The Muskoka Watershed

REPORT CARD

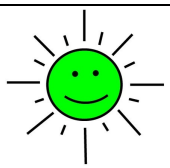
Background Report #7

Our Land

Muskoka
WATERSHED COUNCIL

July 2004

OUR LAND

Indicator	Are We Happy?	Trend
Sufficient amounts of protected land to maintain healthy ecosystems.		
Large natural areas with connecting corridors.		
Quality natural habitat		?
To maintain the naturally forested environment.		
Naturally vegetated shorelines and adjacent areas.	 	
Wetlands are adequately protected.	 	?

Protected Areas

Why are protected areas important?

Protected areas achieve a range of objectives, including protection of natural and cultural heritage values, and the provision of opportunities for outdoor recreation and tourism. Key values identified by the residents of Muskoka through the public consultation session held by the Muskoka Watershed Council in 2003 were the spiritual and intrinsic values they provide. [1] The level of protection for land varies based on ownership and policy direction, with ownership being the highest level of protection and financial and policy protection being secondary options.

What is the current state of protected areas in Muskoka?

Tables 1a and 1b detail the amount and level of protected land across Muskoka. Approximately 40% of Muskoka is Crown land and is subject to minimal threats from development, although forestry, mining, pits and quarries and access roads may be allowed on these lands. In the 1990s, the Ontario government undertook a program to identify protected areas and complete the provincial park system. Ontario's Living Legacy program increased the amount of protected

[1] Muskoka Watershed Council, *Indicators Report*, 2003, unpublished

lands in Muskoka by approximately 8%, including 18 new Conservation Reserves and two new provincial parks.[2] In areas identified as Conservation Reserves, roads, mining, logging and hydro-generation are not permitted.

Almost 12% of land in Muskoka comes under some level of protection, as a result of ownership by a conservation minded organization (see Table 1a). Unfortunately, the distribution of those lands leaves large areas of Muskoka vulnerable to environmental deterioration.[3] An additional 35% of Muskoka benefits from some level of policy protection (see table 1b), however the strength of that protection is dependant on the implementing body and may very over time as circumstances change.

Map 1 illustrates the distribution of protected lands in Muskoka and clearly demonstrates that lands in the Township of Georgian Bay, and the southern portion of the Township of Muskoka Lakes and Town of Gravenhurst have a high level of protection with the majority of the new Conservation Reserves and a portion of the new Queen Elizabeth II Provincial Park. Bracebridge and Huntsville have fewer properties owned by conservation minded organizations although there are a significant number of properties that are managed under the Managed Forest Tax Incentive Program. Many of these properties are not connected however, and effort should be made to ensure proper wildlife corridors are maintained. The eastern portion of the Town Bracebridge and Township of Lake of Bays benefits from a level of policy protection as a result of the Crown land in the area.

Table 1 a
Protected Area (Ownership) in Muskoka

	% of Muskoka
Ownership	
Provincial Park	2.89
Conservation Reserve	7.41
National Park	0.28
Nature Conservancy of Canada	0.11
Muskoka Heritage Trust	0.08
Georgian Bay Trust	0.01
The Mable Hart Brook Property	0.04
Tadenac Club	0.32
Total	11.14

[2] Province of Ontario, *Ontario Living Legacy Land Use Strategy.* 1999, Queen's Printer for Ontario
[3] 12%-protected land is a recognized standard used by the World Wildlife Fund.

Table 1 b
Protected Area (Policy and Financial) in Muskoka

Management	
Crown Land - certified	17.94
Private Land - certified	.82
Incentive Programs	
Managed Forest Tax Incentive	8.74
Policy Protection	
Provincial wetlands and Muskoka Heritage Areas wetlands	1.55
Other Heritage Areas	5.72
Total	34.77

Forested Environment

Why is it important to have natural forested areas?

The ecological services of forests are many. Direct benefits from forests include timber production, fuelwood, tourism and recreation activities, and research and education opportunities. In addition, forests regulate local and global climate, ameliorate weather events, regulate the hydrological cycle, protect watersheds and their vegetation, water flows and soils, and provide a vast store of genetic information, much of which has yet to be uncovered.

While scientists debate the linkages between biological diversity and ecological services, many scientists argue that any ecosystem, forests included, cannot cope with stresses and shocks if the diversity of the system has been reduced. Natural forests provide this biodiversity and stability. On balance, it is very likely that uniform systems are more vulnerable: diversity matters for ecosystem performance.

What is the current state of Forests in Muskoka?

Muskoka enjoys being the first contiguous forested municipality as you travel north from the GTA. As one flies over Muskoka you see forests, open rock barrens and lakes. These natural attributes are the basis of the tourism, recreation and forestry based economy of the area. Using satellite imagery, it was determined that an average 98 % of each watershed or sub-watershed in Muskoka remains forested or has been reforested after the intense logging operations that took place in the early part of the last century. Table 2 summarizes 'forest cover' by watershed.

Table 2
Forest Cover by Watershed

Watershed	% Altered	% Unaltered
Fairy Lake	2.71	97.29
Lake of Bays	0.88	99.12
Peninsula Lake	4.34	95.66
Three Mile Lake	3.49	96.51
Kawagama Lake	0.13	99.87
Oxtongue Lake	0.62	99.38
Go Home Lake	1.27	98.73
Lake Vernon	2.06	97.94
Black River	5.13	94.87
Kahshe Lake	3.3	96.7
Morrison Lake	1.53	98.47
Mary Lake	3.11	96.89
Skeleton Lake	1.18	98.82
Lake Rosseau	1.87	98.13
Lake Joseph	2.28	97.72
Lake Muskoka	2.77	97.23
Moon River	2.75	97.25
Musquash River	0	100
Gibson River	0	100
Go Home River	0	100
Barron's Lake	0	100
Gibson Lake	1.05	98.95
McCrae Lake	2.18	97.82
Average	1.85	98.15

Source: Ministry Natural Resource Ontario Forest Assessment Technology (OFAT),

Shorelines and Adjacent Areas

Why are shorelines and adjacent areas important?

The transition from the natural high water line to upland vegetation has been referred to as the 'Ribbon of Life' and is essential to the survival of the lake. Bilby (1988), in discussing the major interactions between aquatic and terrestrial ecosystems, says that upland and aquatic systems are intricately interconnected physically, chemically and biologically. Trees and plants regulate the outflow of lakes, prevent soil erosion, and protect the lake from siltation and over fertilization.

The naturally vegetated shoreland supports a wide variety of plant and animal life including plants of all kinds, soil organisms, insects, reptiles and mammals. There is a balance between the lake and the land. Much of the land energy for the food chain of the lake is derived from the terrestrial plants and animals of the shore. The shoreline produces the ultimate "Edge" effect

upon which 70% of land-based animals and 90% of the aquatic plants and animals rely (Kipp and Callaway, 2003).

Development around lakes has resulted in the removal of trees, shrubs and other protective vegetation and an increase in the amount of impervious area in the lakeside landscape. Native vegetation, with its deep root systems and natural duff layer, acts like a sponge to hold stormwater runoff and associated nutrients. Impervious surfaces result in more stormwater running directly into the lake. Stormwater runoff picks up non-point source (NPS) pollutants such as soil sediment, nutrients and chemicals that can be detrimental to lake water quality. NPS pollution that enters lakes affects the nutrient balance of the water and creates a bottom habitat ideal for aquatic plants to root. It can cover fish eggs and habitat as well. Maintenance and restoration of shoreline vegetation and revegetation allow native plants to fill in the shoreland zone and will increase biodiversity, wildlife habitat and protect property values.

Shoreline buffers perform a broad range of functions with significant economic, ecological and social value to people. Most researchers generally acknowledge the following functions of shoreline vegetation. The specific list has been modified from the North Carolina Department of Environment and Natural Resources Bulletin entitled *Riparian Buffers for the Catawba Mainstream and Lakes.*

1. *Filters runoff.* Rain that runs off the land can be slowed and infiltrated by shoreline vegetation, which helps settle out sediment, nutrients and other pollutants before they reach waterbodies.
2. *Protects bank from erosion*. Tree roots hold the bank soils together and stems protect banks by deflecting the cutting action of currents, waves, boat wakes, and stormwater.
3. *Absorbs Nutrients.* Tree roots take up nutrients from fertilizers and animal waste that originate on land. Phosphorus and nitrogen are stored in leaves, limbs and roots instead of reaching the lake. Phosphorus is the main nutrient of concern in the lakes of Muskoka. There are three mechanisms of phosphorus removal by shoreline vegetation:
    a. Deposition of phosphorus with sediment;
    b. Adsorption of dissolved phosphorus on to sediment particles; and
    c. Uptake of phosphorus by vegetation.
4. *Performs effective flood control and stormwater management*. Slowing the velocity of runoff, the shoreline vegetation allows the water to slow and recharge the groundwater supply. Groundwater enters the stream at a much slower rate and over a longer period of time than water that has traveled as surface water. This helps control flooding and maintains stream flow during the driest times of the year.
5. *Provides canopy and shade.* Shading by lake vegetation can moderate water temperature along the shoreline, providing relief for aquatic life in the hot summer months.
6. *Provides food and habitat for wildlife.* Leaves and woody debris fall into a lake or river where they provide food and habitat for small bottom-dwelling creatures that are critical to the aquatic food chain. Shoreline vegetation also offers habitat for many animals, including songbirds, foxes, loons, turtles and amphibians. This habitat provides linkages between natural areas and acts as a migration corridor for a wide variety of plants and animals.

7. *Protects property values.* Using shoreline vegetation to setback development and land uses from the shoreline is a cost effective way to protect many of the natural features and water quality that are an essential component in establishing the market value of a lakefront property.

   A new study of lakes in north-central Minnesota shows that clear water can boost the value of lakeshore property (Krysel et al 2003). The study notes that mowing to the water's edge with sloping land, removing emergent vegetation, rip-rapping heavily, loading the riparian zone with docks and lifts after removing indigenous vegetation makes the property environmentally vulnerable.

8. *Provides aesthetic value.* Lakeside property owners often have varying opinions about what constitutes "appropriate" shoreline landscaping. However, most will agree that "natural " is better than "artificial". Even a narrow strip of vegetation can enhance the view from across the lake.

What is the current state of the shoreline and adjacent lands?

In 2002, Muskoka began a survey of shoreline use on lakes across the District. The survey consists of mapping shoreline structures such as docks and boathouses, alterations at the waters edge and land use in the first 20 metres adjacent to the water. Currently, thirteen (13) lakes have been surveyed. Table 3 indicates that on average, 81% of the shoreline and adjacent lands has been preserved in its natural state, with approximately 87.7% of the shoreline itself maintained in a vegetated state.

Table 3
Shoreline Survey

Lake	Land Adjacent to Waters Edge		Water's Edge		Number of Structures
	% Altered	% Natural	% Altered	% Natural	Number
Bella	16.67	83.33	6.76	93.24	100
Brandy	18.85	81.15	4.64	96.04	137
Fox Lake	25.3	74.7	4.4	96.6	58
Lake Joseph			11.79	88.21	1622
Lake Muskoka			15.66	84.34	5636
Lake Rosseau			13.17	86.83	2041
Muldrew	7.00	93.00	2.74	97.26	493
Muskoka River	43.59	56.41	33.86	66.14	355
Rebecca	16.62	83.38	3.71	96.29	98
South Bay	25.41	74.59	8.01	91.99	180
Vernon	19.98	80.02	10.13	89.87	368
Vernon - Hunters Bay	63.04	36.96	39.72	60.28	105
Waseosa	25.4	74.6	6.44	93.56	166
Average	26.19	73.81	12.26	87.74	874
Combined average	80.78				

Source: District of Muskoka Shoreline Inventory Program

Several Area Municipal Official Plans encourage the retention of shoreline vegetation and limit active shoreline use to 25% of the water frontage. As the average active shoreline area today, that being the area where vegetation has been removed, is only 15 to 20% of the shoreline, a standard of 25% active use area per lot may result in a significant loss of existing shoreline vegetation.

Habitat Fragmentation

Why is it important to limit habitat fragmentation?

Habitat fragmentation can have negative and often irreversible effects on local environments, especially when associated with human development. In particular, the following specific issues arise when a forest becomes fragmented.

1. *Reduction of total habitat area*. When habitat is reduced to smaller and smaller patches, there is less overall habitat as well as less diversity in habitat types. A reduced amount of habitat supports correspondingly smaller populations of wildlife, as well as fewer species.

2. *Edge habitat*. When a habitat is fragmented, the amount of edge habitat increases at the expense of interior habitat. Species dependent on interior habitat suffer, while edge-dependent species, including invasive species and predators, thrive. Highly fragmented forests cannot provide the food, cover, or reproduction needs of interior forest species. Predators such as crows and raccoons and nest parasites like the brown-headed cowbird find target nests more easily in edge habitats. Woodland-dependent bird species, even though they are found in nearby woodland areas, often avoid smaller fragments.

3. *Woodland size is also important*. Smaller forests usually support a lower diversity of forest-dwelling species and proportionally fewer numbers of each species due to edge effects, which can extend from 100 to 300 metres into the forest. Patches of 200 hectares are considered the minimum size for a forest ecosystem to recover from disturbance events such as wind-throw, fires, or insect and disease infestations.

4. *Vulnerability during movement among patches*. As a habitat becomes fragmented, patches become separated from one another by relatively inhospitable terrain. Wildlife attempting to cross between patches becomes temporarily vulnerable to predators, harsh environmental conditions, or starvation.

5. *Isolation of a population*. Both plant and animal populations can become isolated within a patch when surrounding patches of habitat are destroyed. Migration or movement becomes difficult and hazardous. Isolated populations are prone to decline due to inbreeding, swings in numbers due to over-exploitation of habitat, and sudden removal from the patch due to disturbances such as fire, wind damage, or insect or disease infestations.

6. *Vulnerability to external competition and predation*. If prey species wander too close to the edge of protective habitat, predators can take them. Some species may be excellent competitors deep within their own specialized habitat, but less successful against those species found at the edge of their habitat.

7. *Flow of genetic material throughout the landscape.* Wildlife should be able to move freely from one forest patch to another. This movement allows for interbreeding, creating genetically stronger populations and ensuring that suitable habitats can be filled. In a fragmented forest landscape, large distances between woodlots may prevent this movement and are an impediment for migrating wildlife. For this reason, corridors between isolated patches can help wildlife by providing routes through which they can travel. Corridors also benefit plants, making seed dispersal and establishment into new areas easier. While even narrow hedgerows can help create linkages between fragments, corridors of 100 to 200 metres or greater are considered more effective.

What is the current state of habitat fragmentation in Muskoka?

Habitat fragmentation occurs when large, continuous forests are divided into smaller blocks, either by roads, clearing for agriculture, urbanization, or other human development. Roads are the single most common impediment that leads to habitat fragmentation. Roads are long and linear and increase species mortality as individuals move from site to site. Establishing a threshold road density above which there is a significant impact on a species, will vary for the species being considered. For example, studies suggest road densities beyond 580 m/km^2 are problematic for wolfs (David, 1989) and beyond 1250 m/km^2 are detrimental for black bear populations (Jalkotzy et. al, 1998). A suite of thresholds should be established for the analysis of these data from a multi-species perspective.

Birds are a good indicator of forest fragmentation because they are easy to monitor and are sensitive to the loss of interior forest habitat. Ornithologists suspect that fragmentation harms many woodland birds by increasing their susceptibility to predation and nest parasitism.

Large undisturbed natural areas are necessary for many native species to Muskoka such as ovenbirds, red-shouldered hawks, (provincially vulnerable), and many warblers. Habitat fragmentation is a significant factor in determining the quality of habitat, with roads being the principal land use fragmenting natural areas. In Muskoka, there are several levels of roads with varying degrees of impact on habitat fragmentation. Divided Provincial highways such as Highway 11 and 400 pose considerable barriers to most animal migration; however, even Muskoka Roads, such as Muskoka Road 5 in Honey Harbour, result in significant road kill. Table 4 provided a preliminary and very coarse summary of road density by Area Municipality and road type. Table 5 summarizes the reptile sightings and mortality along a 10-kilometer stretch of Muskoka Road 5 during the summer of 2003.

Table 4
Road Density

Road Type	Bracebridge m/km2	Gravenhurst m/km2	Georgian Bay m/km2	Huntsville m/km2	Lake of Bays m/km2	Muskoka Lakes m/km2	Muskoka m/km2
Private	158	229	156	113	141	158	156
Township	642	464	120	553	298	455	408
Muskoka	23	206	83	198	131	228	147
Province	56	49	64	154	60	45	71
Other				11			2
Total	879	947	423	1029	629	886	784

Source: District of Muskoka

In planning for the long-term development of Muskoka, attention should be paid to protecting large areas of undeveloped land that can support the native species of the area.

Table 5
Results of Road Survey
Muskoka Road 5 - 2003

Reptile Species	Alive on Road	Dead on Road	Total
Eastern Garter Snake	15	100	115
Northern Water Snake	1	14	15
Painted Turtle	5	9	14
Northern Brown Snake	2	10	12
Northern Redbelly Snake	-	1	1
Snapping Turtle	1	-	1
Eastern Milksnake	-	12	12
Eastern Foxsnake	-	8	8
Northern Ribbonsnake	1	4	5
Massasauga Rattlesnake	-	1	1
Eastern Hognosed Snake	-	1	1
Blanding's Turtle	-	1	1
Stinkpot Turtle	1	-	1
TOTAL	**26**	**161**	**187**

Source: Georgian Bay Islands National Park, *State of the Park Report, 2004*

Explanation:
- 10km stretch of road from hwy 400 to Honey Harbour
- Road driven one return trip per day from April 15th -October 31st
- Only reptiles were recorded
- 86.1% of all observations were dead on road (DOR), 13.9% alive on road (AOR)
- 16.8% (27) of DOR observations were Species at Risk (shaded in gray)

Wetlands

Why are wetlands important?

Wetlands are essential ecosystems and parts of ecosystems. Wetlands do not function in isolation and require the physical, hydrological and biological interaction with the surrounding lands in order to continue to function and provide the benefits noted below. In conjunction with the surrounding land, wetlands are part of regional hydrological systems that help control surface water flow, purify the water and maintain soil moisture levels. Wildlife that rely on the wetland also live in the upland area for a portion of their life. Many endangered species rely on

both the wetland and the surrounding land for all or a portion of their life cycles. Therefore, in order to ensure the continued functioning of wetland environments, consideration must be given to the wetland and the surrounding land as changes are proposed.

Wetlands and the area that surrounds them provide continuous, sustainable environmental, economic and social benefits that contribute to the high quality of life in Muskoka. For convenience, wetland values are generally grouped into biological, hydrological and socio-economic benefits; however, many of the values contribute to all three broad categories.

Wetlands and their surrounding area:

- Are important for the control and storage of surface water and the recharge and discharge of groundwater;
- Maintain and improve water quality, aid in flood control, and protect shorelines from erosion;
- Trap sediments which would otherwise fill watercourses;
- Support and initiate complex food chains which are ultimately essential for a broad spectrum of living organisms, including humans;
- Provide important habitat for a wide variety of plants and animal species;
- Immobilize some contaminants and nutrients;
- Reduce other contaminants to less damaging compounds;
- Assist in maintaining water quality in adjacent lakes and streams that support fish populations;
- Provide valuable resource products such as timber, fish and wild rice on a sustainable basis;
- Contribute substantial economic and social benefits to the municipality through trapping, hunting, fishing and outfitters; and
- Provide active and passive recreational opportunities, including canoeing, bird watching, hunting and fishing.

What is the current state of wetlands in Muskoka?

Relatively few wetlands in Muskoka have been evaluated. As development pressure continues, it is important to identify and evaluate wetlands in order to ensure that appropriate consideration is given to the protection of the function and values of the wetland through the development process. Given the size and nature of Muskoka, it is unreasonable to assume that a significant number of full wetland evaluations will be undertaken in anticipation of future development. In recognition of this situation, Muskoka supported the work being undertaken by Ducks Unlimited and the Ministry of Natural Resources to develop a remote sensing system to identify wetlands, as well as, a computer-based model to evaluate them. Once available, this model will provide a preliminary assessment of wetlands and give a general indication of their significance. The information provided through this process should be incorporated into Official Plan policy as a constraint to development. Those areas that demonstrate a high potential to be provincially significant should be evaluated in the field prior to proceeding with development.

In the early 1990s, the District of Muskoka undertook a program to identify significant habitats across the region. Twenty-three wetlands were identified, of which fifteen were later evaluated by the Ministry of Natural Resources. Thirteen wetlands were determined to be of provincial significance and two of regional significance[4]. The province has not yet evaluated the remaining eight wetlands.

[4] District of Muskoka, Heritage Areas Program, 1994

In addition to the fifteen wetlands identified by Muskoka for provincial evaluation, the Ministry of Natural Resources has identified six wetlands as being of provincial significance. In total, there are twenty-one wetlands in Muskoka which have been evaluated by the MNR using the Ontario Wetland Evaluation System, Northern manual (1993).[5] Table 6 summarizes the pertinent data for the wetlands that have been evaluated.

Table 6
Studied Wetlands in Muskoka

Wetland Name	Heritage Area	PSW	% Crown Land	Wetland Size (hectares)
Axe Lake Peatland	x	yes	65% CR	1570
Bala Bog	X	N/A	0	425
Big East River Delta	x	yes	0%	297
Boyne River		yes	1%	193
Bruce Lake Marshes	x	yes	0%	175
Concession Lake	x	N/A	30%	340
Cooper's Pond	x	no	20%	570
Dwight Conifer Peat Forest	x	no	0%	115
Ellison Bay Wetland (part of Sparrow Lake Wetland)	x	yes	0%	75
Fawn Lake Wetland	x	yes	0%	400
Jevins Lake	x	yes	10% CR	188
Lassetter Lake		no	0%	39
Lewisham Wetland	x	yes	85% PP	640
Loon Lake Wetland	x	yes	75% CR	550
Lost Channel	x	N/A	95% CR	45
Martin's Siding		yes	3%	142
McLean Bay Wetland Part of Sparrow Lake Wetland)	x	yes	0%	65
Morrison Lake Wetland	x	yes	20%	425
Novar Conifer Peat Forest	x	yes	2%	347
Pell Lake		no	0%	66
Pioneer Village Pond		no	0%	6
Port Cunnington Wetland	x	N/A	0%	50
Potato Island	x	yes	10%	240
Quarry Island		yes	0%	47
Shack Creek Wetland	x	yes	65% CR	500
Sparrow Lake		yes	86%	224
Tobies Bay		yes		194
South Three Mile Lake	x	N/A	80%	68
Spring Creek Wetland	x	N/A	0%	402
Wadis Creek Marsh	x	N/A	0%	10

CR means Conservation Reserve PP means Provincial Park PSW means Provincially Significant Wetland

[5] MNR, Wetland Evaluation file

Source: Ministry of Natural Resources.

Key Species

Why are key species important?

The quality of our natural areas can be determined by the species that live there. Every plant and animal requires a unique habitat in which to live, reproduce and thrive. When species become at risk or endangered it is often because their natural habitat has been degraded or destroyed. By monitoring key native species, an indication of habitat quality can be made.

What is the current state of the key species in Muskoka?

Indicator species should be sensitive to change and easy to monitor. For those reasons, several bird species have been identified that will provide some indication of habitat quality. Over time, changes in the location, abundance and breeding success of these species may provide some insight into improvement or deterioration in the habitat upon which they rely. Data on bird populations are collected by volunteers and reported through Bird Studies Canada in the Breeding Bird Atlas. Specific habitat types with indicator species are identified on Table 7 below.

Table 7
State of Key Indicator Species

Habitat Type	Species	State of the Species
Mixed Deciduous Forset	Black-throated green warbler	Warblers are interior forest species that are sensitive to fragmentation. Recent surveys for the Breeding Bird Atlas indicate that all these species are widespread in Muskoka.
	Black-throated blue warbler	
	Blackburnian warbler	
Mature Deciduous Forest	Ovenbird	These birds favour mature deciduous forests. All are found across Muskoka.
	Red-Shouldered Hawk	
	Scarlet Tanager	
Top Predator	Merlin	Numbers are increasing probably as a result of less DDT in the environment.
Aquatic Environment	Loon	Numbers appear to be stable or decreasing slightly as a result of habitat destruction
Fragmented Habitat	Cowbird	Cowbirds are becoming more common as a result of habitat fragmentation.

Source: Breeding Bird Atlas and Al Sinclair, personal communication.

In addition to birds, America marten, white-tailed deer and moose can be useful indicators of forest health.

American marten thrive in older mature forests with plenty of dead standing trees and downed woody material on the forest floor, where they find shelter and forage for the small mammals that they eat. Conversations with trappers and long-time residents of Muskoka suggest that there are more abundant marten populations in recent years compared to earlier in the 1900s due to the general aging of the forest and the succession of old farming attempts back into forest.

Both moose and deer are animals of younger forests. They both feed on the growing tips, succulent shoots and herbaceous growth that are found abundantly in younger forests. Deer populations are affected by winter severity since a series of severe winters can significantly reduce populations. The other limiting factor for deer populations is the presence of the conifer shelter that they require in the winter as protection from the cold temperatures and deep snows of Muskoka. This cover is frequently found as a conifer fringe around lakes, putting deer habitat requirements in conflict with some shoreline cottage development.

In the early spring and summer, moose feed upon submerged and floating aquatic plants found in wetlands and shallow bays of lakes. Unlike deer, moose are not constrained by winter weather in Muskoka, so they do not have the same requirement for conifer cover. A habitat supply assessment of moose habitat in Muskoka shows that the type of forest and the large number of wetland habitats providing good aquatic feeding areas for moose enables quite a high carrying capacity for moose. Aerial moose surveys undertaken by the Ministry of Natural Resources show that moose populations are healthy in Muskoka and are found in high enough densities to support a sustainable hunt.[6]

What are the stresses on Our Land?

There are many stresses on our land that, if left unaddressed, will have a significant negative impact on the ecological integrity of the system. As growth and development occur, a long-term view of Muskoka is required to ensure adequate and sufficient areas are left in their natural state to maintain the natural values identified through the public consultation sessions held by the Muskoka Watershed Council in 2003.

When asked what people feel is the most significant stress on the watersheds in Muskoka, the overwhelming response is development pressure. As our communities grow and our rural roads and waterfront shorelines become lined with development, there is a growing concern that we will lose the very reason we came to Muskoka: the scenic lakes, rocks and trees. Cottages are becoming bigger and used for longer periods during the year; city values with manicured lawns and hardened shorelines are becoming more prevalent and there is an increasing desire for new roads to lakeside areas that have traditionally been water access only. Significant new, space-extensive, development such as golf courses and large plans of subdivision fragment habitat and act as vectors for the introduction of exotic or invasive species.

Other activities can also stress our natural areas:

1. Poor logging practices can lead to destruction of specific habitat or loss of the whole forest. Loggers should be encouraged or required to develop forest management plans that incorporate proper silviculture and wildlife management practices.

[6] Jan McDonnell, MNR biologist, pers. comm.

2. Lack of knowledge and understanding on the part of shoreline residents about the value of shoreline vegetation may result in damage to shoreline habitat and increased erosion.
3. Poor boating practices and the use of personal watercraft too close to the shore can create wakes that erode the shoreline and disrupt waterfowl habitat such as loon nesting areas.
4. Lack of knowledge and understanding about the importance of wetlands may lead to these areas being drained or filled in. The more recent concern with mosquito breeding and the West Nile Virus has also put stress wetlands as more people consider filling or draining wetlands, or using a pesticide to control insect populations. The reduction in the insect population is already starting to affect some insect eating species.

There are activities that occur outside the watersheds of Muskoka that impact the health of our watersheds.

1. The long-range air transport of pollutants such as sulphur and nitrogen oxides results in acid rain, which leaches nutrients, like calcium, out of the soil and stresses tree growth. It will take centuries to rebuild the soils in many parts of watershed.
2. Exotic species that are introduced to the area often out-compete native species, (eg. purple loosestrife, or destroy native plants or animals, such as West Nile virus or the Pine Shoot beetle).
3. General climate change will also stress native habitats as temperatures warm and areas become drier. Climate change currently affects every facet of the natural environment to some extent.
4. The desire for short-term economic gain often leads to decisions that may have long-term environmental consequences. For example, the current high price for hardwood in the United States encourages poor logging practices such as clear cutting or high grading private land. A move toward full cost accounting is required to understand the full consequence of these decisions.

What action can be taken?

A variety of agencies, organizations and individual actions are required to manage our natural areas for future generations.

Land Trusts: Land trusts should be encouraged to focus their efforts for easements, acquisition and protection in areas that have been identified as being under-protected. In particular, the central part of Muskoka that is predominantly private land is vulnerable to environmental deterioration and would benefit from the level of protection offered by various instruments available to Land Trusts.

Strategic Vision: Broad strategic policy direction is required that provides a vision for the build-out of Muskoka. Judging from the input from the public at the Muskoka Watershed Council public consultation sessions in 2003, there is a strong desire to maintain the forested, recreational environment that currently is Muskoka. The vision, therefore, should identify large roadless areas, and ensure that natural functioning corridors and large undeveloped areas are identified and protected over the long term. Such a strategic plan would then be implemented through education, land trust acquisitions, development decisions at the municipal level and best management practices implemented by individual property owners, such as developers of golf courses and large resorts.

Municipal Governments: Municipal governments have the jurisdiction over land use, not only do they need to be involved in developing and implementing a broad strategic vision, but they currently have the ability to implement specific regulations to control development. In particular, the use of fill regulations and a stronger trees bylaw both enacted under the Municipal Act would assist in reducing site-specific damage. Acquiring new development control tools, such as development permit, would also provide municipalities with the ability to control activities that may result in significant environmental damage.

Senior Levels of Government: Decisions and regulations made by senior levels of government can have a significant impact on the local environment. Senior levels of government should be lobbied for

1. Improved financial incentives through property tax programs or charitable donations incentives.
2. Improved legislation requiring proper forest management plans to be filed prior to a logging operation being undertaken.
3. Limiting the exportation of roundwood out of the Province. This will reduce the impact of high lumber prices in the United States and ensure some value added occurs in Ontario.
4. Eliminate coal burning power plants in Ontario and enforce stringent emission controls on other industries that emit high levels of pollutants.
5. More stringent emission controls on vehicles to reduce nitrogen oxides and volatile organic compounds.
6. Tighter control of exotic species at international borders and within the Country. Specifically, it is important that governments understand the environmental cost of allowing ocean-going boats into the upper Great Lakes and increased probability for the introduction of additional exotic species.
7. Legislation to control boat speed and wake.
8. Stronger Provincial policy applicable to Muskoka for the protection of wetlands

Education: Education and stewardship are often the most effective programs to achieve environmental objectives. Education has to start at a young age, through the school system to ensure that future generations value our natural areas, but a program aimed at the general public is also necessary to ensure a continued understanding of natural values and the impact we have on our natural areas. The continued involvement in public education of a number of organizations will be important to achieve behavioural change.

1. The Ministry of Natural Resources, Stewardship Councils, logging companies and logger associations must continue to provide information and training for loggers on silviculture techniques and wildlife management.
2. Information on options for private landowners on land trusts and financial incentives will encourage owners to take advantage of these programs and protect their land.
3. Lake Associations play a pivotal role in developing lake plans and stewardship programs that inform lakefront owners and encourage environmentally sound behaviour.
4. A wide variety of government agencies and non-government organizations must continued develop and distribute educational material that identifies issues and provides environmentally sound alternatives.

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