: Bowers Bay (1), Sheep's Bay (2), Callahan Bay (1), Rathbun Bay (1), Long Bay (1), William's Bay (1), McCoy Bay (2). There are numerous environmental protection areas inland around creeks, streams and inland small lakes within the Jack Lake watershed. Of particular concern are the environmentally sensitive lands around Jack Creek and Little Jack Lake that are being damaged by motorized vehicle routes coming from several directions.

A wetland that is considered provincially significant is the Sharpe Bay Fen Conservation

Reserve. It is located immediately west of the Jack Lake watershed and east of Highway 28.

The wetlands around Jack Lake have not been evaluated and inventoried. According to the CAO of Havelock-Belmont-Methuen, normal evaluation of provincially designated wetlands is the responsibility of the MNR. Other wetlands are the responsibility of a Conservation Authority, if there is one. The MNR acts in the role of a Conservation Authority for Jack Lake. In this case, if the municipality deems it a dire need, and they have the funds and qualified staff or can hire an expert, then the wetland can be evaluated.

Furthermore, the few documents available are inconsistent and show significant wetlands protection areas disappearing over the last several years. Without a wetland evaluation or appropriate zoning, these wetlands remain unprotected.

Observations – Wetlands

- *Casual observations and review of satellite images of the Jack Lake area reveal many wetland areas. These wetland areas filter the lake's water, thus improving water quality.*
- *Wetland evaluation and appropriate zoning is needed, otherwise these areas will remain unprotected.*

Streams

The purpose of this section is to identify inflows and outflows in the watershed. This information is shown on a map in the Appendix. Stream-flow varies over time in response to the inflow of water from the surrounding land and aquifers or ground water. In general, streams, depending upon water quality and geomorphology, provide spawning and rearing habitat for a variety of fish species including walleye. The stream's flow, water temperature, and sediment bed or substrate type combined provide the necessary conditions to incubate the fish eggs deposited during the spawning season. Shallow zones, along the sandy or gravelly sediment-bed of a stream, are often the preferred spawning habitats of various fish species. The healthiest water – well oxygenated for the eggs, with a good source of food for adults – is often found in the shallow zones of streams.

Figure 4.1 – The Streams and Tributaries of Jack Lake

Streams	Location on Map
Sucker Creek	Jackson Bay
Jimmie's/Apsley Creek	Brooks Bay
Halls/Redmond Creek	Redmond Bay
Jack Creek	South Williams Bay

The following is an excerpt from the Natural Heritage Information Centre (NHIC) on the Petroglyphs Provincial Park:

"Jack Creek marks the south-east boundary of the park as it exits at an altitude of 240 metres. Drainage there is generally north to south as it heads into Stony Lake. It is a warm water creek that retains good water flow year round through depths not exceeding one metre. Except in spring, it can easily be forded on foot at many locations. For the most part it runs in a well-defined, deeply incised natural valley about ten metres across with a limited floodplain. Only along a forty metre section in the east of the park does it spread out into a local wetland of about 16 ha in extent. Jack Creek drains about 15% of the park area, taking water from C-Lake in the north-east, McGinnis Lake in the south-east and a narrow border along its route in between."

Observations – Streams

- *The results of the Bancroft Stewardship Ranger preliminary basic benthic study at Apsley Creek in August 2007 indicated that this could be an advisable program in which Jack Lake could benefit. Leaching and run-off could be an issue. Benthic studies are a reliable predictor of water quality of a lake.*
- *No formal assessment of streams has been made.*

Wildlife and Wildlife Habitat

This section focuses on the specific wildlife species that inhabit and use the resources within the Jack Lake watershed and provides comments, observations and recommendations that generally apply to all wildlife. This section has been split into smaller sub-sections, dividing the wildlife into Orders – mammal, bird, amphibian and reptile, and insects, where applicable.

Because our watershed is in the transitional eco-system zone between the Southern Ontario and Canadian Shield ecological systems, it supports a remarkable diversity and abundance of wildlife species. Many of these species are at their southern or northern range limits along this transition zone.

The area around Jack Lake has an abundant, diverse wildlife population, which includes mammals, birds, reptiles, amphibians, and a variety of invertebrates – insects and bugs, which makes wildlife viewing an important recreational pastime for many lake residents and visitors. Protection of wildlife habitat in and around the lake is, therefore, vital to the conservation of biological diversity and the preservation of self-sustaining species' populations around the lake. However, if habitat fragmentation continues because of development pressures, loss of this valuable resource will be the end result.

While loons and many other birds migrate south to more favourable climates, some mammals in the area have developed adaptive methods to survive the harsh winters. Many mammals, including bats and the black bear, enter into hibernation or torpor (sporadic periods of hibernation) where they sleep for extended periods of time during the winter months. Other mammals, such as the white-tailed deer, moose, weasel, beaver, vole and bobcat remain active year-round, but may adapt their behaviours according to the local climate.

According to the Natural Heritage Information Centre in Peterborough, a faunal sighting (any species which is not a plant) is viable for 20 years; if after 20 years the species has not been seen, the observation is no longer viable and the species may be considered extinct (not found living) in that particular location. In the case of flora (plants, etc.,) sightings are viable for 40 years because of the lack of mobility and the difficulty in locating some species due to their size or rarity.

Lake users may have maintained identification lists of species they have seen over the years and are encouraged to contact the JLA to ensure that all species sightings are documented.

Jack Lake lies almost entirely surrounded by the Peterborough Crown Game Preserve. It is important to note that the JLA was instrumental in halting a controlled deer hunt in the area in the 1980s.

Figure 4.1 – List of Mammals Common to the Jack lake Area

White-tailed Deer	Porcupine	Woodchuck (Groundhog)
Moose	Beaver	Mice (white footed, deer-)
Raccoon	Muskrat	Mole (various species)
Black Bear	Red Fox	Shrew (various species)
Mink	Eastern Chipmunk	Vole (meadow, others)
Northern River Otter	Squirrel (red, grey, flying)	Weasel (least short-tailed; long-tailed)
Marten	Grey Wolf	
Striped Skunk	Hare (snowshoe)	Bat (northern long-eared, eastern pipistrelle, little brown)
Fisher	Rabbit (eastern cottontail)	

Source: JLA cottagers and other residents in the watershed

Other mammals of interest sighted in the Apsley area include elk, lynx and bobcat.

Many animals are provincially rare species in Ontario because of their low population numbers or limited dispersal due to human encroachment, intensive trapping for fur, kills due to cars, habitat destruction due to development or pollution and climate change, and/or direct persecution. For example, the northern river otter's population has drastically declined in Ontario and much of its North American range because its fur was extensively trapped in the past and, more recently, toxic pollutants especially mercury has taken its toll on the remaining populations. It is, therefore, incredibly important to understand the intricate role that each of these species plays in balancing the health of the natural environment, and to help maintain and conserve the local ecosystem's biological diversity. Northern river otters until recently had not been seen at Jack Lake.

An environmental impact study conducted by Niblett Environmental Associates Inc. (NEA Inc.) for the Badeau Jack Lake Development in 2004 gives an overview of wildlife on the south side of Brooke's Bay. The species observed in that bay area are typical of those generally found in the Jack Lake area and are detailed below.

Herpetozoa

A total of eight species of amphibians and one species of reptile were recorded during the spring amphibian survey and from incidental observations. Eastern garter snake (Thamnophis sirtalis sirtalis) was the only reptile observed in open forest areas of the site.

Mammals

A total of 11 mammalian species were recorded during the field surveys. Species observed by direct observation and/or sign included raccoon, striped skunk, (Mephitis mephitis), black bear (Ursus americanus), white-tailed deer (Odocoileus virginianus), beaver (Castor canadensis), gray squirrel (Sciurus carolinensis), porcupine (Erethizon dorsatum), red squirrel (Tamiasciurus hudsonicus), eastern chipmunk (Tamias striatus) and moose (Alces alces).

Deer were observed in herds of up to six individuals. The Jack Lake area is known to support a large deer population, in part due to widespread year round feeding of deer by residents and cottagers. As a result the deer are tame and easily approached. Most of the area is part of a deer yard and deer over-wintering areas. The combination of dense cedar stands, wetlands and forest provides ideal conditions for deer.

Anecdotal evidence also points to the presence of wolves near the southern part of the lake.

Significant Birds

Habitat preferences vary with each bird species – some prefer dense forest cover while others prefer open fields, shores or wetland areas. The variety of birds that exist in the lake area is a product of the variety of natural habitat, including food sources (both insects and vegetation,) and nesting sites found in the region. Certain wetlands have exceptional waterfowl staging, moulting and breeding areas as well as significant stopover areas within its marshes, swamps and fens; these areas are critical habitat during moulting or provide desirable vegetation and cover during migration. Therefore, in order to protect this diversity, it is important for the residents, cottagers and visitors to ensure that the current variety of existing habitat is maintained and protected within the lake's vicinity.

A list of known bird occurrences and current bird observations for Jack Lake and watershed has been compiled with input from the local community newspapers, the Ontario Breeding Bird Atlas, cottagers' observations, MNR, and the Badeau Property environmental assessment. Properly encouraged, many birders should be willing to share their lists of sightings, and lake residents would benefit from knowing the extent of the biological diversity of their shorelines throughout the seasons.

The following is a brief description of significant bird species, their life-history (habitat, breeding, nesting sites) as well as potential impacts on their survival.

Dabbling ducks (including the American black duck and mallards,) and diving ducks (including mergansers and loons) – The American black duck is a species that is the subject of **unique** concern in Ontario wetlands because it has been suffering continuous decline in its wintering areas in the United States. In southern Ontario, American black duck populations have been reduced to very low levels, whereas the mallard has been steadily and substantially increasing its population numbers. It is important, especially to the ecological and recreational stability of the lake, to retain its marshes and swamps, those that have suitable brood-rearing habitat – emergent vegetation for cover and shallow water for feeding. The American black duck and mallards are regularly seen on Jack Lake.

The *common loon* is the provincial bird of Ontario. Jack Lake is large enough to support several breeding pairs which inhabit almost every large bay at the lake. Increased human activity is one of the main causes for losses of loon populations on most northern lakes. Loons are particularly sensitive to development and shoreline disturbances. Power boaters and other activities that cause excessive waves and noise disturb the nesting loons, loon chicks, or feeding loons. Sensitivity to such disturbances will often cause loons to abandon nesting sites and/or the lake completely. The presence of loons on a lake is often used as a biological indicator of the ecosystem's health.

The late Irene Mann, a long time Jack Lake cottager, lobbied governments to establish and implement a national program to protect loons and their habitats in Canada. Her initial efforts and monitoring helped develop the *Bird Studies Canada Loon Watch Program* in which Jack Lake continues to participate.

All known loon nest sites at the lake are natural and remarkably successful each year; however, infant mortality may sometimes be as high as 25%.

Rookeries – these and other colonial (living in colonies) bird nesting sites are not present in the Jack Lake immediate vicinity; however, unconfirmed reports have identified a possible heronry near East Bay. Colonial water birds such as the Great Blue Heron are especially vulnerable to human activity and disturbance and habitat destruction during the breeding season, especially when large numbers of birds are concentrated in a confined area. Herons tend to desert nests and entire colonies if disturbed during pair bonding, nest construction, or early egg-laying stages. Desertion of entire colonies is responsible for the major portion of the lack of populations' reproductive output, and can affect the stability of the entire regional population of herons even when the heronry relocates (MNR 1984).

Raptors – As of June, 2008, there were three osprey nesting sites on Jack Lake. Over the past few years each of the nests or their supporting trees were blown down but the osprey pairs successfully relocated and built new nests nearby.

Bald Eagles – These magnificant birds are known to over winter in the Peterborough Crown Game Preserve and have been seen regularly. Bird Studies Canada explains that bald eagles migrate from other parts of Ontario to the area around Jack Lake for the relative abundance of food left over from wolves. Bald eagles have been seen catching fish in the open water zones of the Narrows, at the Jack Lake dam, and at the falls at Little Jack Lake during the winter. In December, 2007, a bald eagle was seen regularly at one of the vacated osprey nests.

In addition to eagles and the long list of confirmed breeding birds below, the following are also commonly heard or seen at Jack Lake: cormorants, great horned owl, red headed merganser, wild turkey, and least bittern.

The *Ontario Breeding Bird Atlas* has identified a total of 102 species of birds in the Jack Lake area:

Figure 4.3 – Jack Lake Bird Species

Acadian Flycatcher	Common Grackle	Pileated Woodpecker
Alder Flycatcher	Common Raven	Pine Warbler
American Woodcock	Common Loon	Purple Finch
American Crow	Dark-eyed Junco	Red-breasted Nuthatch
American Robin	Downy Woodpecker	Red-eyed Vireo
American Black Duck	Eastern Phoebe	Red-shouldered Hawk
American Goldfinch	Eastern Kingbird	Red-winged Blackbird
American Bittern	Eastern Wood-Pewee	Ring-billed Gull
American Redstart	European Starling	Ring-necked Duck
Baltimore Oriole	Evening Grosbeak	Rock Dove
Barn Swallow	Golden-crowned Kinglet	Rose-breasted Grosbeak
Barred Owl	Gray Catbird	Ruby-throated Hummingbird
Belted Kingfisher	Great Crested Flycatcher	Ruffed Grouse
Black-and-white Warbler	Great Blue Heron	Scarlet Tanager
Black-billed Cuckoo	Hairy Woodpecker	Sharp-shinned Hawk
Black-capped Chickadee	Hermit Thrush	Song Sparrow
Black-throated Green Warbler	Hooded Merganser	Swamp Sparrow
Black-throated Blue Warbler	House Wren	Tree Swallow
Blackburnian Warbler	Indigo Bunting	Turkey Vulture
Blue Jay	Killdeer	Veery
Blue-headed Vireo	Least Flycatcher	Warbling Vireo
Blue-winged Teal	Lincoln's Sparrow	Whip-poor-will
Broad-winged Hawk	Magnolia Warbler	White-breasted Nuthatch
Brown Thrasher	Mallard	White-throated Sparrow
Brown Creeper	Mourning Dove	White-winged Crossbill
Brown-headed Cowbird	Mourning Warbler	Wilson's Snipe
Canada Warbler	Nashville Warbler	Winter Wren
Canada Goose	Northern Waterthrush	Wood Thrush
Cedar Waxwing	Northern Flicker	Wood Duck
Chestnut-sided Warbler	Northern Goshawk	Yellow Warbler
Chipping Sparrow	Olive-sided Flycatcher	Yellow-bellied Sapsucker
Cliff Swallow	Osprey	Yellow-rumped Warbler
Common Yellowthroat	Ovenbird	
Common Nighthawk		

Significant Amphibians and Reptiles

The Jack Lake watershed is inhabited by a variety of different species of reptiles and amphibians that includes: turtles, frogs, snakes, salamanders and the five-lined skink.

Turtle and snake nests and hibernacula locations have not been well documented at this time. Turtle and snake species populations appear to have declined dramatically over the past 20 years because of habitat loss due to development encroachment, increased road traffic, and direct persecution. Unfortunately, turtles and snakes are often injured or killed because of misidentification.

Amphibians including frogs and salamanders are particularly at risk because of their life-cycle requirements; frogs and salamanders need both healthy aquatic and terrestrial habitats to fulfill their life-cycle.

Scientists around the world have noted a decline in the world's frog population over the past 20 years. This decline has initiated the use of frogs to highlight and identify notable environmental changes in ecosystem health. The decline of amphibian populations and the loss of biological diversity has been linked to climatic and landscape changes, such as acid rain, greenhouse gases, habitat loss, stream channelization, and effluents leaching into wetlands. It is also due to a combination of environmental factors influenced by human activities such as the food trade, industrialization, and habitat destruction for development purposes.

Figure 4.4 – Amphibians and Reptiles Found in the Jack Lake Area

Amphibians

- American Toad (*Bufo americanus)*
- Bull frog (*Rana catesbeiana)*
- Eastern Red-backed salamander (*Plethodon cinereus)*
- Five Lined Skink (*Eumeces fasciatus)* – species at risk
- Gray Treefrog (*Hyla versicolor)*
- Green frog (*Rana clamitans)*
- Mink frog (*Rana septentrionalis)*
- Northern Leopard frog (*Rana pipiens)*
- Spotted Salamander (*Ambystoma maculatum)*
- Spring Peeper (*Psuedacris crucifer)*
- Wood frog (*Rana sylvatica)*

Reptiles

- Blanding's turtle (*Emydoidea blandingii)* – species at risk
- Common Snapping turtle (*Chelydra serpentina serpentine)*
- Eastern Smooth Green snake
- Eastern Milk snake
- Eastern Garter snake (*Thamnophis sirtalis sirtalis)*
- Eastern Ribbon Snake (*Thamnophis sauritus)* – species at risk
- Eastern Hog-nosed snake
- Midland Painted turtle (*Chrysemys picta marginata)*
- Northern Water snake (*Nerodia sipedon sipedon)*
- Redbelly snake
- Spotted turtle (*Clemmys guttata)* – species at risk

For more information or to report a sighting of rare reptiles or amphibians, contact the Toronto Zoo Adopt a Pond Program (Frog Watch and Turtle Watch): http://www.torontozoo.org/ or the Kawartha Turtle Tally.

If an injured turtle is encountered on a roadway and can be safely transported, contact the Kawartha Turtle Trauma Centre which was established in Peterborough to provide medical assistance for turtles. Call 705-748-9301 Ext. 2303 (Peterborough Utilities) for closest location to take the injured turtle or contact the Kawartha Turtle Trauma Centre: http://www.kawarthaturtle.org/

The Natural Heritage Information Centre compiles and reports on the status of rare species in Ontario: http://nhic.mnr.gov.on.ca/MNR/nhic/species/species_report.cfm

To learn more about other species at risk in Canada additional information can be obtained at: http://www.cosewic.gc.ca/eng/sct5/index_e.cfm

Observations – Wildlife

- *Jack Lake is **unique** because most of it is surrounded by the Peterborough Crown Game Preserve, a preserve managed by the MNR. The watershed is also now identified as The Land Between because it is between two ecosystems. This helps to explain why the area around Jack Lake has an abundant, diverse wildlife population which includes mammals, birds, reptiles, amphibians, and invertebrates – insects. This is **unique** in Ontario and must be protected. Wildlife viewing is an important recreational pastime for many lake residents and visitors.*
- *Protection of wildlife habitat in and around the lake is vital to the conservation of biological diversity and the preservation of self-sustaining species' populations around the lake. However, if habitat fragmentation continues because of increased development pressures (roads, off road routes for ATVs, snowmobiles and four wheel drive trucks), a significant reduction of this valuable resource will likely be the end result.*
- *Forty-two bird species were recorded in the Environmental Impact Study as breeding on the Badeau Property development in Brooks Bay. The recently released (2008) Breeding Bird Atlas of Ontario indicates that there are over 90 species of breeding birds in the area with an additional number of species observed seasonally (e.g. bald eagles).*
- *Regular visitors and cottagers at Jack Lake have observed that the frog population has been declining; however, it appears that in some areas, populations are recovering, although there is no scientific evidence to support this observation.*

Exotic and Invasive Species

The introduction of exotic, non-native or invasive species into a lake environment affects the natural balance of the ecosystem. Cottagers and area residents have witnessed the impact of the introduction of rock bass and black crappies into Jack Lake through lowering the fish populations of other important sport fish species in the lake.

This section identifies those invasive species that have been recorded as having "established populations" within the Jack Lake water body and/or watershed. Species that have successfully

invaded Jack Lake are briefly described including potential impacts on the ecosystem and precautions to prevent invasion of other species into the watershed. Several other species that have been identified in nearby watersheds are also included in the following section as they will continue to be a potential threat to the Jack Lake environment and proper precautions must be established to prevent their spread.

There are many organizations and government agencies that monitor invasive populations. This includes research being conducted at Trent University in Peterborough to address the invasive potential of these species. Potential mitigation involves mechanical removal, biological control agents (natural pathogens or predators), or other preventative measures, such as awareness, education, legislation and enforcement.

The Ontario Federation of Hunters and Anglers receives funding from MNR to provide information and useful links dedicated to invasive species control on their web site www.invadingspecies.com . The JLA currently participates in the Invasive Species Watch program and collects water samples from three locations at Jack Lake. Samples are submitted for analysis to determine the presence of spiny water flea and zebra mussels. As of 2008, no spiny water flea or zebra mussels have been detected at Jack Lake.

Eurasian Watermilfoil and striped mystery snails have both been found in several areas of Jack Lake. The combination of these two species may have a significant impact on the water quality and future enjoyment of many activities at the lake including fishing, swimming and boating. There are a variety of possible sources of how these species may have been introduced to the lake, ranging from aquatic gardens, to boats, to wildlife. There is no way of knowing how long they have been present in the lake but since 2004 many cottagers with properties in Redmond Bay have noticed the population of snails along their shorelines has increased dramatically. All visitors, residents and cottagers must help to reduce their impact and protect the lake from further spread of these and other invasive species.

The Striped Mystery Snail (*Pomacea bridgesii*) is a popular species of snail used in aquariums and water gardens. The characteristics which make them popular – water filtration and algae removal – also make them invasive in the natural environment. Mystery snails can grow to the size of a golf ball but are commonly the size of a dime to a quarter. In the lake they are brown with dark brown/black stripes. They have also been recently confirmed in Chandos Lake and are quite widespread throughout the Kawarthas. The highest concentrations of these snails in Jack lake have been seen throughout Brooks and Redmond Bays but they are found in increasingly large numbers in southern areas of the lake.

Eurasian Watermilfoil (*Myriophyllum spicatum*) is a feathery submerged aquatic plant that can grow quickly to form thick mats in shallow (<6 metres deep) areas of freshwater lakes and rivers in North America. The stems are reddish and the leaves have 12-21 leaflets. (Northern watermilfoil (*Myriophyllum sibericum*) which resembles the Eurasian variety has only 5-9 leaflets and is a native species also present in the lake.) The weed mats that can form interfere with swimming, and entangle propellers which hinders boating and fishing. Heavy infestations have reduced property values in the past at some other Kawartha Lakes. Matted milfoil can displace native aquatic plants and impact fish communities. Milfoil spreads when plant pieces break off and float on water currents and root in new locations. It can be transported to new environments by clinging to boats, motors, trailers and fishing gear.

Eradicating established milfoil infestations is very difficult but preventing their spread is possible. Broken pieces of this plant should not be thrown back into the water. (Reference: 2006 University of Minnesota Sea Grant Program).

Combined Effect on the Lake Environment

The striped mystery snails filter water and remove algae from the lake; (algae is the base of the food chain that supports the fish and wildlife community.) Without an adequate food supply for the small fish and crayfish to feed on, their numbers will be reduced, thereby reducing the amount of food available for larger fish to feed on. The population of fish that the lake can support will be reduced, ultimately decreasing numbers and sizes of fish. Although the lake will appear clearer, this means that sunlight will be able to penetrate to deeper depths of the lake which increases the area that aquatic plants and Eurasian milfoil can be established.

The following is a list of other invasive species that are present in nearby Kawartha and Haliburton Lakes:

Aquatic animals:

rock bass and black crappie (both currently in Jack Lake)
round goby (*Neogobius melanostomus*) (Rice Lake)
rusty crayfish (*Orconectes rusticus*) (likely in Jack Lake but unconfirmed),
spiny water flea (*Bythotrephes cederstroemi*),
stripped mystery snails (*Pomacea bridgesii*) (currently found in many other Kawartha Lakes)
zebra mussels (Big Cedar, Kashabog, Paudash, Catchacoma and Stony Lakes have confirmed colonies of zebra mussels)

Wetland and Aquatic Plants:

Eurasion milfoil (*Myriophyllum spicatum*) (Brooks Bay, Sheeps Bay, Williams Bay confirmed sitings)
European Frogbit (*Hydrocharis morsus-ranae*) on Chandos Lake
Fanwort (*Cabomba caroliniana*) on Kashabog Lake and possibly in Little Jack Lake
Curly pondweed (*Potamogeton crispus*) on Paudash Lake
Flowering Rush (*Butomus umbellatus*) on Paudash Lake.
Purple Loosestrife (*Lythrum salicaria*) (some individual plants have been found along Jack Lake shorelines in the past and have been removed but no large populations have been established)

Viral hemorrahagic septicaemia (VHS) is a relatively new (January 2007) virus found in the lower Great Lakes. It is an infectious disease and has been linked to die-offs of at least four species of fish. The source may be from stores selling aquarium fish. Restrictions on baitfish harvesting and use have been implemented to slow down the spread of the virus. The virus has not been found in Fisheries Management Zone 15 where Jack Lake is located, but this area is along the southern border of the virus free area.

All lake users including government representatives who may patrol the lake, as well as service providers, e.g. Ontario Provincial Police, Ministry of Natural Resources, Ministry of Environment, Health Inspectors, Fisheries and Oceans Canada, Transport Canada, Environment Canada, Parks Canada, Ontario Hydro and Bell Canada, plus residents, cottagers, contractors (builders, plumbers, electricians, landscapers, septic haulers) and visitors all must take the following precautions to protect not just Jack Lake's environment but to help prevent the spread of invasive species to other lakes and areas:

1. Inspect boat, motor, trailer, and boating equipment such as anchors and fishing gear, centerboards, rollers, and axles. Remove any visible organisms and plants clinging to the equipment before leaving the watershed and dispose of them onshore.

2. Drain water from the motor, live well, bilge and transom wells while on land before leaving the boat launch.

3. Wash or dry boat, tackle, downriggers, trailer, and other boating equipment to kill harmful species that are not visible at the boat launch. Some aquatic species can survive more than two weeks out of water. Therefore, it is important to:

Rinse boat and equipment that normally gets wet with hot tap water (greater than 40°C), or
Spray boat and trailer with high pressure water (250 psi), or
Dry boat and equipment in the sun for at least 5 days before transporting them to another body of water.

4. Empty bait buckets on land before leaving any body of water. Never release live bait into water, or release aquatic animals from one water body into another. It is illegal to use gobies, ruffe or rudd for bait.

5. Learn how to identify exotic species. If you believe they have spread to a new location in Ontario, call the province-wide Invading Species Hotline at 1-800-563-7711 to report the siting.

It is important to remember:

It is illegal to take baitfish from one body of water and deposit it in another.
It is illegal to use aquarium fish for bait.
It is illegal to release aquarium fish into the natural environment.
It is the angler's responsibility to know the origin of the bait purchased.
Anglers must have a valid fishing licences to catch baitfish for personal use.

Exotic, invasive or non-indigenous (non-native) species encompass organisms that have been introduced into non-native habitats. The introduction of these invading species causes widespread and unpredictable changes to habitats and is a worldwide problem. Scientific research has recognized the serious threat of exotics to habitat destruction, to the local biological diversity and overall health of the ecosystem, especially in aquatic environments. Ecological changes can result in damage to ecosystems, native fish and wildlife populations, damage to local infrastructure, disruption of commerce, and even threaten human health due to poorer water quality conditions and loss of biological diversity.

In the absence of natural predators, competitors, diseases and parasites, populations of exotic species can explode and out-compete native species for food and habitat. Once established, they are almost impossible to eliminate, and control of nuisance exotic species can cost millions of dollars and impose other serious threats to the local environment such as the release of non-native predators and competitors, or spraying toxic chemical substances to control outbreaks. The impacts of several invading species are often greater than the sum of their individual affects on a system.

Introductions of non-native aquatic species have occurred in a variety of ways. In Ontario, this has included unregulated ballast water discharge from shipping vessels into the Great Lakes (proposed Fisheries Act Regulations will provide authority for managing aquatic invasive species more effectively than in the past,) natural barrier removal, misguided stocking, and lack of education and awareness which causes accidental releases from aquariums and water gardens, bait harvesters, anglers and the live fish for food trade. Unless precautions are taken to remove these organisms before travelling to a new water body, these exotics can be spread from one body of water to another. Once introduced, it is almost impossible to eliminate them; however, various methods are being evaluated by researchers and scientists.

Observations – Exotic and Invasive Species

- *Water samples are collected annually in Brooks Bay, Sharpe Bay and Williams Bay and sent to OFAH for analysis for the presence of spiny water flea and zebra mussel villagers (larval form of zebra mussels).*
- *Signs are posted at boat launch sites to remind boaters to inspect their boats, trailers and bait and bilge areas to ensure they are clean, dry and free of any invasive species which may have been carried from other water bodies. Signage has been posted at all points of water access or access routes to the lake regarding zebra mussels.*
- *The misguided or accidental introduction of rock bass and black crappies into Jack Lake had a devastating impact on the other species of fish in the lake including reducing the population of walleye, smallmouth and largemouth bass.*
- *Eurasian watermilfoil and striped mystery snails have been found in Jack Lake. The combination of these two species may have a significant impact on the water quality and future enjoyment of many activities at the lake including fishing, swimming and boating.*
- *Jack Lake has many neighbouring Kawartha and Haliburton lakes that are battling invasive plant, animal and microbial species.*

Rare Species and Species at Risk

This section is dedicated to rare and at-risk species within the lake's watershed. It is important that the provincial and federal legislation (e.g. Ontario Endangered Species Act, Federal Species at Risk Act, Federal Fisheries Act, etc.) protects species and their critical habitat. This may include areas for breeding, feeding, shelter and protection against predation, and rearing young.

An Area Biologist or Species at Risk Biologist from the local MNR District Office, the Ontario Parks Species at Risk Section (Peterborough), or the Natural Heritage Information Centre (Peterborough) can provide current information, clarification on law, planning policies, analysis of the current status and the identification of rare species observed in the Jack Lake watershed.

The causes of rarity or scarcity of a species are many and varied, and may be natural or related to human activity. Rarity may be caused by the lack of suitable breeding habitat, lack of migratory stopover areas, poor winter habitat, predation, unregulated hunting, disease, pollution, habitat destruction or over-collecting. Rarity may also be due to the fact that the particular population is at its natural limits of its distribution range.

Rare species are considered very important and worthy of protection efforts because of their biological, social and, most often, economic value. Many of these species are ranked in accordance with their rarity, established by the Natural Heritage Information Centre (NHIC), and are significant species and of conservation priority.

Significant species are those regarded as a provincially or regionally rare or sparse natural heritage feature. The Natural Heritage Information Centre (NHIC) (http://www.nhis.mnr.gov.on.ca/MNR/nhic) collects, manages, and ranks Ontario species based on a number of factors such as biological and habitat requirements, distribution, population size, threats, management strategies. Those species that are classified as S1, S2, or S3 are rare and tracked by the NHIC, and are species considered to be provincially significant. Species being tracked by the NHIC are generally known from fewer than 100 occurrences across the province, and are often designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or the Committee on the Status of Species at Risk in Ontario (COSSARO) as 'species at risk'—an official status, which may afford the threatened and endangered species some protection in Ontario and Canada.

For more information regarding distribution, ranks and status of Jack Lake species, or if you would like to report a rare species, contact the NHIC or the JLA who will compile information and submit it to the appropriate authorities on your behalf.

Figure 4.5 – Rare and At Risk Species, Jack Lake Area

Acadian Flycatcher (*Empidonax virescens*)
Bald Eagle (*Haliaeetus leucocephalus*)
Blandings Turtle (*Emydoidea blandinii*)
Cerulean Warbler (*Dendroica cerulea*)
Eastern Hog-nosed Snake (*Elaphe gloydi*)
Eastern Ribbonsnake (*Thamnophis sauritus)*
Five Lined Skink (*Eumeces fasciatus)*
Grey Fox (*Urocyon cinereoargenteus*)
Least Bittern
Milksnake (*Lampropeltis triangulum*)
Monarch Butterfly
Northern Map Turtle (*Graptemys geographica*)
Rams-head Lady's Slipper (*Cypripedium arietinumax*)
Red Shouldered Hawk (*Buteo lineatus)*
Snapping Turtle (*Chelydra serpentina*)
Spotted Turtle (*Clemmys guttata*)
Stinkpot Turtle (*Sternotherus odoratus*)
Butternut tree (*Juglans cinerea*)

Resources: Badeau Property (Brooks Bay) Environmental Impact Study (2004) by Niblett Environmental Associates; observations by various cottagers and Jack Lake and area residents; Environment Canada www.sarareresgistry.gc.ca/default_e.cfm ; Province of Ontario www.mnr.gov.on.ca/en/Business/Species/index.html

Observations – Rare Species and Species at Risk

- *Known, questionable, rare and at-risk species observed at Jack Lake include: Five Lined Skink, Blandings Turtle, Osprey, Barred Owl, Great Horned Owl, Bald Eagle, Monarch Butterfly, Luna Moth, Pink Ladyslipper, Red Shouldered Hawk, Eastern Ribbon Snake and Least Bittern. The number of endangered species found in the Jack Lake watershed makes the area* ***unique****.*

Fisheries

Fisheries Strategy

During the year 2005-06, the Jack's Lake Association (JLA) approved the establishment of a Fisheries Committee charged with the development of a strategy and action plan for improving the fishery of Jack Lake. The JLA contacted a range of people interested in the improvement of the fishery and invited this group to the initial "brainstorming" meeting during the summer of 2005. As a result of this initial discussion and a follow-up session in September, a draft Jack Lake Fisheries Strategy was prepared. The strategy is documented below.

While it is recognized that the Fisheries Strategy should be focused on the entire lake ecosystem and aquatic species, the initial management actions are focused on the improvement of the walleye fishery while considering the overall health of the Jack Lake fishery. Two immediate actions are fundamental to the strategy:

1. *The improvement of walleye spawning habitat*
2. *The education of cottagers and anglers to improve how they use the lake and how they fish.*

The quality of spawning habitat may not be the only limiting factor. Stresses such as weather (cold, late spring or early warm spring,) reduced water quality, and predation by other species may be significant limiting factors. Therefore it is important to understand that this strategy is a "living document" and will evolve as information is forthcoming, as experience and monitoring demonstrates, and as volunteer and fisheries expert commitment and time permits.

Background

It is suspected that before the Dam was constructed in 1910, Jack Lake was two distinct basins with a less complex fishery. The introduction of walleye occurred in 1923 with subsequent stockings in 1951, 1952 and 1953 (Corbett 1981). Due to the less complex fishery at that time, these stockings served to establish walleye in the lake and created a popular fishery. The stocking of fingerling and fry muskellunge also occurred during this period ,beginning in 1946 and continuing until 1973, creating a popular muskellunge fishery (Kerr, 2001).

While old Lands and Forests records have not been checked, during this early period no management action likely took place other than stocking, creel census and the establishment of Regulations on the number of fish to be taken by anglers.

During the last half of the 20th century a number of events happened that were relevant to Jack Lake and the fishery. From 1950 to approximately 1970, American and Canadian scientists

developed a means of estimating the fish productivity of a lake based on nutrient levels (total dissolved solids) and depth, referred to as the morphoedaphic index (MEI, Ryder 1965). This was refined by Canadian scientists to include temperature (solar radiation) (Schlessinger and Regier). Thus a lake in Northern Ontario (colder) with the same MEI as a lake on Southern Ontario (warmer) would have a lower fish productivity. This was important research for fisheries managers who could now estimate the fish productivity of a given lake and thus indicate the number of fish that could be taken while maintaining the fishery.

There were a number of other events that happened during the 1960s and 1970s including the strategic plan for Ontario fisheries (SPOF), several major symposiums, Provincial Lake Trout synthesis and fresh water fish community synthesis exercises. (S.J. Kerr, 2006). The relevance of these events for Jack Lake fisheries is unknown.

At that time, there were only two known walleye spawning sites for Jack Lake including Apsley and Redmond Creeks. When walleye began to use lake shoals as spawning sites is unknown. Apsley Creek received streambed improvement in 1976 and 1978 including bank stabilization and the addition of sand, gravel and rock in the streambed (Corbett, 1981). This study shows that walleye eggs survived on the improved gravel streambed.

White sucker also spawn in the creek, but there was spatial separation in egg distribution. A further study (Corbett and Poules 1986), confirmed that there was no indication that walleye and white sucker competed for spawning areas as adults or for food as lavae. Yellow perch were, however, prime predators of walleye. Apsley Creek also received improvement in the mid 1980 ‘s by placing rock rubble to extend the spawning bed and gabion baskets to control bank erosion (Dosser 1986).

A 1983 creel census indicated that walleye in Jack Lake were being over harvested. For instance, harvest mostly by cottagers and some tourists in the summer season exceeded the lake’s estimated allowable annual yield (Irwin, Brisbane and Gillap 1983). This study also indicated that anglers tended to keep more walleye caught and bass anglers tended to release more.

A further study confirmed that the bass population in Jack Lake was high compared to walleye (Lean, Brisbane and Irwin 1983). This study also reported that from 1976 to 1983 the streambed improvements of Apsley Creek improved walleye reproduction success. However, trap net results showed a steady decline in walleye dominance in the lake and the increasing dominance of smallmouth bass. Both species were reproducing well. Also the study indicated that yellow perch is the dominant forage species and that the water chemistry showed no change in quality. A further creel census confirmed that walleye were being over harvested. (Burris, Irwin and Brisbane 1984)

It would appear that the practice by anglers to keep more walleye than bass has persisted to the present day, perhaps explaining, in part, why the bass population in Jack Lake is now predominant. However, there are many reasons for the decline in walleye including over-fishing of walleye and other mature fish, the introduction of new species that compete with the sport fish, increase in shoreline development, deterioration of spawning sites, continued use of old two-stroke engines, increased water clarity and decreased nutrient levels.

Although anglers at the time may not have been fully aware of the reasons for this decline, they did understand and were frustrated with the declining population. Consequently, a “jar hatchery” project was undertaken in 1984 and expanded in 1985 by volunteers, with assistance from MNR fisheries experts. A great deal of time and effort by these volunteers and experts was given to capture spring spawning walleye, collect and rear eggs in jars to “fry” size and subsequently release the fish in the lake (Burris, Brisbane 1985). This project was stopped in the early 1990’s when it became apparent that this effort was not increasing the abundance of walleye in Jack Lake.

A review of the walleye sports fishery from 1964 to 1993 (MNR) is summarized as follows:

- The jar hatchery efforts appear to have had no significant effect on the walleye population.
- Total angling effort on Jack Lake increased 274% between 1975 and 1993; walleye angling effort increased 164% in the same period.
- Jack Lake walleye appear to have been over-harvested in the early 1980’s.
- The increase in fishing pressure on walleye and the introduction of new species may have altered the relative species composition, resulting in the current complex population of younger, smaller fish.
- The data indicated that a large proportion of the yearly harvest of walleye per unit of angling effort is taken in the last two weeks of the winter and the first week of the summer seasons.

It became evident that the walleye population was well established and reproducing in the lake albeit at a low levels of productivity. The challenge was to improve the fishery to a productivity level where sports fish like walleye could reach a full range of age classes with sufficient numbers for a sustainable sports fishery.

People often believe that the appropriate response to a declining population is to institute a stocking program. According to fisheries experts, supplementary stocking of walleye, that is, stocking over an existing population, has been shown to be ineffective at increasing the walleye population whether it is native or introduced fish (Kerr et al,1996). Young walleye eat each other within a few weeks of hatching, particularly in areas of high fry density. Furthermore, natural walleye usually have a size advantage over hatchery reared fish and will prey upon their smaller stocked cousins. There are many other predators including yellow perch, bass, crappies, rock bass and other pan fish (now present in Jack Lake) which prey upon young walleye. In addition, if walleye are stocked at a larger size they will feed on smaller fish. (Kerr 2005)
(See Appendix for the History of the Fishery of Jack lake.)

Current Issues

The fisheries committee identified a number of issues impacting on the productivity of the Jack Lake fishery:

Over Harvest – Summer angling pressure has increased significantly over the years. MNR records also support this observation. Furthermore, Jack Lake is one of the few area lakes (together with Kashabog and Oak lakes) open for winter angling in the area.

Angling Practice – While it is recognized that some anglers fish for bass, many anglers

tend to prefer other sport fish such as walleye, lake trout and muskellunge. When catching bass there is a tendency to release them rather than keep and eat the catch. On the other hand, when other sport fish are caught such as walleye, the tendency is to keep and eat them rather than release. This practice in a lake with reduced mature fish is not sustainable. (MNR 2001)

Water Quality – Monitoring for water quality indicates that Jack Lake clarity is increasing allowing sunlight to penetrate deeper into the water column. This has negative implications for walleye, which prefer to feed in darker water. Furthermore, while fecal coliforms are increasing in parts of the lake (2005 Health analysis McCoy Bay) this trend needs monitoring and verification to identify the extent and source of such pollutants. It is understood that total phosphorus samples are taken each spring and submitted to MOE for analysis; however, there is no indication of the relevance of this monitoring for the fishery. Also, critical parameters such as dissolved oxygen – essential for a healthy aquatic ecosystem – although monitored in the past by MNR and periodically by volunteers, are not being monitored on a regular basis, leaving managers with large data gaps.

Introduced Species – Historical species introductions such as walleye and muskie have resulted in a self-perpetuating fishery. Whether fisheries managers at the time fully understood the consequences of such introductions to the ecology of the lake is unknown and perhaps academic at this time. More recently, the occurrence of rock bass and black crappie in the lake is troublesome as these species compete with and predate upon the more desirable sports fish and add complexity to the aquatic ecosystem leaving less space for other more desirable species.

Lake Trout – There is a remnant population of lake trout in deeper portions of the lake and anglers are catching lake trout. Jack Lake is no long classified as a lake trout fishery by MNR and thus management of lake trout has not been an MNR priority. There is an ongoing attempt to address this issue by asking anglers to log lake trout caught and to freeze heads and deliver them to MNR for analysis. This action is noted in the plan below. It is hoped to develop a strategy for lake trout in an effort to sustain this species.

Other issues that may be affecting the fishery include:

- Shoreline development and impact on habitat for fish spawning and rearing.
- Boating and the use of old two-stroke engines putting gas and oil in the lake, and the effect of jet ski craft.
- Effluents entering the lake from shore development including septic systems, use of insecticides, herbicides and pesticides (not applied by a licensed business.)
- The effectiveness of the fish sanctuary on Jack Lake during March and April.

The Plan

The Province of Ontario is well endowed with fresh water lakes – approximately 250,000 according to records. This means that government fisheries management of this extensive resource is difficult with so many lakes and so few fisheries biologists to manage the resource. For instance, the Province is divided into vast areas for fisheries management and for

regulations. Consequently, the government is only able to provide limited management advice for individual lakes. As a result, to manage Jack Lake to the level required to sustain the fishery will require a great deal of public education and volunteer time instead. Seasonal and permanent residents, tourist operators, local community members and anglers who value and enjoy this resource and who want to sustain the fishery for future generations will have to step up to the plate.

This plan has resulted from "brainstorming" by the fisheries committee members and through discussions with other anglers, local seasonal and permanent residents and MNR fisheries specialists. Initially, the strategy was focusing solely on the improvement of the walleye fishery. This rather narrow strategy was broadened to include the lake fishery. However, while this plan is documented in the form of a Fisheries Strategy and Action Plan for Jack Lake, the immediate strategy is focusing on improving the walleye fishery together with educational action aimed at changing the behaviour of anglers and land use practices on the shoreline. Simply stated, the goal of the strategy is:

> *To maintain and enhance the Jack Lake fishery to optimize social and ecological benefits.*

The immediate objectives of the strategy are:

To focus on sustained health of the fishery through:

- identification and improvement of spawning site conditions;
- education of anglers and seasonal and permanent residents on how they fish.

The initial fisheries management plan is summarized in the following table, which lists optional solutions in response to specific issues and observed effects on the fishery.

Jack Lake Fisheries Management Strategy

Issues	***Cause and Effects***	***Suggested Solutions***
Limited reproduction of walleye spawning in creeks	Reproduction success is limited due to lack of rubble, presence of silt and low water flow	Continue improvement of Apsley, Redmond and other creeks; remove beaver upstream; replace culvert, stabilize banks, add rubble where necessary
Limited reproduction of walleye spawning on shoals	Some shoals are utilized. Most lack rubble, thus eggs wash or are eaten by other fish	Carry out spring Walleye Watch to identify and prioritize shoals. Add rock rubble in August. Obtain funding from JLA and MNR. Educate residents to observe shoals for spawning
Unauthorized introduction of black crappie and other non-native species	Black crappie are competing for food and predate on walleye	Control black crappie by educating anglers to keep and eat, Organize fish derbies and fish fry. Late winter and early spring best time to catch

Abundance of rock bass	Compete for habitat with walleye and other sport fish, and feed on eggs and larvae	Educate anglers to keep and eat rock bass and other pan fish. Include in bass/crapppie derby/fish fry demonstrations. Check with FOCA to see what others use to control
Abundance of smallmouth and largemouth bass	Jack Lake is good habitat for bass, a popular sport fish. However, bass has increased compared to other sport fish. Anglers tend to keep fewer bass	Educate local anglers to keep bass for consumption. Organize local derby/fish fry demos. Avoid promoting Ontario-wide derby to reduce risk of importing unwanted species
Ice fishing perceived as depleting walleye population	Jack Lake one of few local lakes open to ice fishing. Summer anglers see winter fishing as detrimental to walleye population	MNR creel and studies during 1980s, 1990s indicate that most walleye taken in summer. Need new summer and winter creel and study to confirm situation so firm recommendation can be made
Maintain lake trout population	Anglers are catching lake trout. MNR does not recognize Jack Lake as lake trout priority	Recent data is needed to assess condition and extent of lake trout population. Have anglers freeze heads and send to JLA/MNR for analysis
Prime breeding size walleye are also best to clean and eat	Anglers traditionally return older walleye to lake for reproduction. This is good. Walleye between 16" and 22" are also good breeders but also best to eat	Educate anglers to voluntarily return to lake some 16-22" walleye as well as large ones and only keep one or two for eating
To stock or not to stock	Prior to mid-1990s, stocking considered to be improving number of walleye. Experts suggest it's better to improve spawning habitat where there is a naturalized population and a complex fishery	Replace stocking strategy with spawning habitat improvement strategy. Means improving creeks and shoals where walleye known to spawn.
Fishing pressure	Increase of summer and winter fishing pressure	Monitor new Regulations for reduction of walleye taken. If not effective, develop another strategy
Fish sanctuary	Fish sanctuary March-April prevents angling for black crappie and other pan fish	Negotiate with MNR for change in sanctuary status to permit pan fish catch, close walleye

(See Appendix for details on Immediate Fisheries Management Plan, Other Issues and Monitoring, and Fisheries Management History of Jack Lake.)

Physical, Chemical and Biological Characteristics of Jack Lake

Surface area (ha)	1,237.3
Maximum depth (m)	51
Mean depth (m)	10
Morphoedaphic Index (MEI)	7.32
Total Allowable Yield (kg/ha/yr)	3.35 (1.07 for walleye)
Growing Degree Days (> 5 degrees C)	1,820

Resident Fish

Black crappie (*Pomoxis nigromaculatus*) – first documented in 200?
Bluntnose minnow (*Pimephales notatus*)
Brown Bullhead (*Ictalurus nebulosus*)
Common white sucker (*Catastomus commersoni*)
Creek Chub (*Semotilus atromaculatus*)
Golden Shiner (*Notemigonus crysoleucas*)
Johnny Darter (*Etheostoma nigrum*)
Lake Herring (*Coregonus artedii*)
Lake Trout (*Salvelinus namaycush*) – remnant population
Largemouth Bass (*Micropterus salmoides*) – first documented in 1974
Muskellunge (*Esox masquinongy*)
Rock Bass (*Ambloplites rupestris*) – first documented in 1989
Smallmouth Bass (*Micropterus dolomieu*)
Spotfin Shiner (*Notropis spilopterus*)
Walleye (*Sander vitreus*)
Yellow Perch (*Perca flavescens*)

Observations – Fisheries

There are a number of issues impacting on the productivity of the Jack Lake fishery:

- *Over Harvest – Summer angling pressure has increased significantly over the years. Furthermore, Jack Lake is one of the few lakes in the area (together with Kashabog and Oak lakes) open for winter angling.*
- *Angling Practice – While it is recognized that some anglers fish for bass, many anglers tend to prefer other sports fish such as walleye, lake trout and muskellunge. When catching bass there is a tendency to release them rather than keep and eat the catch. On the other hand, when other sports fish are caught such as walleye, the tendency is to keep and eat it rather than release. This practice in a lake with reduced mature fish is not sustainable.*
- *Water Quality – Monitoring for water quality indicates that Jack Lake clarity is increasing allowing sunlight to penetrate deeper into the water column. This has negative implications for walleye, which prefer to feed in darker water. There are questions on the monitoring and/or effects of fecal coliforms, total phosphorous and dissolved oxygen.*

- *Introduced Species – Historical introductions such as walleye and muskellunge have resulted in a self-perpetuating fishery. More recently, the occurrence of rock bass and black crappie in the lake is troublesome, as these species compete with and predate upon the more desirable sport fish and add complexity to the aquatic ecosystem leaving less space for other more desirable species.*
- *Lake Trout – There is a "remnant" population of lake trout in deeper portions of the lake. Jack Lake is no longer classified as a lake trout fishery by MNR. A strategy for lake trout will be developed in an effort to sustain this species.*
- *Other issues possibly affecting the fishery, in no particular order, include:*
    - *– Shoreline development and impact on habitat for fish spawning and rearing*
    - *– The use of older, non-efficient two-stroke engines.*
    - *– Effluents entering the lake from shore development.*
    - *– The effectiveness of the March-April fish sanctuary on Jack Lake.*

Section 5 Physical Elements

Jack Lake is classified as a Canadian Shield Lake. Shield rock is made up of acidic metamorphic and igneous rocks (e.g. granite, quartz, gneiss,) which are hard and generally resistant to weathering. Erosion and soil accumulation are, therefore, a slow process in this area. The underlying bedrock varies in chemical properties, which influences the chemical properties of the Jack Lake water, such as the ability to buffer acid precipitation and nutrient enrichment, as well as the watershed's soil buffering capabilities, and moisture and nutrient retention abilities.

Soils

The physiography and surficial geology of Jack Lake are largely the result of the glacial activity and the nature and form of the bedrock. The bedrock of the area is predominately Precambrian in age. The bedrock is commonly covered with a thin mantle of till laid down by the glacier. The till deposited by the ice is generally not acceptable for use as aggregate because it has high fines content and contains abundant oversize boulders; however, it has been used for cottage road construction and fill.

The north side of the lake is shallow till with rock ridges that are predominantly granite while the south and islands have a little more soil with bare rock ridges that are marble/gneiss.

Jack Lake is well protected from acid rain and erosion because of the shield rock and the resulting carbonates. The predominant rocks of the lake are igneous and sedimentary in origin and therefore act as a buffer.

Observations – Soils

- *Jack Lake is **unique** in the Township of Havelock-Belmont-Methuen for being on the Canadian Shield. The Township by-laws are based on the topography for non-Canadian Shield Lakes.*
- *Jack Lake is well protected from the effects of acid rain and natural erosion by the Precambrian bedrock and the resulting carbonates. This granite has high conductivity. According to an expert at the Ministry of Northern Development and Mines, the lake is not protected from man-made causes of erosion. Erosion has an impact on water quality through surface runoff and it buries spawning beds, negatively impacting the reproductive potential of fish.*
- *Soils are stony, sandy, acidic, with low fertility and frequent bedrock outcrops. Research is needed to determine the effectiveness of the soil to retain run-off on the land instead of letting contaminants readily flow into the lake water.*

Minerals and Aggregates

The environmental impacts from mining and aggregate operations can be substantial when they occur near a lake or waterbody. Aggregate and mineral excavation can also impact on ground water levels, sedimentation of lakes and streams, and result in noise pollution from increased truck traffic, blasting and machinery operation.

The term “mineral aggregates” refers to gravel, sand and various types of bedrock that are suitable for construction, industrial, manufacturing and maintenance purposes.

There are no abandoned mines in the Jack Lake watershed.

The whole area is undifferentiated Precambrian bedrock covered by thin drift. There are two quarries in the Jack Lake area:

1. southwest of Sharpe Bay, which has some marble and some gneiss.
2. east of Jack Lake, which has weathered gneiss.

In the watershed area there is also the Nepthon Plant in Nepthon which extracts nephelin syenite . This is a site that has been in place since World War II. The Nephton plant is regulated by the Mining Act. The extracted product is used in glass and ceramics and is a very benign material. Occasional blasting at the site can be heard at Jack Lake.

The geological types of sand and gravel deposits in the area are outwash (OW), esker (E), and undifferentiated ice-contact stratified drift (IC). The sand contains less than 35% gravel with an average 5-10 feet in thickness. Outwash deposits consist of sand and gravel laid down by melt waters beyond the margin of the glacial ice lobes. IC includes deposits from several ice-contact depositional environments that usually form extensive, complex landforms. All these areas are considered quite small.

There are three areas of interest around Jack Lake.

1. North of Brooks Bay – an outwash with oversized particles.
2. South of Brooks Bay – a small esker (narrow sinuous ridge of sand and gravel deposited by glacial meltwater flowing in tunnels) containing sand and gravel. This short sinuous ridge trends in a north to south direction and rises less than 10 feet above the surrounding terrain.
3. Southwest of Sharpe Bay – has IC and OW. (The area southwest of Sharpe Bay contains a sand and gravel resource area of primary significance although the material seems to be for low specification use, i.e. for cottage roads only.)

(See Appendix for maps on: Distribution of Sand and Gravel Deposits – Aggregate Resources Inventory (ARI); Selected Sand & Gravel Resource Areas (ARI); Bedrock Resources for Burleigh and Anstruther, Chandos Township and Methuen Geographic Township (ARI); and Precambrian Geology – Burleigh Falls Area.)

Interesting Findings

Pegmatite is found in the Jack Lake area. It is red squiggly lines found in the granite in the shield rocks and is considered to be very young rock with intrusions cut through the granite. It is not worth anything economically, but is very interesting from a naturalistic and historic viewpoint.

There is a *very old fault line* (billion years old) running under and alongside parts of the northern section of the lake. This does not pose a threat but one might see the “bent” minerals along the fault with alterations of rocks on either side.

New Legislation – June 1, 2007, the Aggregate Resource Act (MNR). Highlights of the legislation are: New quarries will be strictly controlled. Public meetings and notification of local landowners will be part of the process for a new quarry. Doubled dollar application fees will be applied to rehabilitation of sites. There will be studies conducted to determine the effects on the surrounding area. There also will be many more inspectors. Existing quarries will have to update their sites if they want to make any changes.

Observations – Minerals and Aggregates

- *As of June 1, 2007, there was a new Aggregate Resource Act governing the current and future sites to strict standards.*
- *There are no abandoned mine sites in the Jack Lake watershed.*
- *The sand and gravel in the area is of low use value.*

Narrow Waterbodies

Development on narrow waterbodies can create problems for navigation. When too many docks and boathouses protrude into a narrow bay or channel, it may result in congestion and create a hazard for water users. By nature, a narrow waterbody has intrinsic liabilities with respect to boat use, e.g. human and property safety, periodic intrusive noise, shoreline degradation, natural habitat destruction, etc.

The District of Muskoka has an Official Plan policy that considers a narrow waterbody to be the portion of a lake where the distance from shore to shore is less than 150 m (500 ft). (See Appendix for a map of the narrow areas within Jack Lake.)

Observations – Narrow Waterbodies

- *As can be seen in the map of the narrow waterbodies, there are many narrow channels on Jack Lake, including the Narrows between the north and south basins, between clusters of islands, and also between islands and the mainland. The visual environmental integrity of any narrow waterbody could easily be changed because of the cumulative effects of development in close proximity to a narrowing.*
- *Recreational safety is a concern in narrow waterbodies.*
- *These narrow areas suffer some erosion. According to the Ministry of Northern Development and Mines, some cases of erosion are due to wakes from motor boats because under natural wave motion and runoff from precipitation, the soils around Jack Lake are not as prone to erosion. A certain amount of erosion is also caused by the fluctuating water levels from spring to fall due the TSW dam controls.*

Steep Slopes

Development on steep slopes can result in substantial alteration of the natural landscape and visual environmental integrity due to the prominence and location of development and the intrusion into the treed horizon/skyline. Indirect impacts may include increased erosion, slope instability, a significant increase in storm water run-off and the potential damage to fish and wildlife habitat.

Observations – Steep Slopes

- *A few areas surrounding Jack Lake have steep slopes. The ones on the lake are on Mosquito Bay in Sharpe Bay, and on the east shore of the entrance leading into Crane Bay. Altering the natural vegetation on a steep slope, especially between the tile bed and shoreline, may have indirect impacts that may include increased erosion, slope instability, a significant increase in storm water run-off, and potential damage to fish and wildlife habitat.*

- *Obtaining GIS mapping from the County and other sources should be investigated. The lake's shorelines, natural features and sensitive areas can be tracked.*

Forestry

The forest within the Peterborough Crown Game Preserve is basically a white pine forest, although white spruce, balsam fir, poplar, maple and birch are also present. According to the Natural Heritage Information Centre posting of 2005, there is no successful regeneration of cedar in the Preserve due to the high concentration of white tailed deer. (Pileggi and Gray 1991)

There are different government control mechanisms regulating tree cutting in Crown forests and privately owned forests.

Crown Land Forestry

All forest management activities on Crown lands are carried out in accordance with the approved Forest Management Plan (FMP) for this area. Forest Management Plans are prepared with public participation and a Local Citizens' Committee (LCC) provides an opportunity for local representatives to be involved in the preparation of the FMP.

A forest management plan establishes objectives and strategies for the achievement of harvesting and tending practices over a twenty-year period and the location of proposed operations are established for a five-year period. Every five years the plan is reviewed, updated and a further five years of operations are determined. Details with respect to access, harvesting locations, harvesting methods, renewal and maintenance activities, and environmental, and fish and wildlife habitat protection are described. According to the 2006-2011 MNR, Bancroft District Forest Management Plan map there is no area within the Jack Lake watershed that is allocated for forest operations. The MNR plans to have all Forest Management Plans and Annual Work Schedules available on-line in 2008. There will be links from the MNR site.

On Crown lands, forestry in the Jack Lake watershed is carried out in accordance with the Bancroft Minden Forest Management Plan 2001-2021. The protection for location-specific values is outlined in FMP-17 . For values that occur across the landscape, table 18, pg. 207 & 208 in the main text apply. The "Good Neighbour" policy is described on page 205 to work with neighbours (ski and snowmobile clubs, cottagers, adjacent landowners, hunters) on a case by case basis. Harvesting is prohibited in the Sharpe Bay Fen Conservation Reserve, just outside the Jack Lake watershed.

According to Bruce Fleck, Management Forester of MNR, Bancroft District, the Peterborough Crown Game Preserve is within the Jack Lake Deer Yard and receives the same considerations as other local deer yards. This involves protecting present and future cover, future winter harvest requirement for browse and trail benefits, and spreading harvest allocations through time on a balanced schedule. Also, the above normal browsing pressure in the preserve makes the regeneration of red oak and other hardwood species extremely challenging, and renewal of hemlock and cedar impossible. This is changing the future forest composition away from hardwoods, cedar and hemlock in favour of spruce and pine.

In the watershed of Jack Lake, forestry operations on Crown land are licensed to The Bancroft Minden Forest Company Inc. (BMFC). This company has shareholder agreements to allocate both harvest and volume rights among its shareholder companies. Their address is 27578 Hwy. 62 South, RR1 Bancroft, ON K0L 1C0.

With respect to blowdown areas, the BMFC is salvaging the Crown areas. Natural regeneration will restock the sites.

The lakebed of Jack Lake is Crown with the exception of some flooded municipal road allowances in the former Methuen Township.

Private Land Forestry

Tree cutting on privately owned forested lands has to be in accordance with a local municipal Tree Cutting By-law. This type of by-law usually applies to commercial activities and does not apply to trees cut for personal use, the construction of buildings, road maintenance or the removal of injured trees.

This type of by-law can require landowners or logging contractors to apply for a permit to cut trees; prohibit tree cutting in provincially significant wetlands or areas of natural and scientific interest (ANSI's) designated by the MNR; restrict clear cutting using a residual tree density rule; establish diameter based restrictions for different tree species; and may require logging operations to be carried out in conjunction with a plan that is prepared by a Registered Professional Forester (RPF).

The Peterborough County Official Plan has two relevant references: Rural and Cultural Landscape, sec. 4.3.3.1– General, which states "Local municipalities should encourage and, where appropriate require, through the passage of tree cutting by-laws, public and private landowners to maintain the forested appearance of the landscape." and Shoreland Areas and the Waterfront, sec. 4.4.3 – Policies, which states "Tree cover and vegetation is encouraged to be retained along the shoreline to uphold the visual environmental integrity of waterfront areas."

The Forestry Act, R.S.O., 1990, Chapter F.26, permits municipalities to pass by-laws restricting and regulating the destruction of trees by cutting, burning and other means. However, this action cannot interfere with the rights of registered owners to cut trees on their own lands for their own use. Private landowners are encouraged to conduct sound management operations and to manage their woodlots through agreements with the Ministry under the Woodlands Improvement Act, or through MNR private land forestry extension services.

On private land areas, red and white pine and red oak are good choices for replacing damaged trees. Red oak will require netting protection from deer in the Jack Lake area. White spruce can also be planted and is free from browsing problems. Planting is an option, but natural seedlings can also be nurtured beyond the deer by protection. For further online information go to the Ontario Forestry Association www.oforest.on.ca ; or the Ontario Woodlot Association at www.ont-woodlot-assoc.org ; or the Landowner Resource Centre www.lrconline.com

According to Bruce Fleck, Management Forester, MNR Bancroft District, stakeholders within the Jack Lake watershed should:

– resist the desire to bring plants, especially trees and shrubs, to the cottage from nurseries (increasing the spread of disease such as oak sudden death syndrome);
– not move firewood from farther south (pine shoot beetle, emerald ash borer and others to come are spread in this way);
– reduce the excessive thinning of trees and prevent damage of root systems with heavy equipment as this increases the chance of windthrow;
– maximize diversity of species when planting to reduce future losses due to species specific disease/mortality;
– in periods of drought, use lake water to reduce the impact on shoreland trees, especially those on shallow soils and those with restricted rooting zones;
– plant the species most suited to the soil texture, moisture regime and light conditions of the site to reduce stresses.

Most recently scientists have discovered from progeny tests that offspring of parent trees at one location are more suited to the local climate than offspring of the same parents grown at a different location. This indicates that you can plant local plant material that is more suited to the local climate than the parents. Nature is more adapted to change than we think, so do not panic and do not import southern species at this time.

According to the 2005 MNR presentation on Forests and Climate Change in Ontario, our local climate will be warmer with a longer growing season. There is some uncertainty with respect to precipitation; however, evapotransportation is predicted to be greater, increasing drought stress on trees. In southern Ontario, it is uncertain if this will lead to more forest wildfires. Storm events will increase. Exotic pests will negatively affect more tree species. Renewal of Boreal forests will be difficult and a concern.

Observations – Forestry

- *According to the Natural Heritage Information Centre of 2004, the Peterborough Crown Game Preserve "is basically a white pine forest, although white spruce, balsam fir, poplar, maple and birch are present. In 1991, there was no successful regeneration of cedar in the Preserve due to the high concentration of white-tailed deer."*
- *The Peterborough County Official Plan is encouraging municipalities to pass tree cutting by-laws for woodlots and encouraging "private landowners to maintain the forested appearance of the landscape and the visual and environmental integrity of waterfront areas."*

- *The Bancroft Minden Forest Management Plan, which oversees the forests on Crown land, is reviewed every five years. Its "Good Neighbour Policy" encourages the MNR to work with cottagers and adjacent landowners on a case by case basis.*
- *The Peterborough Crown Game Preserve receives the same considerations as other local deer yards. This involves protecting present and futures cover, protecting winter harvest requirement for browse and trail benefits, and spreading harvest allocations over time on a balanced schedule.*
- *It is important that local forests remain diverse with native species, healthy and less prone to stresses caused by climate change, disease, drought and human activity.*

Section 6 Land Use

Summary of Current Land Use

Land use description based on the Land Use Maps for the Townships. (See Appendix.)

For Havelock-Belmont-Methuen:
- The shoreline lots are designated seasonal residential.
- South of County Road 54 is a waste management transfer station on Shady Lane.

For North Kawartha:
- Beside Apsley Lake is a closed waste disposal site off County Road 504.
- Between FR51 and 52 is an area of environmental constraint.
- In the north part of Brooks Bay are recreational commercial designations.
- On the centre to south-west shoreline of Sharpe Bay is a large expanse of extractive industrial area with five existing pits/quarries.
- In the southern part of the watershed around Hull Bay of Stony Lake is a recreational site and north east of that are two existing pits/quarries.

Below is a record of lots on the lake that is accurate as of December 2004. Information was obtained from Township Assessment Maps, township Zoning By-Laws, Township 911 Maps, and B. Badeau information acquired with his Plan of Development project for Brooks Bay. (An additional 22 lots have since been added to Brooks Bay through that project.)

Figure 6.1 – Properties on Jack Lake

Location/total		Mainland lots	Mainland vacant lots	Island lots	Sub-total	Commercial
North Basin Brooks Bay	246	57	1	0	58	188
Redmond Bay	86	77	9	0	86	0
Callahan Bay	110	92	6	12	110	0
Lake other	54	43	2	9	54	0
Sub-total	496	269	18	21	308	188
South Basin Sharpe Bay	141	122	15	4	141	0
McCoy Bay	17	15	0	2	17	0
Williams/Long Bays	53	23	3	27	53	0
Lake other	80	42	1	30	73	7
Sub-total	291	202	19	63	284	7
Grand total	**787**	471	37	84	592	195

Excluding vacant lots and commercial properties, Figure 6.1 shows that as of December 2004 there were some 555 dwellings on Jack Lake.

According to the T.M. Robinson Associates Planning Consultants report for the Jack Lake Condominium Development Planning Study, Jack Lake contains 592 existing seasonal residential/cottage and associated vacant lots and eight commercial establishments. It has been observed that the majority of permanent dwellings are located in Brooks Bay because of the accessibility of a well maintained year-round road.

The amount of existing seasonal residential development and the number of vacant lots is fairly evenly divided between the north and south basins, but the majority of island development is found in the south basin. The division between the two basins is the "Narrows".

As referenced in Figure 6.2, 76% of the existing seasonal residential/cottage development is located in the Township of Havelock-Belmont-Methuen and 24% is located in the Township of North Kawartha. Furthermore, 68% of the vacant mainland lots and 95% of the existing island development are in Havelock-Belmont-Methuen.

Figure 6.2 – Summary of Existing Seasonal Residential/Cottage Development (Dec. 2004)

Mainland Lots	Mainland Vacant Lots	Island Lots	Total
North Kawartha 129 (27%)	12 (32%)	4 (5%)	145 (24%)
Havelock-Belmont-Methuen 342 (73%)	37 (100%)	80 (95%)	447 (76%)
471 (100%)	37 (100%)	84 (100%)	592 (100%)

Sources: Township Assessment Maps, Zoning By-laws and 911 Maps

Six commercial establishments are located in Brooks Bay in the north basin, and one is located in the south basin. The existing businesses include small lodges, rental cabins, stores, marinas, trailer parks and accompanying residences. This commercial development provides an additional 195 units on Jack Lake, a significant degree of development. Specifically, they include the following.

North Basin (Brooks Bay) :

- Jack Lake Lodge – 3 cabins/10 trailers/residence
- Anchorage Marina – marina/2 cabins/store/residence
- Anchorage Trailer park – 10 trailers/residences
- Forest Glen marina – marina/boat storage/shop/residence
- Jack Lake Tent and Trailer Park – 130 trailer sites/residence
- Miller's Timber Sands – 8 cabins/12 trailers/residence

South Basin:

- Wagar's Pine Point – 6 cabins/residence

As of December 2004, the total number of existing seasonal residential/cottages and vacant lots and commercial units on the lake were 787. Included in this total are a limited number of lots used for permanent occupancy. (According to the returned surveys and Apsley postal codes of the tax payers, there are approximately 25 of these.)

Tourist resort operations have a major financial investment in the sustained health of Jack Lake. Given this investment, operators would have less of an opportunity to sell their properties and move to another location should the features that attract guests to their resort diminish.

Planning consultant surveys indicate that the highest value that paying guests seek is the natural beauty, as well as the clean and quiet surroundings of the lake. The overall success of a tourist resort is directly linked to the same values that attract seasonal residents. Due to the significant investment and limited opportunity to replace commercial properties, the impact of the loss of features or values is every bit as important to resorts as to seasonal and residential users.

Figure 6.3 – Shoreline Development (Dec. 2004)

	North Basin	South Basin	Total
Seasonal Dwellings	290	265	555 (92.6%)
Permanent Dwellings**	unavailable	unavailable	
Vacant Residential Lots	18	19	37 (6.2%)
Resorts and Marinas	6	1	7 (1.2%)
Total	314	285	599

** In April 2007, it would have cost $1,000 to have the Municipal Property Assessment Corporation identify the number of permanent residents living on Jack Lake.

According to Robinson Consultants, the average lot frontage in the North Basin is 178 feet while in the South Basin it is 206 feet. The average lot area is 1.02 acres in the North Basin and 1.09 in the South Basin.

Because of its accessibility by road, most of the early development on Jack Lake occurred in the Brooks Bay area in the north basin. Water access was the only available choice until the 1970's and 1980's when Narrows Point Road from the northwest and McCoy Bay Road from the northeast were constructed. This gave vehicles access to many waterfront properties in different parts of the lake.

At present, most of the remaining vacant and undeveloped shoreline areas are Crown land. (T.M. Robinson Associates, Planning Consultants Jack Lake Condominium Development Planning Study, Pages1-3.)

Figure 6.4 – Existing Vacant Lot Inventory on Jack Lake (Dec. 2005)

Location	Number of Existing Vacant Lots	Number of Vacant Lot Locations
North Basin		
Brooks Bay	1	1
Redmond Bay	9	5
Callahan Bay	6	5
Lake	2	2
Sub-total	18	13
South Basin		
Sharpe Bay	15	13
Williams/Long Bays	3	3
Lake	1	1
Sub-total	19	17
Total	37	30

Sources: Township Assessment Maps, Townships Zoning By-laws, Township 911 Maps, Robinson Report)

Vacant Land

According to the T.M Robinson Associates Jack Lake Condominium Development Planning Study, in December, 2005, there were a total of 37 existing vacant seasonal/cottage mainland lots situated at 30 different locations in the north and south basins on Brooks Bay, Redmond Bay, Callahan Bay, Sharpe Bay, and Williams/Long Bay and on the lake proper. The maximum number of vacant lots grouped together at any one location is two.

In 2005, 12 lots of the existing supply of vacant lots did not meet both the minimum lot frontage and area requirements of the Township of Havelock-Belmont-Methuen Zoning By-law. Four additional lots did not satisfy either the minimum frontage or area requirement of the same By-law.

There are three undeveloped waterfront locations under private ownership on Jack Lake at two mainland and one island locations, which could potentially be suitable for large scale development (waterfront subdivision or condominium development,) but proposals have not been prepared for these properties. The three locations are in Sharpe Bay and include a mainland location of 137 acres with 300 feet of shoreline in the Township of North Kawartha, an 11-acre location at Lamoyne Island in the Township of North Kawartha; and a mainland location comprising five parcels under the same ownership totalling 261 acres, with 12,850 feet of shoreline in the Township of Havelock-Belmont-Methuen. (See Appendix for maps of the Vacant Lots, and Undeveloped Lands in 2005)

In conclusion, according to T.M. Robinson Planning Consultants, “there is a very limited supply of vacant waterfront properties at a suitable standard on Jack Lake. It is important to also appreciate the **uniqueness** of this water body due to the fact that other remaining undeveloped/vacant shoreline locations are under the jurisdiction of the Crown and are not available for development.”

According to the calculations performed using a Geographic Information System (GIS) by a Planning Technician of the County of Peterborough, the amount of shoreline along Jack Lake that is Crown Land is 114,362 feet (34,858 metres/34.86 kilometres). The length of the shoreline excluding islands north of Rathbun Bay is 34,169.83 metres and south of Rathbun Bay is 45,527.79 metres. Thus the fraction of shoreline excluding islands that is Crown land is 43.6%. It is believed that this likely represents the unpurchased shoreline road allowance and is giving a false picture of the large amount of Crown land on the lake. At present, the MNR Crown land maps are not accurate according to French Planning Services.

The following information on the existing form and scale of shoreline development is provided from a survey of 251 cottage owners in 2005; however, it only represents a sample of the property owners and therefore the analysis is given as a percent of responses to each question/statement:

- 10.6% indicate that the cottage is their principal residence
- 65% of cottages are built to seasonal standards, while 35% are built to year round standards
- 15.3% will probably renovate to year round standards while 70% probably will not and 14.6% do not know
- 20.6% will keep to seasonal occupancy, 66.4% will probably not keep the cottage to seasonal occupancy i.e. will extend the stay at the cottage) and 13% do not know
- of the property owners who are planning changes to their property in the next five years (2005-2010) 24% will build a dock, 11.6% will add to a dock, 12% will build or enlarge a deck/patio
- 10% will try to decrease erosion/silt build up at the shoreline
- 6.4% will build/enlarge a garage
- 6.8% will build/enlarge a workshop of more then 100 sq. ft.
- 10% will build/enlarge a bunkie

Observations – Land Use and Development

For Havelock-Belmont-Methuen –

- *The shoreline lots are designated seasonal residential.*
- *South of County Road 54 is a waste management transfer station on Shady Lane.*

For North Kawartha –

- *Beside Apsley Lake is a closed waste disposal site off County Road 504.*
- *Between FR51 and FR52 is an area of environmental constraint.*
- *In the north part of Brooks Bay are recreational commercial designations.*
- *On the centre to south-west shoreline of Sharpe Bay is a large expanse of extractive industrial area with five existing pits/quarries.*
- *In the southern part of the watershed around Hull Bay of Stony Lake, is a recreational*

site and north east of that are two existing pits/quarries.

- *Land use is mainly seasonal recreational. In Brooks Bay, which is highly developed, there is a mixture of land use including two marinas, 16 rental cabins, and 162 trailer sites. In December 2004, there were 290 seasonal dwellings in the north basin and 265 in the south basin. In addition there were seven resorts and marinas in the north basin and one resort in the south basin.*
- *The existing Crown Land on Jack Lake contributes greatly to the natural beauty of the lake.*
- *In 2005, there were 21 existing vacant lots that meet the minimum frontage and area requirements of the zoning by-laws. Of these, there were three undeveloped privately owned land tracts on the lake that could be subdivided.*
- *There are several lots especially in the South basin that have 500 foot frontages and could be subdivided to create an additional one or two 150 foot lots.*
- *The economic importance of the tourist industry is essential to the area.*

Residential Occupancy

The amount of time that people occupy their lake residence directly increases the amount of sewage that is disposed of on an annual basis. As residential occupancy increases, the potential amount of phosphorus that reaches the lake also increases. Increased phosphorus will directly affect lake water quality. Current water quality models often refer to “estimates” of phosphorus loading based on the total number of shoreline lots, whether the lot is used permanently or seasonally. Current information on residential occupancy will help to provide more accurate predictions of future water quality based on known information on the amount of time people stay on the lake. The 2005 property owner survey had a question on whether the residence is occupied seasonally or permanently as well as the number of days that the residence is occupied.

The ability to predict trends in use and occupancy will depend on the availability of historic information as well as the quality of this information. The following comes primarily from the JLA survey because the MPAC fee was $1000 to gather this information.

The Jack Lake Residential Survey indicates that 15% of existing seasonal households intend to convert their cottage to year-round construction in the near future. The trend of cottage conversion from seasonal to permanent standard can be predicted to increase as baby boomers retire and high speed internet allows more people to run businesses from their cottages. Currently, only cottages that are on a serviced County road are likely to have year-round residency.

The number of people living on and using the lake can have a direct effect on water quality and can have an impact on social elements such as diminished natural landscapes, and increased noise, recreation and boating activity. Occupancy refers to the number of residential users and the length of time that they stay on the lake. Longer stays at the cottage increase the amount of phosphorus generated through sewage. Figure 6.5 indicates that the summer season had the highest number of days occupied, followed by fall, spring and winter. In addition, 25 respondents identified themselves in the survey as being year round residents.

Figure 6.5 – Seasonal Users' Occupancy, Jack Lake 2005-06
[Based on 90 days per season]

	Average No. of Days	Percentage of Days
Spring	11.8	15.1
Summer	49.3	62.9
Fall	12.7	16.1
Winter	4.6	5.8

Observation – Occupancy

- *On average, Jack Lake seasonal users occupy their accommodation 78 days per year, almost two thirds of the time in summer and one third in the other seasons.*

Sewage Systems

The purpose of this section is to report on the state of septic systems for the waterfront properties on Jack Lake.

There are no municipal water and sewer services, and most properties are serviced by private septic systems and either well water or lake water. Septic systems fall under Part 8 of the Ontario Building Code.

There was a visual septic inspection conducted on the lake between 1992 and 1994 with the assistance of the Ministry of Environment (MOE). The records of this inspection were turned over to the Peterborough County City Health Unit (PCCHU) when the responsibility for septic systems was transferred to the Ministry of Municipal Affairs and Housing (MMAH) in April 1998. The MOE retained responsibility for the oversight of sewage haulers.

The following figures were derived from various sources including partial records for the inspection that concluded in 1994, (unconfirmed by the PCCHU,) and two newspaper articles, "Many cottages polluting" by Neil Boughen, and "Survey fails 70% cottage septics" by unknown author, that were written after the completion of the inspection.

Nominal survey results –

Total units inspected	335
Units with Satisfactory rating	102
Units with Substandard Performance	77
Units with Visual Problems	107
Units with Dormant systems	16
Units with Incomplete Survey	33

The following data was printed in the winter 1994 JLA newsletter and show the 1993 Jack Lake Septic Survey Results.

Total systems inspected	264
Systems with No Sewage Problems	117
Systems with Signs of Potential Concern	90
Systems with Faulty Sewage Disposal	52
Systems classified as Direct Polluters	5

(Due to time restrictions, 66 establishments were not surveyed and it was hoped they would be completed in 1994.)

The records are not complete and a request has been made to the PCCHU to supply the complete inspection totals and classifications from the inspection.

The MOE still controls the holding tank systems of trailer parks which have tanks that are 10,000 litres or larger. Conversations with some of the trailer parks on the lake indicate enforcement of procedures falls under inspection of the PCCHU. Trailers may only be placed in approved trailer parks and are not permitted on single family dwelling locations.

A voluntary Lake Management Survey was conducted by the JLA in 2005. The JLA received 236 survey responses but not all answered the questions about Septic Systems. Of the 218 surveys that did answer the questions, the systems used on our lake came out as follows:

septic system	84.6%
holding tank	2.2%
outhouse (pit)	6.6%
seepage pit	3.1%
humus toilet	3.5%

The PCCHU has records of all approved permits for installation of septic systems. They are not required to keep any record of periodic maintenance or repair of any system. It is the responsibility of the owner to maintain the system in proper order. Currently there is no requirement by the PCCHU to get a report on any maintenance (including pump out,) or the repair of an existing system, or even to consider maintaining such a record for existing systems. The Clean Water Act has resulted in changes being made to the building code and the new regulations will likely require the Townships to establish a re-inspection program.

Observations – Sewage Systems

- *Properly installed and operating sewage systems reduce the risk of polluting the lake water. On the other hand, faulty, failing or under capacity systems lead to increased phosphorus loading and accelerated eutrification.*
- *The original voluntary sewage review program was conducted in the summers of 1993 and 1994. It was a municipally initiated program that was supported by the Jack's Lake Association. The results were positive for the lake, as needed waste management upgrades were made.*

(See Appendix for additional research on sewage systems.)

Crown Land Use Regulation

The purpose of this section is to identify the public policy that applies to the Crown land that exists on shorelines, under the lake, in the watershed and surrounding lands and lake bed.

Within the Jack Lake watershed there is a wide range of activities carried out on Crown lands and waters. These activities are subject to the Public Lands Act, Lakes and River Improvement Act, Class Environmental Guidelines, MNR's Bancroft District Land Use Guideline, Crown Land Use Atlas, Forest Management Plans, Fisheries Management Plans, Provincial Park Management Plans and the Ontario's Living Legacy Land Use Strategy.

Public Lands Act – The Ministry of Natural Resources administers the Public Lands Act to manage Crown lands in Ontario.

The Ministry of Natural Resources (MNR) is responsible for the management of Crown land, pursuant to the Public Lands Act, which includes acquisition, disposition and management of Crown waters and lands. The Ministry endeavours to administer all Crown assets in the best interest of the public.

Chapter 413, Part 1, 3 of the Public Lands Act states that 25% of all Crown shorelines will be set aside for public recreation and access. Since 43.6% of the Jack Lake shoreline is Crown land (this may include some unpurchased shoreline road allowances and will have to be investigated further), it is possible that portions of the shoreline could be made available for disposition for other purposes, pursuant to the Public Land Act. The Jack Lake lakeside community would be opposed to such an action since it could threaten the health of the lake.

Ontario's Living Legacy – According to the Ontario Living Legacy Land Use Strategy, immediately outside the watershed of Jack Lake is the Sharpe Bay Fen. Care must be taken to conserve the lands abutting on this conservation reserve. The following is included to stress the sensitivity of this area.

Sharpe Bay Fen C24
Designation: Conservation Reserve
Area, hectares: 636

> *The relatively large and undisturbed fen and peat land in Site 5E-11 supports large black spruce and cedar stands, fen forests, as well as open black ash and cedar swamps. The fen changes from shrubby to forested land, with only a few open water patches. The organic soils of the fen area overtop extensive marble deposits.*
>
> *Sharpe Bay fen Conservation Reserve was regulated as a conservation reserve on June 23, 2000.*
>
> *Land Use Intent: Management of this area is also governed by the general policies contained in the Land Use Strategy (1999).*
>
> *Management Direction: Those uses and management activities not listed in the following table are governed by existing conservation reserve policy and the Sharpe Bay*

Fen Statement of Conservation Interest (2001). Any new uses, and commercial activities associated with conservation reserves will be considered on a case by case basis, and they must pass a test of compatibility to be acceptable that is normally determined through a planning process.

(See Appendix for Management Direction of Commercial Activities and Recreational Activities and Facilities, and Science, Education, and Heritage Appreciation. Source of information: Crown Policy Use Atlas – Policy Report 31/01/2006)

The Ontario's Living Legacy (OLL) Land Use Strategy (MNR, 1999) outlines the intended strategic direction for the management of Crown lands and waters throughout Ontario. The OLL strategy sets a framework for future land and resource management on Crown lands and provides guidance and direction on what activities are preferred in certain areas and what activities will not be permitted. Any new or revised plans for Crown lands must be consistent with the intent of the OLL strategy. The OLL strategy will replace current direction provided in existing planning documents such as the District Land Use Guideline.

District Land Use Guidelines

MNR's Bancroft District Land Use Guidelines does not state that Crown lands on the shore of its lakes will not be disposed of for the purpose of cottage lots. However, Chapter 413, Part 1, 3 of the Public Lands Act states that only 25% of all Crown shorelines will be set aside for public recreation and access.

Forest Management Plans

On Crown lands, forestry is carried out in accordance with Forest Management Plans. These plans are reviewed every 5 years and provide the location of areas that are allocated to be harvested or tended. These plans also identify sensitive areas as "Areas of Concern" and prescribe mitigation measures to be implemented. Contact with the District Forester at the Bancroft MNR District Office is to be maintained for information and maps from these plans.

From 2006-2011, there are no areas to be harvested and tended that are within close proximity (within the viewscape) of Jack Lake or within the watershed. Contact should be made to the Bancroft District MNR in early 2010 to ensure that the visible hillsides surrounding Jack Lake and Little Jack are not harvested.

Other Management Plans

Peterborough Crown Game Preserve
Area (ha): 15,268
Designation: Overlay

The Peterborough Crown Game Preserve was established in 1933 on 223 square kilometers of forested land near Apsley, Ontario. The preserve was established to: provide wildlife viewing opportunities in a natural setting; increase wildlife populations; and protect local wildlife populations in order to ensure an abundance of game in adjacent areas.

The boundaries of the area have been changed over the years to better suit the needs for management. In 1951, 4,700 hectares were removed from the preserve while another 2,200 ha were removed between 1956-67. The current boundary reflects the description contained in Regulation 66598 (as amended) of the Game and Fish Act dated 1 January, 1990. The preserve is approximately 15,268 ha in size.

The Preserve is located almost entirely in the Jack Lake watershed which has numerous lakes and wetlands. Jack Lake drains through Jack Creek into Stony Lake which is located on the southern boundary of the Preserve and the Jack Lake watershed.

This portion of the Crown Game Preserve is located within the Sharpe Bay Fen Conservation Reserve. The Conservation Reserve (see Policy Report C24) provides the primary land use intent and management direction for this area. The land use intent and management direction for the Crown Game Preserve amends or supplements the primary direction. The Management direction for Commercial Activities does not permit commercial fur harvesting, and for Recreational Activities and Facilities does not permit hunting.

The area continues to provide opportunities to view white tailed deer; however, the fluctuating populations have seriously degraded the habitat within the Preserve. The management of wildlife populations and their habitats within the Preserve has been and continues to be of concern to the MNR. The lack of regeneration of suitable or preferred browse species such as eastern white cedar as well as large deer population numbers have lead to a degradation of habitat.

Petroglyphs Provincial Park
Size (ha): 1,555

The south east part of Petroglyphs Provincial Park which borders Jack Creek on the southeast and Stony Lake on the south is within the southern part of the Jack Lake watershed area. The park is of national cultural heritage significance. It contains **unique** historical features and certain rare plant species. The Park contains one of the largest collections of aboriginal rock carvings (petroglyphs) in Canada, estimated to be between 500 and 1000 years old and associated with the Algonkian speaking culture. The petroglyphs are significant on a provincial and national level. The park also has a large population of white tailed deer, which provide viewing opportunities for the public. It is the only park in the Algonquin Region that shows the geological transition from crystalline limestone to granite rock.

Land Use Intent: The goal of this historical class park is to protect and preserve a **unique** and important archaeological resource in a natural setting, providing visitors the opportunity to view the petroglyphs on a day-use basis in a manner that will increase their understanding, appreciation and enjoyment of these rock carvings.

Observations – Crown Land Use Regulations

- *The MNR's Crown Land Use Atlas – Policy Report of 2002 notes that "the fluctuations in the white-tailed deer populations have seriously degraded the habitat within the Preserve. The management of the wildlife populations within the preserve is still a concern as is the habitat management. The lack of regeneration of suitable or preferred browse species such as eastern white cedar as well as a large deer population have lead to the degradation of the habitat."*
- *Wetlands act as natural filters to maintain the lake's water quality.*

Municipal Planning Regulation

Jack Lake and all of its watershed are located within Peterborough County, as shown on the map from the Peterborough County OP in the Appendix. The County, or upper tier, government offices are located in Peterborough. The Lake and watershed are divided between two Townships: North Kawartha (NK) on the west and north sides, and Havelock-Belmont-Methuen (HBM) on the east side. These two lower-tier municipal government offices are located in Apsley and Havelock respectively. Each government is required to prepare an Official Plan (OP) that provides general land use policy to describe how land can be used. All development must conform to the OP. The Township of North Kawartha was formed in 2000 by the amalgamation of the Townships of Burleigh-Anstruther and Chandos.

Official Plans

The OP of Peterborough County was consolidated in March, 2006.

In the Township of NK, the OP of the former Township of Burleigh-Anstruther, which applies to Jack Lake, was issued in 1996. The OP of Peterborough County is presently being revised to incorporate the OP for NK and two other Townships. The OP of HBM was updated in 2004. These OPs must be reviewed every 5 years.

The OP for Peterborough County is based on a watershed approach to land use planning and water management, and the projected needs for up to 20 years. The amendment encourages lake associations, like the JLA, to undertake the creation of Lake Plans to identify important local values, features, and unique, individual lake characteristics. The implementation of these Lake Plans may involve amendments to the OP and incorporate policies that are **unique** to the specific lake. This is an important step forward.

Zoning By-laws

Each Township prepares Zoning By-laws to regulate the use and location of buildings and structures. The Zoning By-laws for Burleigh-Anstruther were issued in 1996; they will have to be revised within three years of the adoption of the OP for NK. The zoning By-laws for HBM were adopted in 2004.

The Zoning By-laws in NK and HBM are not identical. Therefore, development on Jack Lake is subject to different standards, depending upon the location.

Observations – Municipal Planning

The Official Plans and Zoning By-laws are municipal government documents that legislate land use practices. It is the responsibility of the municipality to establish and carry out the vision of the Official Plan and to implement the by-laws. The Lake Stewardship Plan recognizes the positive, long term land use practices that help to maintain and promote Lake Quality and the Natural Environment.

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Glossary

Algae: simple, one-celled or colonial plant-like organisms that grow in water, contain chlorophyll and do not differentiate into specialized cells and tissues like roots and leaves.

Algal blooms: sudden proliferations of algae.

Anoxic conditions: low concentrations of oxygen.

Benthos / benthic invertebrates: insects, worms, crustaceans and other organisms without a backbone that live in, on, or near the bottom of water bodies.

Buffer (Riparian) Zone: a strip of vegetation, including native vegetation, located between developed land and a lake, stream, or wetland. A buffer zone protects the water quality, adds beauty, enhances fish spawning, provides a habitat for wildlife and is considered to be a Best Management Practice. The MNR and MOE recommend a minimum 30-metre vegetated buffer in Precambrian Shield areas.

Contamination: degradation of water quality compared to natural or original conditions, caused by the release of contaminants.

Dissolved oxygen: the amount of free oxygen dissolved in the water. It is used by aquatic organisms to “breathe”.

***E.coli* bacteria**: bacteria that live in the intestines of warm-blooded animals such as birds, beavers and humans. While most are harmless, a few strains of *E.coli* cause severe gastrointestinal illness. Drinking water and recreational water can be tested for the presence of this bacteria.

Ecosystem: a community of organisms and the environment in which they live.

Erosion: the process by which rocks and soil are worn away and moved from one place to another.

Eutrophication: the aging of a body of water as it increases in dissolved nutrients like phosphorus and declines in oxygen. This is often a natural process that can be accelerated by shoreline development and other human activities.

Exotic species: plants or animals that are not native to an area.

Ground truthing: verifying predicted patterns or outcomes through follow-up studies.

Invasive species: exotic plants or animals that compete with (and overtake) native species.

Littoral zone: the area of a water body bounded by the shoreline and the limit of submerged aquatic plant growth.

Pesticide: a chemical or mixture of chemicals used to kill unwanted species of plants or animals.

Phosphorus: a widely occurring chemical element that stimulates the growth of terrestrial and aquatic plants as well as algae. Naturally occurring phosphorus comes from decaying vegetation on the bottom of lakes and streams. Human sources include waste water runoff and allowing waterbody contact with certain soaps and detergents.

Sediment: particles, derived from rocks, soils and organic materials that are suspended in, or deposited at the bottom of, a body of water.

Watershed: an area of land from which water drains to a given point. It is synonymous with drainage area, basin, and catchment.