Section 4 Natural Heritage Features and Areas

In the Lake Vernon watershed natural heritage features and areas generally include: water quality, fish habitat, wildlife (winter deer habitat, loon nesting sites), wetlands, endangered, threatened and vulnerable species and natural vegetation. Natural heritage features and areas provide numerous economic, environmental and social benefits. Collectively, they contribute to the conservation of biological diversity, or biodiversity, and to the maintenance of the quality of our air, land and water. The benefits of conserving natural heritage occur at lake, watershed and broader scales.

Natural heritage features and areas provide ecological functions that are critical to the survival of all species – including humans. Some of these ecological functions include the provision of habitat, hydrological functions, nutrient and energy cycling and storage, succession and disturbance functions, reproduction and dispersal, landscape linkages and others. Locally, these features and areas help to sustain a way of life that attracts people to live, work and play on Lake Vernon.

4.1 Water Quality

In terms of biological productivity or "trophic status", Lake Vernon is considered to be a slightly oligotrophic lake. Oligotrophic lakes have low biological productivity, which are indicated by secchi disk readings of greater than 5.0 metres and total phosphorus levels less than 10.0 micrograms per litre. Oligotrophic lakes are generally clear lakes located on the Canadian Shield and are usually the most desirable for cottage development because they have low levels of phosphorus, algae and nutrients.

The water quality of Lake Vernon is an integral component of the current quality of life on the lake. According to the Nelson report, Assessing Environment and Development, 1995 prepared for Fairy and Peninsula lakes, water quality can be affected by several factors. Due to the proximity of Lake Vernon to these lakes and their navigational connection, it can be assumed that these factors would also apply to Lake Vernon:

Turbidity – the suspension of fine particles has the potential to affect the entire food chain or trophic cycle.

Nutrient Enrichment – an increase in nutrient loads, particularly phosphorus, may accelerate the eutrophication process and increase the growth of algae and aquatic plants.

Waterfront Alteration – removal of shoreline vegetation, alteration of fish and wildlife habitat, increased runoff from cleared areas (sedimentation, fertilizers, other chemicals), construction of shore-walls will impact fish and wildlife habitat and affect natural aesthetics.

Increased Boating – can cause turbulence, re-suspension of bottom sediments, disturb loons and increase pollution from boat exhaust.

Sewage Effluent – can contain nutrients such as suspended solids and phosphates, which can cause excessive growth of aquatic plants and algae.

Golf Courses – impacts from removal of natural landscapes and the use of fertilizers, pesticides and herbicides is not well known or documented.

Three agencies are currently involved in monitoring the water quality of Lake Vernon (Figure 10):

Figure 10 – Agencies Involved in Water Quality

Agency	Issue	Parameters
District of Muskoka	Recreational Water Quality	Secchi disk, chlorophyll a
Ministry of Natural Resources	Lake Trout Habitat	Dissolved oxygen, temperature
Ministry of the Environment	Drinking Water Lake Partnership Program	E-Coli Total Phosphorous & Secchi

The District of Muskoka has implemented a water quality modeling program since the early 1970's and has collected information on secchi disk and spring phosphorus loadings (Figures 11-14).

The current model is based on predicting the inputs of one key pollutant, that being, anthropogenic (manmade) sources of phosphorus from septic systems. Objectives have been integrated with planning policy with the intention of defining shoreline development capacities on inland lakes to protect recreational water quality.

The primary purpose of the model is to predict how much residential and commercial development a lake can sustain without impairing water quality. The model quantifies linkages between natural sources of phosphorus to a lake, human impacts from shoreline development, water balance, the size and shape of a lake, and the resultant phosphorus concentrations. The model uses a number of assumptions about phosphorus loadings, phosphorus retention, and usage figures. The model allows the user to calculate how water quality in a lake will respond to the addition or removal of shoreline development such as cottages, permanent homes and resorts. It predicts several important indicators of water quality: total phosphorus concentration, algal density (chlorophyll a concentrations), water clarity (Secchi depth), and oxygen concentrations in the bottom waters at the critical end of summer period.

Figure 11 – Secchi Disk and Spring Phosphorus

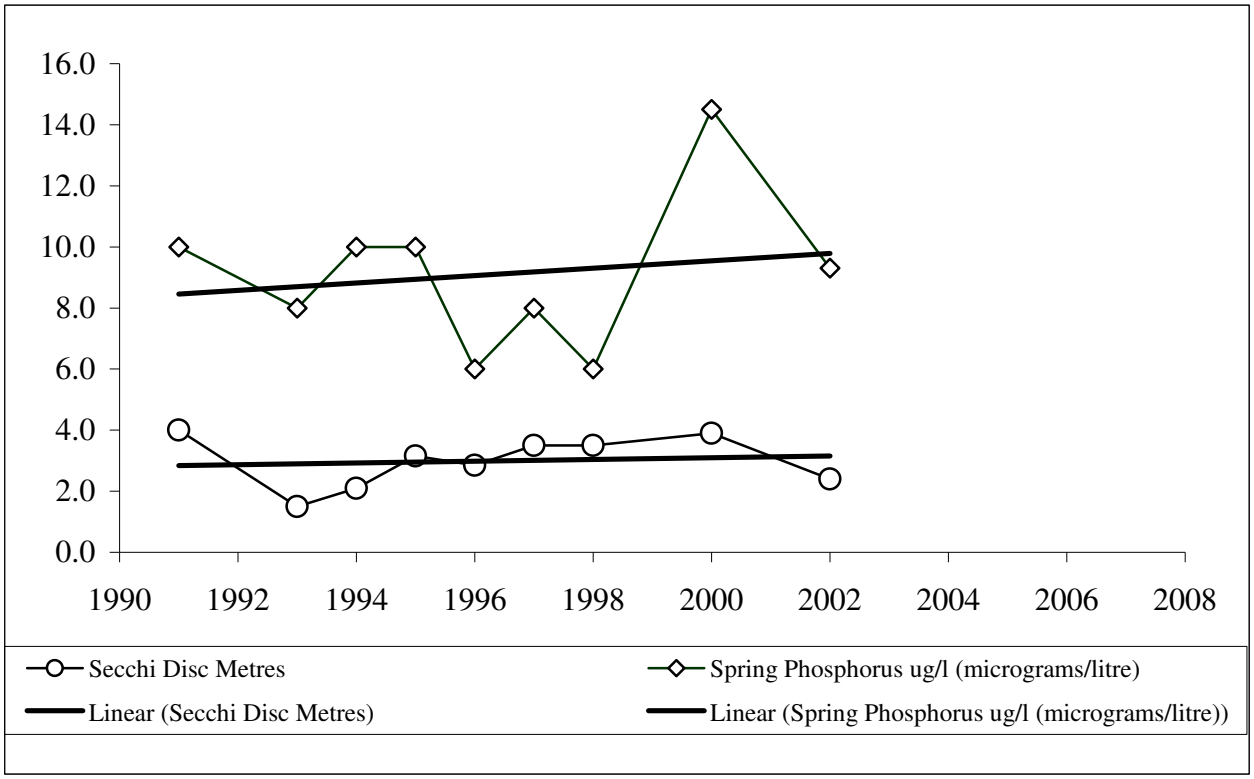
Year	Secchi Disk (m)			Spring Phosphorous (ug/l)		
	Hunter's Bay	Main	North	Hunter's Bay	Main	North
1991	-	4.0	-	-	10.0	-
1992	-	-	-	-	-	-
1993	-	1.5	-	-	8.0	-
1994	-	2.1	-	-	8.0	-
1995	-	3.2	-	-	7.0	-
1996	-	2.9	-	-	7.0	-
1997	-	3.5	2.8	-	-	-
1998	3.0	3.5	3.0	-	6.0	12.0
1999	-	-	-	-	-	-
2000	4.0	3.9	3.7	13.2	-	19.9
2001	-	-	-	-	-	-
2002	1.7	2.4	2.6	-	-	-
Long Term Average	2.9	3.0	3.0	13.2	9.1	16.0

Source: District of Muskoka, Planning and Development Department

Figure 12 – Hunters Bay Lake Vernon – Spring Phosphorus and Secchi Disk

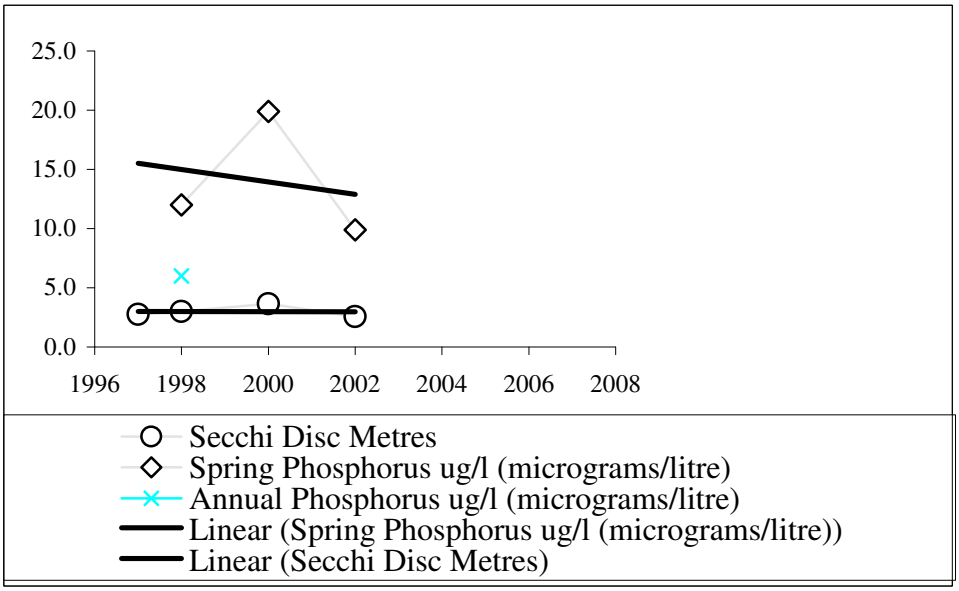
Source: District of Muskoka, Planning and Development Department

Figure 13 – Main Lake Vernon – Spring Phosphorus and Secchi Disk



Source: District of Muskoka, Planning and Development Department

Figure 14 – North Lake Vernon – Spring Phosphorus and Secchi Disk



Source: District of Muskoka, Planning and Development Department

The setting of development capacities is currently based on the prediction of specific chlorophyll a objectives, by a computer model, for each lake. Chlorophyll a is a green pigment in plants that is a by-product of photosynthesis and is an indication of the amount of algae present in the lake. The objective set is based on the principle that a lake can generally sustain a small increase in predicted chlorophyll a without a noticeable change in water quality. When a lake is at capacity, no new lot creation is permitted. Existing lots may only be developed after a site-specific evaluation has been completed to demonstrate how the lot can be developed with minimum impact on the lake's water quality.

Figure 15 indicates that the District of Muskoka Official Plan has established an objective of 2.9 µg/l of chlorophyll a for Hunters Bay and the main portion of Lake Vernon and 2.7 µg/l for North Bay and where these targets are exceeded, no further development is permitted. Presently, Lake Vernon has a rating of "not sensitive" to additional development. "Not sensitive" means that the lake is not nearing capacity and that there are more than 10 lots left to develop on the lake. However, this capacity could be depleted if significant development is proposed.

The District of Muskoka water quality program considers the impact of development on recreational water quality and does not provide detailed criteria regarding the impact of development and phosphorus loadings on Lake Trout habitat. As noted in Section 4.3.1, Lake Trout Habitat, Lake Vernon is currently at capacity based on the impacts of phosphorus on dissolved oxygen and Lake Trout optimal habitat. However it is expected that the approval of phosphorus abatement technology will substantially decrease the level of phosphorus entering the watershed. As a result, the current development restrictions that are based on Lake Trout habitat will likely be lifted at some point in the future. As the Ministry of Environment has not officially sanctioned these technologies, new lot creation should not be approved based on their use. Development of existing vacant lots should be encouraged to use the most advanced, cost-effective technology available at the time of construction.

Figure 15 – District of Muskoka Official Plan – Water Quality Objectives

Lake Section	Township	Municipality	Water Quality Objective (Chla)	Sensitivity
Lake Vernon (Hunters Bay)	Stisted	Huntsville	2.9 µg/l (micrograms per litre)	Not sensitive
Lake Vernon (Main)	Stisted/ Chaffey	Huntsville	2.9 µg/l (micrograms per litre)	Not sensitive
Lake Vernon (North Bay)	Stisted	Huntsville	2.7 µg/l (micrograms per litre)	Not Sensitive

Source -Table 6 District of Muskoka Official Plan

Nelson (1995) notes that current phosphorus monitoring on Fairy and Peninsula Lakes focuses only on the impacts of shoreline residential development. The District model does not incorporate the impacts of backshore development, golf courses, the loss of the natural buffering effects of wetlands if they are disturbed or removed, or unpredictable sewage events such as sewage effluent spills or erosion and sedimentation.

The District of Muskoka is currently conducting a review of its water quality program and will soon be releasing a first draft of the report. Although the results of the review are still preliminary, the District intends to update the model by using current existing development numbers, include backlot, commercial and golf courses as well as assess phosphorus inputs from sources within 300 metres (1000 feet) of the shoreline. Together with this report, the District intends to conduct a comprehensive review of the water quality policy. It is imperative that the Lake Vernon Association is aware of these changes and the methods that will be used to determine development capacity.

Phosphorus is the nutrient that limits or promotes biological productivity in most freshwater ecosystems. Its sources are both natural and anthropogenic.

Natural – atmospheric, precipitation, run-off and natural drainage.

Anthropogenic (manmade) – development (residential, resorts, golf courses), human waste, dishwasher detergent, lawn fertilizer and laundry soap.

The amount of phosphorus inputs from manmade sources depends on the lifestyle of the shoreline residents. Figure 16 provides an estimate of the range of phosphorus inputs based upon a low impact and a high impact lifestyle.

Figure 16 – Lifestyle and Phosphorus Inputs

Lifestyle			
Low Phosphorus		**High Phosphorus**	
Human Waste	535 gm	Human Waste	535 gm
No Dishwasher	0 gm	Dishwasher using powdered detergent once a day	650 gm
No Fertilizer	0 gm	Fertilizer used 1/yr using 10% nitrogen, potassium and phosphorus	1,960 gm
Tress not cut down	20 gm	Lot cleared of trees	20 gm
Use phosphate free products	20 gm	Use phosphate products	180 gm
Total Phosphorus	575 gm		3,355 gm

Source: District of Muskoka Publication

Observations – Water Quality

- **The District of Muskoka's water quality modeling program has identified that Lake Vernon has a rating of "not sensitive" to additional development.**
- **The Ministry of Natural Resources has identified Lake Vernon to be at capacity for new development based on the impact of phosphorus loadings on Lake Trout habitat.**

- **The District of Muskoka's water quality program does not address the concerns of MNR's restriction on Lake Vernon due to Lake Trout habitat (dissolved oxygen and related temperature).**

- **Lake water testing for contaminants is practically non-existent.**

- **The Ministry of the Environment may approve new phosphorus abatement septic systems, which could permit additional lot creation on Lake Vernon in the future.**

Recommendations – Water Quality

24. *Contact the District of Muskoka and express an interest in the review of the Water Quality Model to ensure proposed changes are appropriate for Lake Vernon. Provide up to date information on current development, occupancy rates and capacities.*

25. *Continue to support the District of Muskoka's water quality program. Conduct water quality monitoring for those years that the District of Muskoka does not do it.*

26. *Promote a low phosphorus impact lifestyle by encouraging the use of phosphorus free products through education and communication. Promote the following messages:*

    - *Do not use lawn fertilizers, pesticides or herbicides;*
    - *Do not bathe in the lake;*
    - *Maintain shoreline vegetation; and,*
    - *Use of phosphate free products (provide list and where to obtain).*

27. *Encourage local retailers to make a range of phosphate free products available.*

28. *Prepare an "Annual State of the Lakes Report" to promote awareness of water quality and other matters.*

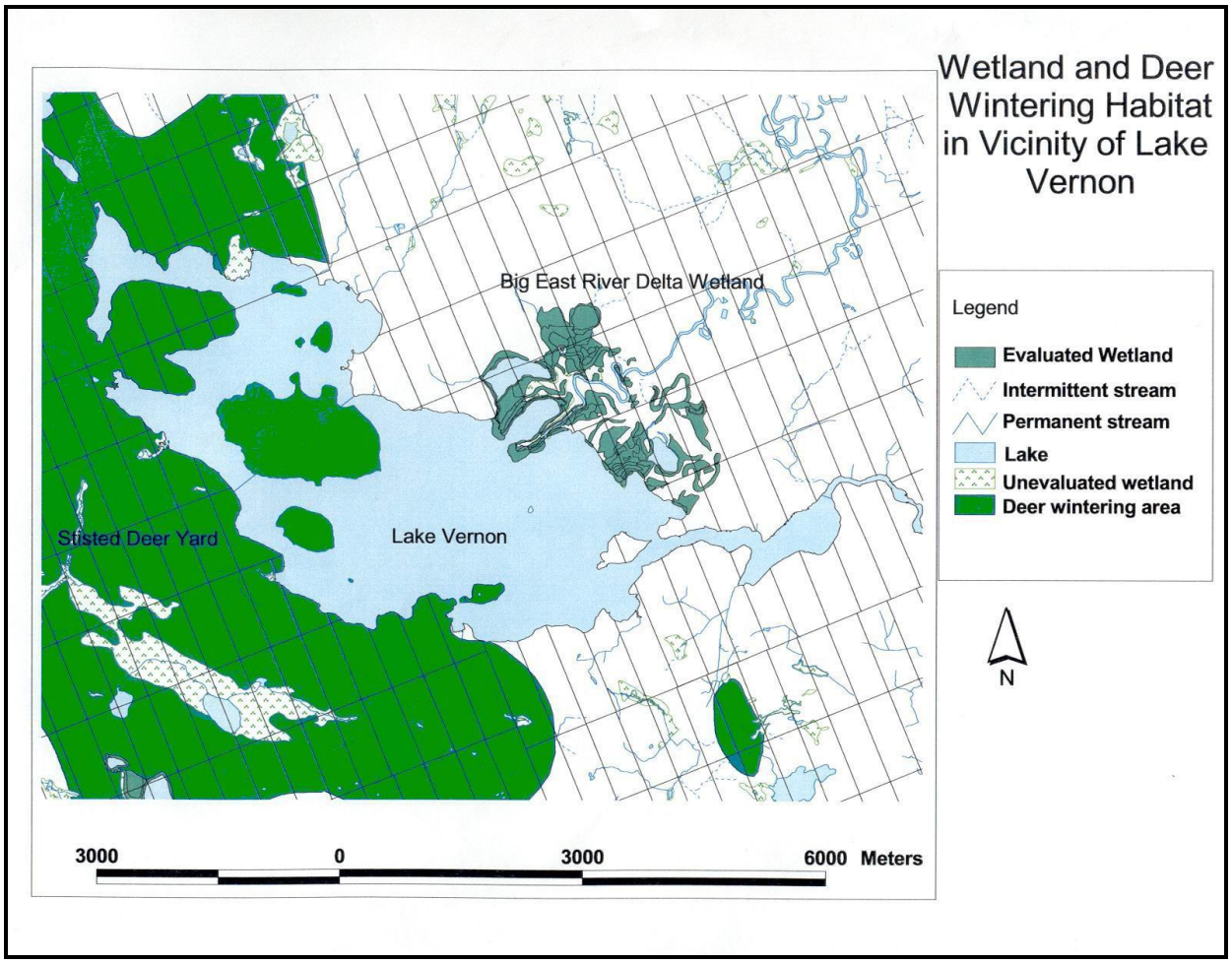
29. *Provide a regular ongoing forum in conjunction with Fairy and Peninsula lakes to educate the Huntsville Lake stakeholders about impacts on water quality.*

4.2 Wetlands

Wetlands are an important natural resource and the ecological, social and economic benefits that can be attributed to wetlands are substantial. Wetlands maintain and improve water quality, help control flooding, provide habitat for fish and wildlife, provide conditions for a wide variety of vegetation (including rare and unusual species) and result in substantial social and economic benefits and opportunities such as hunting, fishing, wildlife viewing and appreciation of nature in general.

There are numerous lacustrine and riverine wetlands on Lake Vernon and throughout the watershed. Map 13 – Wetland and Deer Habitat, provides the location of some of these wetlands. There are also many other wetlands located on the 20 tributaries that flow into Lake Vernon. While these wetlands provide habitat to fish and wildlife, they also provide a storage area for water flowing into the lake. As the map indicates, one of these wetlands has been evaluated and determined to be Provincially Significant, however, all wetlands contribute to the health of the lake by providing ecological, social and economic benefits.

Map 13 – Wetlands and Deer Habitat



Source: Bracebridge MNR Office

The Big East River Delta has been identified as a provincially significant wetland and is a Muskoka Heritage Area. The physical boundaries of the provincially significant wetland and Muskoka Heritage Area are not identical; however significantly overlap in physical area and policy. The Provincial Policy Statement permits new development in provincially significant wetlands where such development does not negatively impact the function of the wetland and similar protection should be afforded to all wetlands within the watershed, regardless of their status. The District of Muskoka Official Plan encompasses policy from the Provincial Policy Statement generally protecting the area from incompatible development.

This Big East River Delta Wetland is 189 hectares in size and was classified by the Bracebridge Ministry of Natural Resources through the Northern Ontario Wetland Evaluation System, which is the cornerstone of the Provincial Wetlands Policy Statement under the Planning Act.

Muskoka Heritage Areas (MHA) include those areas in Muskoka that exhibit historic, geologic, archaeological, scenic or biologic value on a local, district, provincial or national scale. The Natural Heritage Evaluation study was a result of a District of Muskoka led project in cooperation with the Muskoka Heritage Foundation and the Ministry of Natural Resources.

According to the Natural Heritage Evaluation study, **The Big East River Delta** is the best example of a highly active, modern delta formation within the District Municipality of Muskoka. The Big East River has a heavy sediment load that has created levees along the banks of the river. The area is privately owned with most cottage development occurring along the road on the southern boundary of the site. The delta has a very high representation of plant and bird species, as well as supporting habitat for many rare species:

Wildlife

- Black-banded Band Wing Dragonfly
- Pygmy Shrew
- Willow Flycatcher
- Red-shouldered Hawk
- Cape May Warbler

Vascular Plants

- Virginia Rye
- Pond Weed
- Marsh St. John's Wort
- Nodding Trillium

In addition, one mammal, one bird and fourteen species of vascular plants were recorded as regionally uncommon (District of Muskoka – Muskoka Heritage Areas). There is also a representation of deep emergent marsh vegetation known as Bayonet Rush (Juncus militaris) that is unique to Muskoka. The representation that occurs in the Delta is the largest of its kind in the province. The Big East River Delta is sensitive in regards to its wetland ecology. Measures from the Provincial Policy Guidelines relating to the protection of wetlands should be enforced, along with stewardship.

In addition to the Big East River Delta, there are many lacustrine (lake shoreline) wetlands that are extremely important to the health of the lake because they provide spawning, foraging and rearing habitat for fish, refuge and nesting areas for ducks, loons and other birds as well as habitat for wildlife.

The two largest lacustrine wetlands are located east and west of the Big East River inlet. There are other smaller shoreline wetlands, although most occur at the mouth or within close proximity of in-flowing streams. Map 12 (insert at back of report) also shows the areas where natural lacustrine wetlands occur.

The general tendency of residents is to remove aquatic vegetation in order to "improve" a portion of the shoreline for swimming and boating activities. Impacts can occur from direct removal of aquatic vegetation through dredging and filling activities, removal of riparian vegetation, construction of docks and boathouses and the manual or chemical removal of aquatic vegetation.

Observations – Wetlands

- **The Big East River Delta has been classified as a provincially significant wetland and is also recognized as a Muskoka Heritage Area.**
- **There are many smaller lacustrine wetlands located at or near the inlet of streams on Lake Vernon.**
- **All wetlands on the lake are important to the rich diversity of flora and fauna that exists on Lake Vernon.**
- **There is a tendency for residents to remove aquatic vegetation from shorelines to make these areas more "desirable" for swimming and boating.**

Recommendations – Wetlands

30. *Undertake measures to protect and enhance all wetlands within the watershed.*
31. *Encourage the Town of Huntsville to identify all wetlands and ensure development is restricted through appropriate zone categories in the local zoning by-law.*
32. *Provide information to residents about the importance of wetlands and create guidelines for their protection. Create a landowner contact program.*
33. *Promote awareness about the importance of the Big East River Delta.*

4.3 Fish Community

The Ministry of Natural Resources manages Lake Vernon's fish community. The Department of Fisheries and Oceans Canada (DFO) has the responsibility throughout Canada for the protection of fish habitat and the local office is located in Parry Sound. The District of Muskoka and the Town of Huntsville also have a vested interest and participate in maintaining a healthy fish community for Lake Vernon primarily through the site-specific review of development applications.

Lake Vernon is a coldwater fish community (i.e. Lake Trout) and is also the home to many traditionally warmwater lake species (Smallmouth Bass). The lake supports a wide range of fish species, however, the population of many of these species has significantly declined over the past decade. Some of the factors that have contributed to this decline include: loss of fish habitat, the effect of turbidity on spawning and rearing beds, water pollutants and the introduction of non-native

fish species (Northern Pike) into the lake. Since the early 1990's the native fish population has been and continues to be enhanced and maintained by the Ontario Ministry of Natural Resources (OMNR) fish-stocking program.

Lakes, rivers, streams, ponds and wetlands provide fish habitat. Intermittent and seasonally flooded areas can provide important habitat for some fish species at different times of the year. In addition, in-water structures such as logs, stumps and other woody debris, pools and riffle areas, riparian and aquatic vegetation and ground water recharge/discharge areas also provide habitat. Habitat includes the watercourses that act as corridors allowing fish to move from one area to another. Fish habitat provides food and cover and conditions for successful reproduction and support of their life cycle. Lake Vernon provides habitat for at least 18 fish species.

The following species have been observed in Lake Vernon according to the OMNR, Bracebridge Area Office records (Figure 17).

Figure 17 – Fish Species Found in Lake Vernon

Lake Trout	*Salveninus namaycush*
Rainbow Trout	*Salmo gairdneri*
Lake Whitefish	*Coregonus clupeaformis*
Lake Herring (Cisco)	*Coregonus artedii*
White Sucker	*Catostomus commersoni*
Longnose Sucker	*Catostmus catostomus*
Smelt	*Osmerus*
Northern Pike	*Esox lucius*
Smallmouth Bass	*Micropterus dolomieui*
Largemouth Bass	*Micropterus salmoides*
Yellow Perch	*Perca flavescens*
Trout-Perch	*Percopsis omiscomaycus*
Bullhead	*Ictalurus nebulosus*
Pumpkinseed	*Lepomis gibbosus*
Blacknose Shiner	*Notropis heterilepis*
Bluntnose Minnow	*Pimephales notatus*
Golden Shiner	*Notemigonus crysoleucas*
Creek Chub	*Semotilus atromaculatus*

Source – Bracebridge MNR

In 1986 the OMNR initiated a Fisheries Management Plan for the Bracebridge Area. The purpose of this planning process was to develop both long-term and short-term fisheries management directions for the area. The background information for the Fisheries Management Plan identified the following issues as well as optional management strategies to deal with the potential issues.

Issues identified in the Fisheries Management Plan include:

i. over-harvesting;
ii non-native fish species introduction;
iii water level fluctuations;

iv shoreline development (resulting in loss of habitat);
v contaminants;
vi illegal harvest / poaching;
vii restricted access; and
viii underlying problems –conflicting use, lack of scientific knowledge and public awareness.

4.3.1 Lake Trout Habitat

Lake Trout are recognized as being one of the prime species for sport fishing in Ontario. Lake Trout are also a key indicator species of the environmental health of a lake, as they tend to be more sensitive to development and human impacts than most other species of fish (i.e. decrease in oxygen, increase in temperature, loss of spawning beds due to turbidity and algae growth). Lake Vernon is fortunate to be one of the few lakes in Ontario that has and can support Lake Trout and the residents and other users of Lake Vernon must be vigilant in their efforts to protect this natural resource.

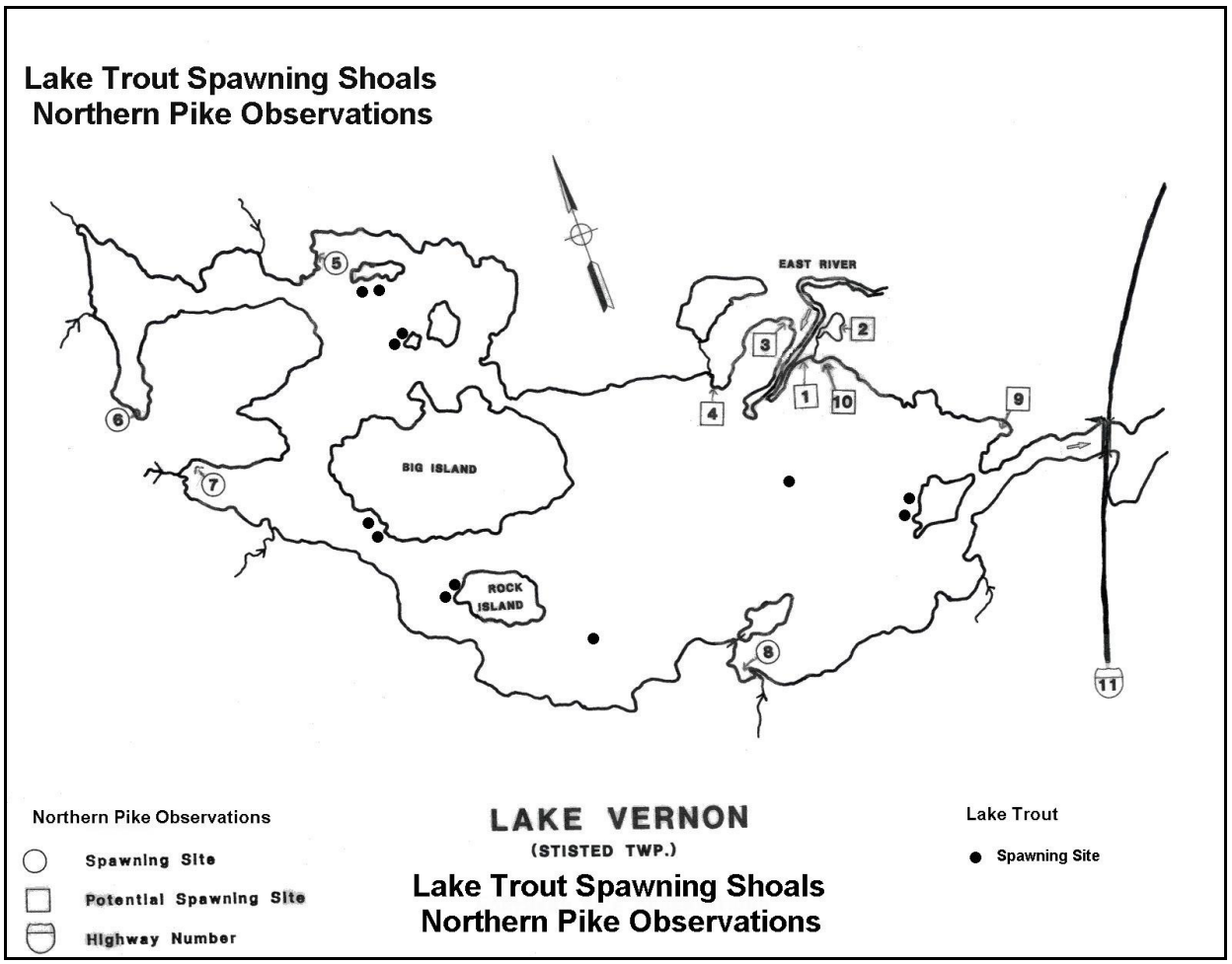
Lake Trout are found in only 2000 (less than 1%) of Ontario's lakes. These numbers have been gradually reducing due to the effect of human activities. One factor in the decline in Ontario's Lake Trout lakes may be the effects of acid rain. Lake Trout are particularly vulnerable in the spring when temporary acid shock from spring run-off may occur. At this time Lake Trout are closer to the surface of a lake in active search of their food sources.

Lake Trout spawn at night in the fall of each year (usually late October). Preferred spawning beds are on shallow rocky shoals, one to three meters below the surface (see Map 14 for location). The female trout usually cleans the area before laying her eggs using her body, tail fin or snout. The eggs, when released by the female are fertilized by the male and then drift down into the safety of crevices in the rocky bottoms where they remain for four to six months until hatching in late February to early April.

Lake Trout have two significant habitat requirements, cold water and dissolved oxygen.

Cold Water - Lake Trout live in cold water. During the winter period the trout in Lake Vernon have an ideal temperature throughout the lake. Most of their food sources, however, are not present or active in the winter, thus feeding activity is generally lower. The most active feeding period of the year for Lake Trout is late April and early May. At this time, nearshore life in a lake begins to stir again, and with the shoreline surface water temperatures still being in the cool range, ideal conditions exist. Under these springtime conditions, Lake Trout actively search the nearshore (littoral zone) area for their preferred food sources such as minnow, crayfish, mayfly nymphs and even flying insects. During the warm summer months the trout retreat to the deeper coldwater sections of the lake where their preferred food sources are less abundant.

Map 14 –Spawning Sites of Lake Trout and Northern Pike



Source: Bracebridge MNR Office

Dissolved Oxygen - When phosphorous is added to a lake, it creates algae, and when algae fall to the lake bottom, decomposition takes place. The process of decomposition uses up available dissolved oxygen. Through recent research, the MNR have determined that the recommended minimum dissolved oxygen criterion for the protection of Lake Trout populations is 7 mg L^{-1}. Lake Trout lakes that are below the 7 mg L^{-1} criterion would have no further capacity for phosphorus loading. Since the mid 1970's the Ministry of Natural Resources and the Ministry of the Environment (MOE) have used the Lakeshore Capacity Assessment Model, which is similar to the DOM water quality model, to set development capacities on Lake Trout lakes throughout Ontario. In the past the MNR have relied on the District of Muskoka's recreational water quality objectives to protect Lake Trout habitat. However, the District of Muskoka water quality model does not take into account dissolved oxygen as a parameter for setting development capacity.

At present, the Ministry of Natural Resources has indicated that additional development in the form of new lots would impact Lake Trout habitat and they would be opposed to new lots being created. The Town of Huntsville Official Plan indicates that Lake Vernon is a coldwater fishery that supports

Lake Trout populations and that they will require the MNR to comment on the impact of any development proposal.

It is important to note that the MNR and MOE have four exceptions where additional development on lakes at capacity may be considered. They include situations where:

- New development is located on municipal sewer services;
- The tile fields on each new lot are set back at least 300 metres from the shoreline of the lake, or such that drainage from the tile fields would flow at least 300 metres to the lake;
- The tile fields on each new lot are located such that they would drain into the drainage basin of another waterbody, which is not at capacity; and
- To separate existing, viable dwellings, each having a separate septic system, provided that the land use would not change.

As well, it is expected that new septic system technology will be approved in the future that will eliminate or reduce the effect of additional phosphorous loadings from shoreline development. When this occurs, the current development restriction on Lake Vernon will be lifted and new lot creation will be permitted. Therefore, it is extremely important that when new lot creation applications or major commercial redevelopment is proposed, that impacts from additional phosphorus loadings are considered and mitigated where possible.

Observations – Lake Trout Habitat

- **Lake Vernon is a coldwater lake that supports a healthy population of Lake Trout.**

- **Lake Vernon is at capacity for new lot creation based on MNR's Lake Trout habitat requirements, however, MNR and MOE have four exceptions where additional development may occur.**

- **Future septic system technology that will reduce or eliminate phosphorous loading may allow the creation of new lots on Lake Vernon.**

Recommendations – Lake Trout Habitat

34. *Ensure new development (new lot creation) and redevelopment (increased density) does not adversely impact Lake Trout habitat. Contact the MNR for comments about new planning approvals within 300 metres (1000 feet) of the shoreline.*

35. *Ensure that the current official plan policy and zoning by-laws reflect the current restriction on new lots and ensure that the expansion of commercial operations reflects this restriction.*

36. *Continue to monitor water quality. Initiate contact with the District of Muskoka to provide assistance with their water quality program. Specifically, the Association should undertake water quality monitoring during the years that DOM does not monitor.*

37. Ensure all development within 300 metres of the shoreline (e.g. residential, backlot, and golf courses) is included in the District's model.

38. Determine other parameters that should also be monitored.

4.3.2 Site Specific Fish Habitat

One of the key characteristics of a healthy fish population in a lake is the quality of the habitat. Fish habitat is primarily in the nearshore area of a lake and usually includes an ample supply of vegetation, woody debris, shade, and rocks. The type of habitat necessary to support each species of fish varies to some degree, however, it is understood that maintenance of healthy shorelines, vegetation and wetlands as well as the health of the streams entering Lake Vernon are all critical factors.

> *"Fish habitat means the spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes."*
>
> Source: Provincial Policy Statement, OMNR

Both coldwater and warmwater fish species require specific habitats for spawning, rearing and foraging. These areas are very site specific and are identified on the fish habitat mapping that was prepared by MNR in 1997. This information provides data on fish habitat type and location. For the streams and watercourses draining into the lake there is little information about the location of specific habitats such as spawning, feeding and nursery areas.

The OMNR have evaluated, classified and mapped fish habitat on Lake Vernon (a set of five maps available from the Lake Vernon Association). Fish habitat areas are classified as Critical (Type 1), Important (Type 2) or Marginal (Type 3). The DFO has established the following classifications:

- Critical habitats (formerly Type 1) are those, which have high productive capacity, are rare, highly sensitive to development or have a critical role in sustaining fisheries (e.g. spawning and nursery areas for some species and ground water discharge areas).

- Important habitats (formerly Type 2) are moderately sensitive to development and although important to the fish population, are not considered critical (e.g. feeding areas and open water habitats of lakes).

- Marginal habitats (formerly Type 3) have a low productive capacity or are highly degraded and do not currently contribute directly to fish productivity. They often have the potential to be improved significantly (e.g. a portion of a waterbody, such as a channelized stream, that has been highly altered physically).

Critical habitats (Type 1) and important habitats (Type 2) require the highest level of protection because of their specific sensitivity and importance to local fish populations. Marginal habitats have a low productive capacity and are less susceptible to development impacts.

The location of Northern Pike and Lake Trout spawning areas is identified on Map 14. Northern Pike and Lake Trout spawning shoals are a good example of Type 1 habitat. These specific habitat locations must be protected from incompatible development.

The review of development proposals often involves more detailed habitat evaluations as well as the consideration of potential negative impacts (which are dictated by the kind of development, magnitude and proximity to fish habitats and the nature of local fish habitat). The municipality may require additional studies when development is proposed in Type 1 fish habitat or in adjacent lands.

Generally, it is found that appropriate mitigation measures such as increased setbacks, vegetative buffering and the construction of low impact structures (such as floating and pole docks) may address most concerns. In some instances where fish habitat is critical, due to its function and relative scarcity, no development may be warranted.

As noted by Nelson (1995) information on phytoplankton and macrobenthos is lacking. "Phytoplankton (small floating plant life) and macrobenthos (small animals living on the bottom of the lake) are near the bottom of the food chain and serve to support higher orders of aquatic life such as Lake Trout." Additional monitoring or assessment reports on phytoplankton and macrobenthos would help to develop an understanding of the health of Lake Vernon.

4.3.3 Fish Contaminants

Contaminants from the water are taken-up by aquatic organisms and contaminants such as mercury, dichlorodiphenyltrichloroethane (DDT) and PCB's bioaccumulate and are further concentrated with every step up the food chain (Spacie and Hamelink 1985).

There was an advisory notice for Fairy Lake regarding mercury levels in the lake. Due to the proximity of Lake Vernon and Fairy Lake, it can be assumed that these mercury levels may also apply to Lake Vernon. This can also be assumed, by reviewing the Guide to Eating Ontario Sport Fish and recommended fish consumption.

Figure 18 provides data taken from the 2001-2002 Guide To Eating Ontario Sport Fish produced by the MOEE. Values in the table indicate the number of meals that can be consumed per month without exceeding a tolerable daily toxin limit. The guidelines for women of childbearing age and children under 15 years of age are more stringent than listed in the table. For complete information with respect to the recommended consumption rates the guide should be obtained and studied.

Figure 18 – Guide to Eating Fish - Number of Meals per Month for Lake Vernon

Species	Fish Size (total length) in Centimetres								
	15-20	20-25	25-30	30-35	35-45	45-55	55-65	65-75	> 75
Lake Trout	-	-	-	2	2	0	0	0	0
Northern Pike	-	-	-	-	-	4	4	4	2
Largemouth Bass	8	4	4	-	-	-	-	-	-
Smallmouth Bass	4	4	4	2	2	-	-	-	-

Source: Guide to Eating Ontario Sport Fish

Note – The guide indicates that Lake Vernon fish have been tested for mercury, PCB's, mirex, photomirex and pesticides.

Observations – Site Specific Fish Habitat & Fish Contaminants

- **There is a lack of information on phytoplankton and macrobenthos on the Huntsville lakes and yet this information would help to understand the health of the lake.**

- **Critical habitats (Type 1) are very important to the health of existing fish populations and extra caution should be exercised before shoreline development is allowed near or in these areas.**

Recommendations – Site Specific Fish Habitat & Fish Contaminants

39. *Encourage the protection of fish habitat, and especially Type 1 fish habitat. Ensure the municipality's official plan incorporates and implements a strong policy with respect to shoreline alteration.*

40. *Educate shoreline residents about the impact of the removal of substrate and woody debris in the littoral zone.*

41. *Advise MNR/DFO of any infractions.*

42. *Consider undertaking additional monitoring of phytoplankton and macrobenthos. Contact the District of Muskoka and Ministry of Environment (and other organizations) to determine guidelines and potential for partnerships.*

4.4 Streams

Streams are ecologically important to Lake Vernon as a refuge to many species of fish living in the lake. There are 20 streams that are either permanent or intermittent in nature but all are an important part of the fish and wildlife habitat of Lake Vernon (see Map 3 - Lake Bathymetry and

Tributaries and Map 18 - Topographical Map of Lake Vernon). These streams provide spawning, nursery and rearing habitat for fish species in Lake Vernon, including Brook Trout, Bass, Northern Pike, Suckers and most of the minnow families. The normal stream flow and the elevated spring flow provide the conditions necessary to incubate eggs deposited during the spawning season. The aquatic organisms found in most of these permanent and intermittent streams provide a significant food source for the species of fish that frequent the streams. There are also numerous intermittent drainage courses that flow directly into the lake and these areas should also be protected from development.

The Ministry of Natural Resources' fish habitat maps have identified 5 streams as coldwater streams (Big East River, Wallington Creek, Black Creek and two other unnamed creeks, one at Peacock Bay and the other at Camp Wabanaki). *Coldwater streams* are characterized by colder water temperature and high oxygen, which are habitat requirements for trout species. Coldwater streams have a fairly high gradient to keep them flowing fairly fast and are often fed by springs and tend to be more fertile. *Warmwater streams* are characterized as those streams that are not able to support salmonoid species. The water temperature is warmer and the oxygen content lower. They are slower moving streams and provide habitat for minnow and sucker species. Coldwater streams are generally more sensitive to development that removes vegetation and introduces silt, than warmwater streams.

Unfortunately, there is little information about the health and habitats of streams in the watershed and further research is required. Development located along these streams can impact water quality and fish habitat.

Observations – Streams

- **There are 20 streams on Lake Vernon. Five of these streams have been identified as coldwater habitat.**

- **There is very little detailed information regarding the health and habitat of Lake Vernon's streams.**

Recommendations – Streams

43. *Protect and rehabilitate streams and drainage courses.*

44. *Conduct an inventory of streams to determine function, flow and impacts.*

45. *Ensure appropriate setbacks from stream banks are in Official Plan and Zoning By-law to ensure protection of natural vegetation buffers. 30 metres is recommended for coldwater streams and 15 metres for warmwater with the setback areas to be maintained as a natural buffer.*

46. *Require the proponents of development to undertake inventories and mitigation plans, if appropriate, to ensure their protection. Alteration of natural streams through straightening or re-channelization must be prohibited.*

47. *Undertake rehabilitation or restoration where warranted.*

48. *Increase awareness about their location and function. Challenge residents with the "Name the stream contest". Initiate a Land Owner Contact program.*

4.5 Endangered and Threatened Species

The protection of endangered and threatened species and their habitats is necessary in order to slow or prevent their loss from Ontario. A number of species have been listed in regulation under Ontario's Endangered Species Act. An updated list of "Vulnerable, Threatened, Endangered, Extirpated or Extinct Species of Ontario List" may be obtained from the fish and wildlife page on the MNR Internet web site at http://www.mnr.gov.on.ca/MNR/.

Lake Vernon is on the fringe of the range of many species. Lake residents and Ministry of Natural Resources (MNR) staff have observed many of the species found on the Royal Ontario Museum and Ministry of Natural Resources website http://www.rom.on.ca/ontario/riskphp?region=4.

Figure 19 shows the species on the ROM/MNR website that occur within the Lake Vernon watershed. Although there are very few known locations of Endangered and Threatened species in the Lake Vernon watershed at the present time, it is important to be aware of their occurrence so that future sightings can be recorded. When new sites and species are identified, appropriate steps should be taken to ensure that the significant portions of the habitats of these species are protected.

Figure 19 – Lake Vernon's VTEE Species

Common Name	Latin Name	Status		Observations
		COSEWIC	OMNR	
Birds:				
Red-shouldered Hawk	Buteo lineatus	Special Concern	Vulnerable	Known habitat in Big East River Delta
Bald Eagles	Haliaeetus leucocephalus alascanus	Endangered	-	No confirmed nesting sites, however, have been spotted over Lake Vernon.
Peregrine Falcon	Falco peregrinus	Threatened	-	No confirmed nesting sites, however, Lake Vernon is within their range.
Black Tern	Childonias niger	Not at Risk	Vulnerable	Nesting sites in wetlands areas within Lake Vernon watershed. Nests are vulnerable to water level fluctuation.
Cerluean Warbler	Dendroica derulea	Special Concern	Vulnerable	Lake Vernon at range limit. Vulnerable to deforestation.

Common Name	Latin Name	Status		Observations
		COSEWIC	OMNR	
Great Gray Owl	Strix nebulosa	Not at Risk	Vulnerable	Lake Vernon just outside range, however, sightings have occurred in Algonquin Park.
Least Bittern	Ixobrychus exilis	Threatened	Vulnerable	Spotted in Lake Vernon wetlands – vulnerable to development activities.
Pileated Woodpecker	Dryocopus pileatus	-	Not at Risk	Nesting sites near Ravenscliffe and Peacock Bay. Vulnerable to deforestation.
Red-headed Woodpecker	Melanerpes erythrocephalus	Special Concern	Vulnerable	North of range, however sightings have occurred.
Short-eared Owl	Asio flammeus	Special Concern	Vulnerable	Potential habitat in Big East River Delta.
Mammals:				
Eastern Wolf	Canis lupus lycaon	Special Concern	Vulnerable	Occur within the watershed, experience year round hunting season.
Southern Flying Squirrel	Glaucomys volans	Special Concern	Vulnerable	Northern edge of their range.
Insects:				
Monarch Butterfly	Danaus plexippus	Special Concern	-	Milkweed plants are their habitat requirement.
West Virginia White Butterfly	Pieris virginiensis	-	Vulnerable	Many sightings on Lake Vernon.
Reptiles:				
Eastern Hognose Snake	Heterodon platirhinos	Threatened	Vulnerable	Within the species range.
Eastern Milk Snake	Lampropeltis triangulum	Special Concern	-	Within the species range.
Five-lined Skink	Eumeces fasciatus	Special Concern	Vulnerable	Within the species range.
Northern Ribbon Snake	Thamnophis sauritus	Special Concern	Vulnerable	Within the species range.
Spotted Turtle	Clemmys guttata	Special Concern	Vulnerable	Within the species range.

Source: Lake Vernon Association

Observations – Endangered and Threatened Species

- **There are few known sites of Endangered or Threatened species within the Lake Vernon watershed.**
- **There are many Endangered or Threatened species that occur in the Lake Vernon Watershed.**

Recommendations – Endangered and Threatened Species

49. Encourage local municipalities to include Official Plan policy that protects habitat of endangered and threatened species when identified. Proponents may be required to prepare an additional assessment before development is approved.

4.6 Significant Wildlife Habitat

The area around Lake Vernon has an abundant wildlife population. Species include mammals, birds and ducks, reptiles and amphibians. Wildlife viewing is an important recreational pastime and opportunity for lake residents. Protection of the wildlife habitat in and around the lake is vital to the preservation of the self-sustaining population and biodiversity of wildlife around Lake Vernon. The continued fragmentation of habitat by development will result in loss of this valuable resource.

Significant wildlife habitat areas are locations where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. The Ministry of Natural Resources indicates that specific wildlife habitats of concern may include areas where there are:

- Seasonal concentrations of animals (deer, heronries, waterfowl concentration areas);
- Animal movement corridors;
- Rare or specialized habitats and centres of diversity; and
- Habitats of species of conservation concern (provincially rare plants, reptiles, amphibians and birds, as well as nests of birds of prey such as osprey and red-shouldered hawk).

Within the Lake Vernon watershed, the significant wildlife habitats include winter deeryards and the nesting sites of loons. Due to the lack of wildlife assessments in the Township there are likely other areas that are not currently identified. When new sites are identified steps should be taken to protect them. A large number of the mammals that are resident to Lake Vernon are nocturnal. However, most of these can be seen and enjoyed in the late evening or early morning when they begin or end their active periods. Figure 20 provides a list of the more common mammals that are found in the Lake Vernon watershed:

Figure 20 - List of Common Mammal Families In the Lake Vernon Watershed

Mammal Family	Family Name
Moles	Talpidae
Shrews	Soricidae
Bats	Chiroptera
Rabbits and Hares	Leporidae
Squirrels and Chipmunks	Sciuridae

Mammal Family	Family Name
Flying Squirrels	Sciuridae
Woodchucks	Sciuridae
Beavers	Castoridae
Muskrats	Muirdae
Mice and Vole	Muridae
Porcupines	Erethizontidae
Dogs (wolf, coyote and fox)	Canidae
Bears	Ursidae
Raccoons	Procyonidae
Weasels	Mustelidae
Minks	Mustelidae
Skunks	Mustelidae
Fishers and Martens	Mustelidae
Deer and Moose	Cervidae

Source: National Audubon Society Field Guide, Mammals

4.6.1 White-Tailed Deer

White-tailed Deer are numerous around Lake Vernon and in particular on the west side of the lake where the Stisted Deer Yard occurs (see Map 13 – Wetlands and Deer Habitat).

In the winter, deer usually travel to their traditional winter yards. These yards are normally in areas having heavy coniferous tree cover, or areas that typically have low snow levels and provide protection from the harsh winter winds and cold. Diet for White-Tailed Deer in winter usually consists of twigs, and branches found in the immediate area of the deeryard. At this time, deer usually prefer to browse on cedar, hemlock, maple, birch, oak and cherry trees. The Ministry of Natural Resources District Land Use Guidelines (DLUG) has identified the Stisted Deer Yard as a significant deer wintering area. The Stisted Deer Yard contains suitable conifer cover and sources of food that have traditionally supported deer populations through the winter season. It is the intent of the MNR to maintain wintering areas and their management strategy is as follows:

- The district will manage deer yards for the purpose of providing habitat conditions suitable for the survival of deer;
- All activities within deeryards on Crown land will be consistent with the requirements of winter deer populations;
- The district will encourage the management of deer yards on private lands consistent with the requirements of winter deer populations; and
- No further disposition of Crown rights will occur, except for mineral exploration and development as provided for in the DLUG.

In the spring to fall periods the deer roam over a larger expanse in search of food. During these seasons, a considerable amount of a deer's time is spent "fattening" itself up in preparation for winter. They have developed a particular fondness for food grown by humans, as anyone who attempts to grow vegetables in the region is aware. Winter is a significantly greater challenge for deer in years when the snow cover is deep, as winter food is limited to above snow level twigs and

branches. Accordingly, it is important to maintain as much natural vegetation on the properties in the Lake Vernon region in order to maintain a healthy deer population. Development must be controlled to the extent that the dense conifer forests are maintained to provide the winter habitat needed for the area deer herd. Trees and shrubs should be maintained on a significant portion of the surrounding lands in order to ensure a continual supply of browse. Rural and waterfront lots must be maintained at a large enough size to ensure adequate forested area for the existing deer population.

The protection and management of wildlife habitat is fundamental to the maintenance of self-sustaining populations of wildlife, and to biodiversity. The fragmentation of wildlife habitat through indiscriminate development will result in the loss of wildlife opportunities, such as recreational viewing that is important to the lake stakeholders.

Observations – White-Tailed Deer

- **Lake Vernon has a significant deer concentration area called the Stisted Deeryard.**
- **Property development and wood lot clearing can reduce wildlife habitat, including deer cover and winter browse areas.**

Recommendations – White-Tailed Deer

50. Encourage municipalities to include Official Plan policy and Zoning By-law provisions to protect deer winter habitat. A minimum standard for new lot creation of 90 m x 90 m is promoted by the MNR.

51. Encourage municipalities to consider the use of site plan control and tree cutting by-laws to regulate the cutting of vegetation important to wintering deer.

4.6.2 Loons

The Common Loon is the provincial bird of Ontario and it would be difficult to imagine Lake Vernon without nesting loons. Unfortunately, this could become an unacceptable reality unless the residents of the lake ensure that proper loon habitat and conditions are maintained. Loons prefer lakes surrounded with forest and rocky natural shorelines that offer an abundance of bait fish for their diets.

Loons nest along the riparian zone and are susceptible to shoreline development and wave action. Preferred loon habitat includes small islands and bogs that are characterized with flat shorelines with gentle inclines to permit easy access to and from the nest. Loons commonly arrive on the lake in mid to late April, as soon as the ice is out, and return to the south in November. Loons lay their eggs as soon as the ice is out and they usually hatch in early July.

The Canadian Lakes Loon Survey (CLLS) web page indicates that "the legs of loons are placed far back on the body, making loons powerful swimmers but virtually helpless on land. Nests are typically built right at the water's edge for ease of access and to provide a quick escape from perceived danger. Cottages built close to the shore displace loons from their traditional nesting sites. Also, power-boaters often unknowingly run down buoyant loon chicks, panic parents and disrupt care and feeding of young, or create wakes that wash loon eggs out of nests. "

Loons rely on an abundant supply of baitfish in a lake for their diets. Maintaining clear, uncontaminated water in a lake allows the loons to use their abilities with ease to hunt and seize baitfish in Lake Vernon. A few decades ago the loon population in Ontario was threatened due to the increasing presence of toxic chemicals in the water such as DDT. The consumption of fish contaminated with DDT, affected the loon's ability to lay normal, viable eggs. With the severe restrictions placed on the use of DDT, loons are now regaining their health and this danger, for the present, seems to have passed.

According to a scientific paper released in 1983, "the reduction in nest success near cottages and the higher level of activity around nests in developed areas certainly suggest that the most probable cause of failure is associated with human activity. Hatching success declines as the number of cottages within 150 metres of the nest increased".

Loons are sensitive to disturbance, which can cause nest abandonment and possibly death of their young. MNR's forest management guidelines generally require a 150 metre reserve from the nest tree or colony with specific timing of operations for Great Blue Herons and Raptors, however, there are currently no restrictions required for Loon nesting sites.

Observations – Loons

- **There are loons nesting on the shores of Lake Vernon and it is important to maintain their habitat.**

- **Loon populations generally declined a few decades ago due to DDT, but is now beginning to rejuvenate.**

Recommendations – Loons

52. Identify known nesting sites in the Official Plan and Zoning By-law with appropriate development restrictions to protect them from incompatible development and activity.

53. Conduct a loon nest survey to confirm the location of other sites. Participate in the Canadian Lakes Loon Survey program.

54. Obtain additional information to promote awareness and educate lake users.

4.7 Vegetation

The naturally occurring vegetation found in the water and on the uplands adjacent to a lake is important to maintaining the health of a lake system. In addition to the natural beauty, vegetation is vital to the health and abundance of fish and wildlife in and around a lake. Over the years, development of Lake Vernon has gradually resulted in the decrease of this vegetation, which may have a negative impact on the fish and wildlife population.

A lake consists of three vegetation zones: the littoral zone – the shallow coastal area of a lake; the riparian zone – the first 10 meters inland from the shoreline; and the upland zone – the area beyond the riparian zone. Each of these areas provides vegetation that is important to the health of a lake. The importance of vegetation is also discussed in other sections of the Lake Plan.

Upland Vegetation – The upland vegetation around Lake Vernon consists predominantly of a tolerant hard maple forest. Figure 21 provides a list of the common tree species found in the vicinity:

Figure 21 – Upland Vegetation Species

Common Name	Latin Name
Trembling Aspen	Populus tremuloides
Largetooth Aspen	Populus grandidentata
Balsam Poplar	Populus balsamifera
White Elm	Ulmus Americana
White Ash	Fraxinus Americana
Black Ash	Fraxinus nigra
Green Ash	Fraxinus pennsylvanica
Balsam Fir	Abies balsamea
Beech	Fagus grandifolia
Black Cherry	Prunus serotina
White Spruce	Picea glauca
Black Spruce	Picea mariana
Red Spruce	Picea rubens
Eastern White Cedar	Thuja occidentalis
Eastern Hemlock	Tsuga Canadensis
Sugar Maple	Acer saccharum
Red Maple	Acer rubrum
Striped Maple	Acer pensylvanicum
Silver Maple	Acer saccharinum
Red Pine	Pinus resinosa
White Pine	Pinus strobus
Red Oak	Quercus rubra
Bur Oak	Quercus macrocarpa
White Birch	Betula papyrifera
Yellow Birch	Betula alleghaniensis
Tamarack	Larix laricina
Basswood	Tilia Americana

Common Name	Latin Name
Pin Cherry	Prunus pensylvanica
Cottonwood	Populus deltoids
Ironwood	Ostrya virginiana
Hawthorn	Crataegus spp.
Staghorn Sumac	Rhus typhina

Riparian and Shoreline Vegetation – Vegetation in these shore and near-shore regions, known as emergent vegetation, provides an important mixture of plants, shrubs and trees that together create a complex web of roots and foliage that knits the waterfront together. Natural shores provide an effective and inexpensive form of erosion control. Accordingly, it is imperative that this critical region of vegetation be disturbed as little as possible. A natural mix of native shrubs, trees and plants provides a buffer between lawns and the lake that is critical to the health of a lake. Emergent vegetation common in these zones is shown in Figure 22.

Figure 22 – Emergent Vegetation

Common Name	Latin Name
Sedges	Carex spp.
Pickerelweed	Pontederia cordata
Arrowheads	Sagittaria spp.
Burreeds	Sparganium spp.
Cattail	Typha latifolia
Speckled Alder	Alnus rugosa
Choke Cherry	Prunus virginiana
Pussy Willow	Salix discolor
Slender Willow	Salix petiolaris
Red Osier Dogwood	Cornus stolonifera

Littoral Vegetation – The vegetation found in the shallow, calm waters of the littoral zone, known as submergent vegetation, provides not only a buffer to assist in erosion control but a virtual fast food outlet for fish, wildlife and amphibians. The vegetation in this zone provides a foraging area for fish, ducks and amphibians, and spawning and nesting areas for perch, bass and Northern Pike. The plants in this area act like the lungs of the lake, by converting sunlight into food and releasing oxygen in the process. Submergent plants are indicated on Figure 23.

Figure 23 – Submergent Vegetation

Common Name	Latin Name
White Water Lilies	Nymphaea odorata.
Yellow Pond Lilies	Nuphar variegatum
Water Shield	Brasenis schreberi
Pondweeds	Potamogeton spp.
Wild Celery	Vallisneria americana
Water-milfoils	Myriophllum spp.
Smartweeds	Polygonium spp.

Common Name	Latin Name
Horsetails	Equisetum spp
Pickerelweed	Pontederia cordata
Common Bladderwort	Utricularia vulgaris

Map 12 (insert at back of report) was prepared by the District of Muskoka Planning Department to indicate the level of disturbance of the natural vegetation along the entire shoreline and adjacent backlot (land within 20 metres of the shoreline) of Lake Vernon. The map also indicates the location of shoreline structures, and natural areas. This map can be used to identify areas where yards have been landscaped and shoreline buffers have been removed. These areas should be a priority for natural regeneration programs.

Generally, Lake Vernon's shoreline and backlot area is in excellent shape; only 10% of the shoreline and 20% of the backlot has been altered. Figures 24 and 25 indicate the percentage of natural and altered shorelines and backlots.

Figure 24 – Percentage of Natural and Altered Shorelines

Shoreline Types	%
Natural Shoreline	
Beach	4
Forest	33
Mud	1
Rock	22
Wetland	30
Total Natural Shoreline	**90**
Altered Shoreline	
Beach	2
Shore wall	8
Total Altered Shoreline	**10**

Source – District of Muskoka

Figure 25 – Percentage of Natural and Altered Backlot

Backlot Types	%
Natural Backlot	
Forest (coniferous, deciduous, mixed)	73
Rock	2
Wetland	5
Total Natural Backlot	**80**
Altered Backlot	
Yard (landscaped)	1
Yard (buffered)	8
Yard (unbuffered)	11
Total Altered Backlot	**20**

Source – District of Muskoka

Observations – Vegetation

- **Shoreline vegetation is important for water quality and for fish and wildlife habitat.**

- **Structures on the shoreline such as boathouses, docks and man-made beaches have only minimally replaced or altered natural shoreline vegetation.**

Recommendations – Vegetation

55. *Municipal planning documents should incorporate policy to protect upland, riparian and littoral vegetation.*

56. *Programs should be developed to educate, assist and encourage landowners to protect and restore shoreline vegetation, where warranted.*

57. *The use of indigenous plant and tree species should be promoted. Local nurseries and landscaping businesses should be encouraged to stock local plants and trees.*

4.8 Exotic Species

The introduction of exotic species affects the natural balance of ecosystems in any lake. To date there have been no records of the invasion of Zebra Mussels, however, Ontario Federation of Anglers and Hunters (OFAH) have indicated that Spiny Water Fleas were found in Vernon, Peninsula, Fairy and Mary Lakes in 1991.

The spiny water flea was introduced into the Great Lakes from Europe in the early 1980's. The Spiny Water Flea competes with natural fish species by feeding on zooplankton, altering the lake's food chain. The best defense against this organism is to restrict its movement between waterbodies, for once they are present in a lake there is no known way to eradicate them.

In the late 1970's or early 1980's there was an unauthorized introduction of pike into Lake Vernon. Northern Pike are aggressive and a competitor for the food sources of resident Lake Trout. Some residents believe that the decline in the Lake Trout population may be attributable to the introduction of pike.

The Lake Vernon Association should continue working with the OFAH to promote awareness about the problems of contamination and how to reduce the likelihood of further invasion.

Observations – Exotic Species

- **Exotic and non-native species such as the spiny water flea and Northern Pike have already invaded Lake Vernon.**

Recommendations – Exotic Species

58. *Educate lake users about the presence and control of spiny water flea and other exotic species. Post signs at all public access points warning boaters about the proper requirements for controlling the invasion of exotic species.*

59. *Work with other Lake Associations (e.g. Fairy, Peninsula and Mary) within the watershed to create a comprehensive program for connected lakes.*

60. *Educate property owners as to the risks of introducing new fish species into any bodies of water in the watershed.*