

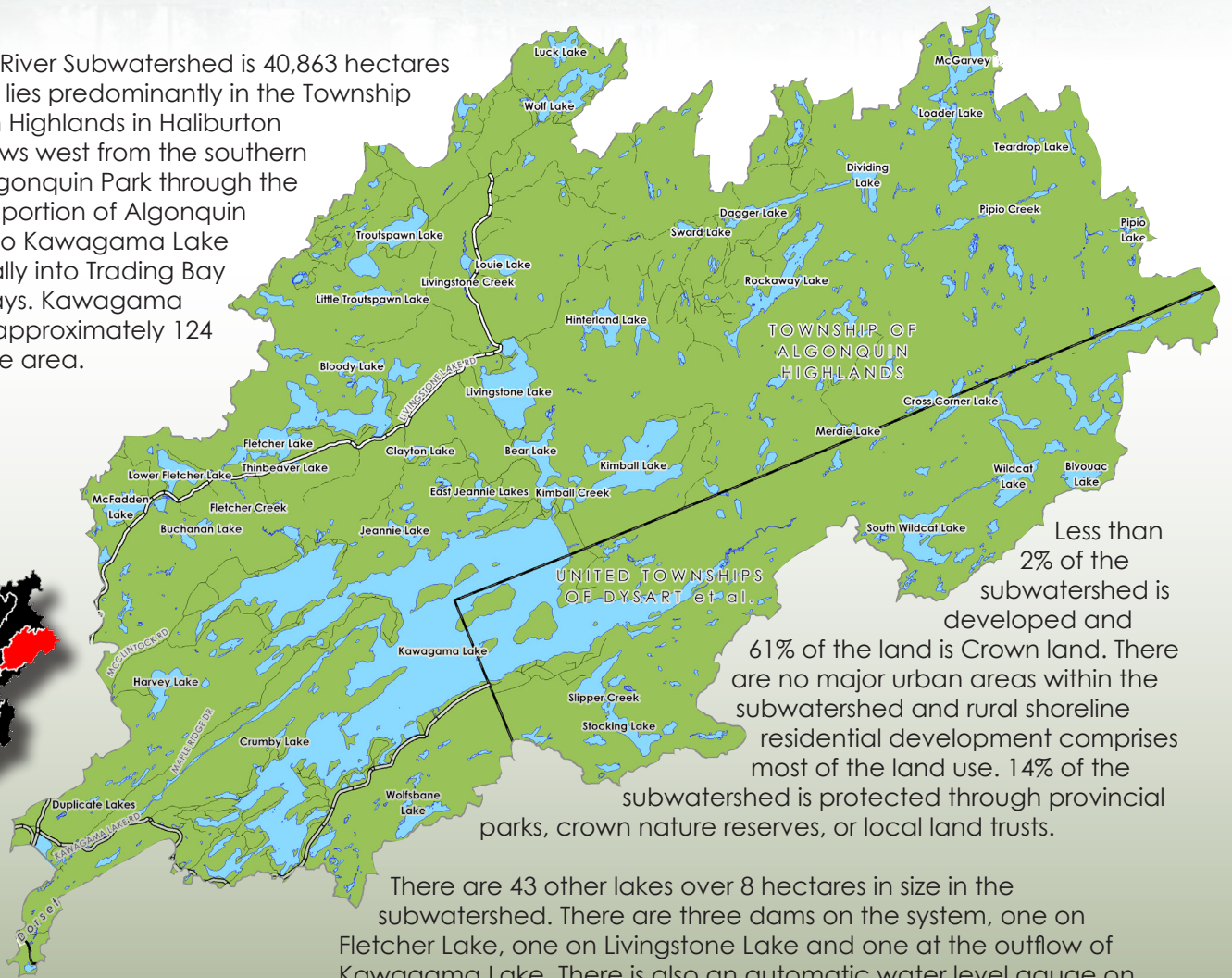
2014 MUSKOKA WATERSHED

REPORT CARD

HOLLOW RIVER SUBWATERSHED

GRADES	
Land	Not Stressed
Water	Not Stressed
Wetlands	Not Stressed
Biodiversity	Vulnerable

The Hollow River Subwatershed is 40,863 hectares in size and lies predominantly in the Township of Algonquin Highlands in Haliburton County. It flows west from the southern portion of Algonquin Park through the Crown Land portion of Algonquin Highlands into Kawagama Lake and eventually into Trading Bay of Lake of Bays. Kawagama Lake itself is approximately 124 km² in surface area.



Less than 2% of the subwatershed is developed and 61% of the land is Crown land. There are no major urban areas within the subwatershed and rural shoreline residential development comprises most of the land use. 14% of the subwatershed is protected through provincial parks, crown nature reserves, or local land trusts.

There are 43 other lakes over 8 hectares in size in the subwatershed. There are three dams on the system, one on Fletcher Lake, one on Livingstone Lake and one at the outflow of Kawagama Lake. There is also an automatic water level gauge on Kawagama Lake.

This report card describes the health of the land, water, wetlands and biodiversity of the Hollow River Subwatershed and is part of the **2014 Muskoka Watershed Report Card** available at www.muskokawatershed.org.

Stewardship Works!

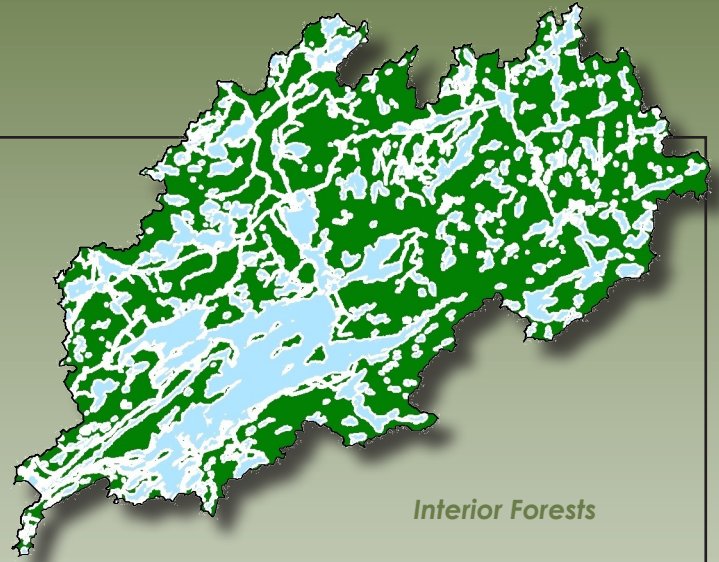


Muskoka
WATERSHED COUNCIL

Land:

- ✔ Not Stressed
- Vulnerable
- Stressed

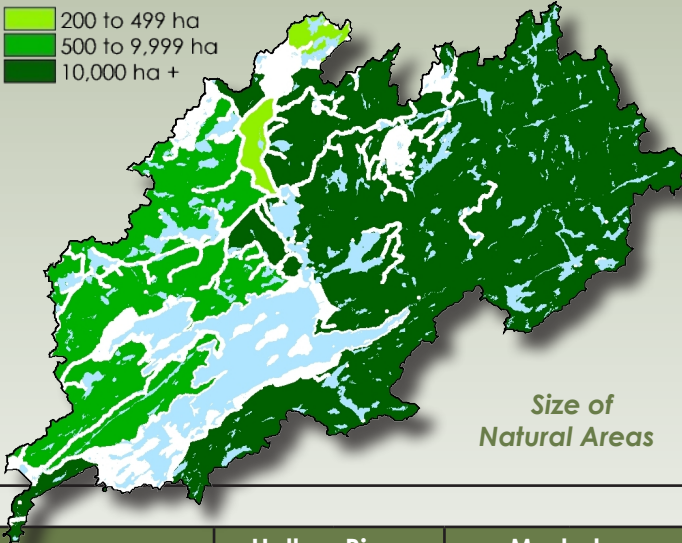
98% of the Hollow River Subwatershed is in natural cover. The Hollow River Subwatershed is relatively large and is comprised of many small lakes. Over 60% of the subwatershed is Crown land and is dominated by mixed forest vegetation with little development. The development pattern has resulted in a large undisturbed area that supports many of the large mammals native to Muskoka/Haliburton, such as bear and moose. These natural areas are also important to support local biodiversity and to help purify the air, maintain good water quality and provide a carbon sink.



Interior Forests

40% of the subwatershed is privately owned and it will be important to maintain a strong private land stewardship program to ensure that the long-term health of the subwatershed is maintained as development occurs. Private land stewardship activities such as participation in MFTIP, CLTIP, and donations to land trusts is encouraged to maintain the values enjoyed in this subwatershed.

Both healthy riparian areas and interior forests are important to support local wildlife and maintain good water quality. Planting native species and renaturalizing shorelines are important stewardship activities in the subwatershed.



Size of Natural Areas

Indicator	Hollow River Subwatershed		Muskoka Watershed		Description
	Value	Grade	Value	Grade	
Size of Natural Areas	81%	Not Stressed	79%	Vulnerable	Areas of natural cover that are 200 ha or greater. Natural cover includes forest, lakes, rock barrens and wetlands.
200 - 499 ha	2%		7%		
500 - 9,999 ha	20%		52%		
10,000 ha +	59%		20%		
Interior Forest	59%	Not Stressed	58%	Not Stressed	Interior forest is a forested area with a 100-metre forested buffer surrounding it.
Road Density	Very Low	Not Stressed	0.51 km/km ²	Vulnerable	Road density is a measure of the degree of fragmentation of the landscape. Roads are a primary cause of death of many species, especially turtles and snakes.
Level of Development	<2%	Not Stressed	5.4%	Vulnerable	Level of development is the percent of the watershed in urban or rural development. When more than 10% of a watershed is developed, lake and stream health may be impacted.
Shoreline Density	<13 lots/km	Not Stressed	N/A	N/A	Shoreline density is an indicator of the human stress on a water body. This stress includes nutrient loading, crowding, aesthetic appeal, and habitat impacts.
Shoreline Buffer	>85%	Not Stressed	75%	Vulnerable	Shoreline buffer is the percent of unaltered lot area from the water's edge 20 metres inland. The shoreline buffer is the last line of defense against the forces that may otherwise damage a healthy lake.

Water:

- Not Stressed
- Vulnerable
- Stressed

Indicator	Hollow River Subwatershed		Muskoka Watershed		Description
	# Lakes	Grade	# Lakes	Grade	
Total Phosphorus Concentration	11	Not Stressed	129	Vulnerable	The amount of total phosphorus in a lake is a measure of recreational water quality as phosphorus is generally the limiting nutrient in algae production.
< BG + 30%	9		73		
BG + 30% to BG + 50%	0		27		
> BG + 50%	2		29		
Algae		Not Stressed		Not Stressed	The propensity for algal blooms is the percentage of lakes with TP greater than 15 µg/L and are over threshold.
Fish Habitat (% Unaltered)	>90%	Not Stressed	91	Not Stressed	This is a measure of fish habitat. Many fish species require the overhanging vegetation, rock shoals, and aquatic vegetation generally found in undisturbed sites.
Calcium Levels	16	Stressed	377	Vulnerable	Calcium is an important nutrient for the development of bones and exoskeletons. As a result of acid precipitation, calcium has been leached out of the forest soils and is now also in decline in many of the lakes in the watershed threatening the continued presence of important lake species.
< 1.5 mg/L	9		161		
1.5 - 2.0 mg/L	7		138		
> 2.0 mg/L	0		78		

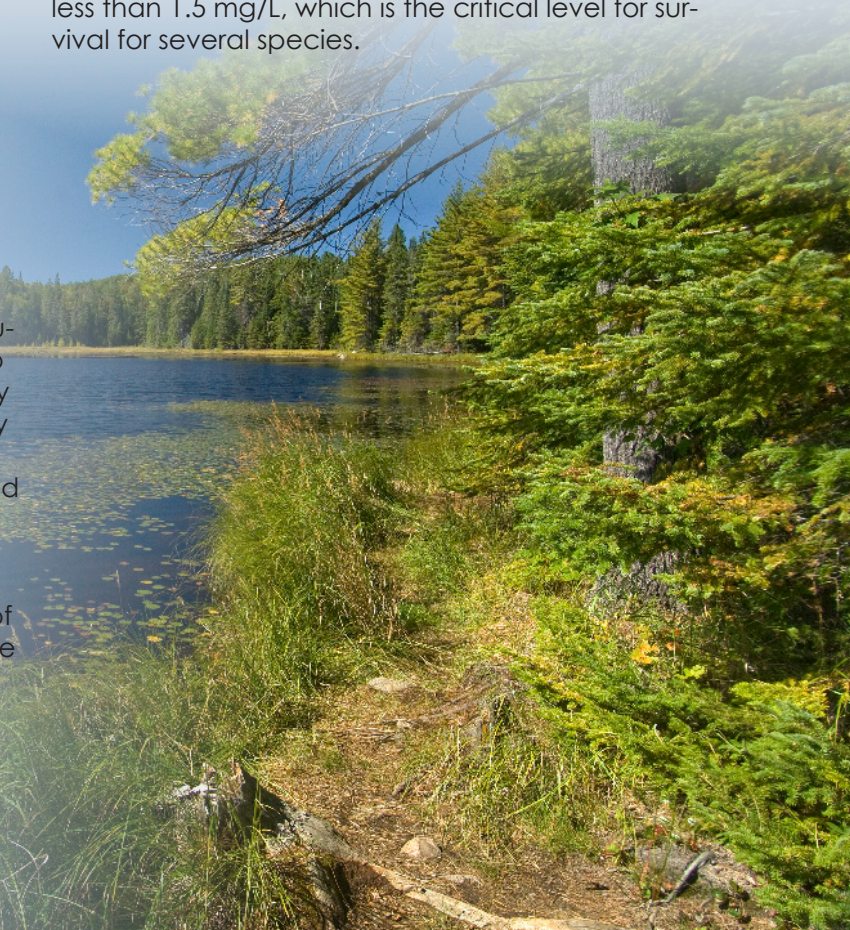
The Hollow River Subwatershed flows from the highlands in Algonquin Park to Trading Bay on Lake of Bays.

Total phosphorus concentration is an indicator of the amount of nutrient in a water body. A background or undeveloped level of total phosphorus has been determined for each lake. Where the phosphorus level has increased by more than 50% above the background level the lake may show signs of stress. There are two lakes that are Over Threshold in the Hollow River Subwatershed.

Shoreline vegetation protects water bodies from nutrients and toxic chemicals that can be carried into the lake and contribute to water quality issues. They also protect the lake edges from erosion caused by waves and ice. The shoreline zone provides critical habitat for aquatic insects, microorganisms, fish, and other animals, thereby helping to maintain a balance in sensitive aquatic ecosystems.

Municipalities recommend that no more than 25% of a shoreline be developed. Over 90% of the shoreline of lakes in the Hollow River Subwatershed are in a natural state.

As a result of acid deposition, calcium has leached out of many lakes across Muskoka. In the Hollow River Subwatershed 9 lakes, more than 50%, have less than 1.5 mg/L, which is the critical level for survival for several species.



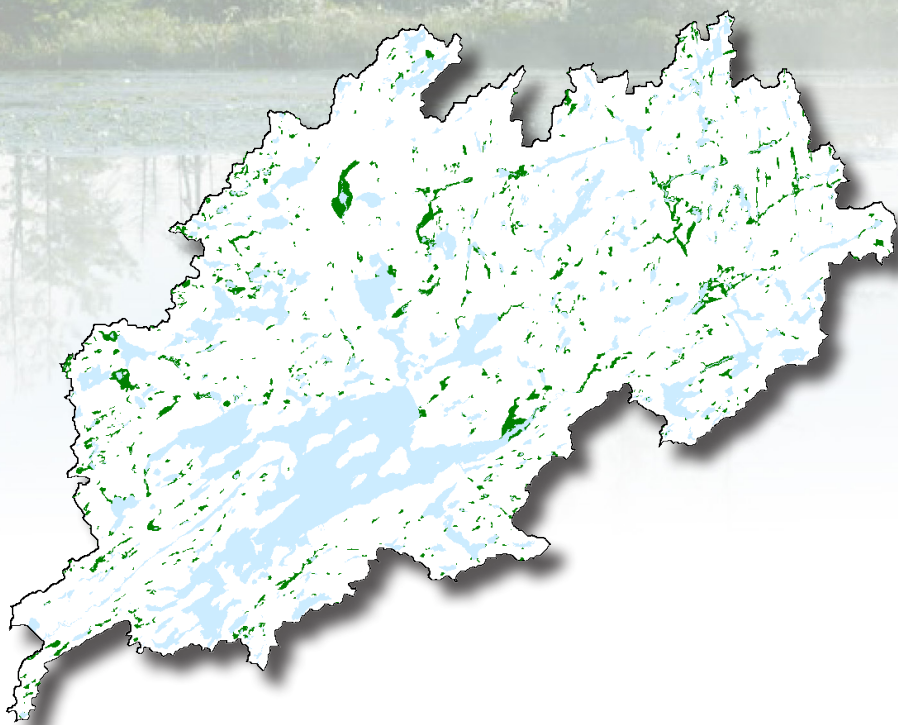
Wetlands:

- Not Stressed
- Vulnerable
- Stressed

The Hollow River Subwatershed has less than 4% wetlands. Wetlands are recognized by all levels of government as important components of a healthy environment. 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. Most species at risk native to Muskoka rely on wetlands for all or a portion of their life cycles.

Wetland Values

- Control and storage of surface water and recharge 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;
- Provide important habitat;
- Support species at risk;
- Provide fish populations; and
- Provide active and passive recreational opportunities, including canoeing, bird watching, hunting and fishing



Subwatershed Name	% Wetlands	Comment	Grade
Hollow River	3.74	The Hollow River Subwatershed is approximately 75% Crown and protected lands with less than 2% development. It is not close to a developing community and significant development is not planned for the area. Wetlands in this watershed are in good condition.	<i>Not Stressed</i>

Biodiversity:

- Not Stressed
- Vulnerable
- Stressed



Biodiversity refers to the richness of life in the environment – the number of different species, their genetic variability, and the extent to which different groups of species occur from one place to another within the region.

Muskoka is blessed with a rich biodiversity primarily because of the extensiveness of its natural ecosystems. This biodiversity provides the resilience necessary to withstand environmental change and to continue to function

normally and provide the environmental goods and services on which we and other species depend.

Indicator	Hollow River Subwatershed		Muskoka Watershed		Description
	# Species	Grade	# Species	Grade	
Species at Risk Habitat	11	<i>Not Stressed</i>	22	<i>Vulnerable</i>	The number of different types of species at risk habitat in the subwatershed. Subwatersheds with habitat for more types of species at risk are more vulnerable to development or other stressors.
<i>Endangered</i>	1		5		
<i>Threatened</i>	3		7		
<i>Species Concern</i>	7		10		
Alien Invasive Species*	2	<i>Stressed</i>	10	<i>Stressed</i>	Maintaining the diversity of native species is important to a healthy watershed. Invasive species often out-compete native species and significantly reduce the biodiversity of an area.

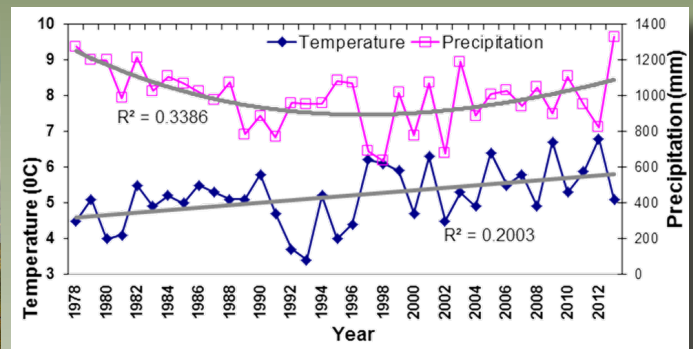
* Includes the Spiny Water Flea in the large recreational lakes. Spiny Water Flea will collapse the biodiversity of a lake.



Changing climate: temperatures continue to rise

The mean temperature showed a clear and moderate increase or warming over 1978 to 2013, about 0.35 degree increase per 10 years, or a warming of 1 degree within 30 years. The annual precipitation had a significant decrease during 1978-1998 and then a weak increase during 1999-2013.

(Dorset Environmental Science Centre)

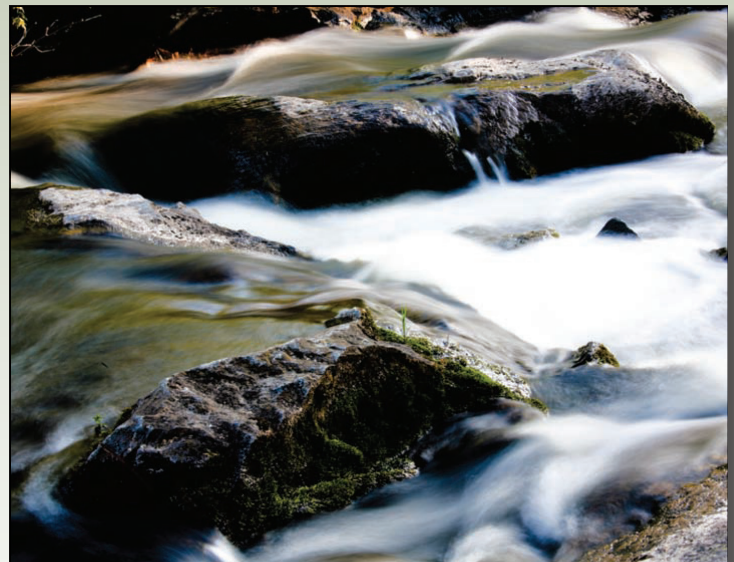


Stewardship Works: help protect the watershed

When all is said and done, the fate of sustainable management of Muskoka's watersheds lies in large part in the hands of local residents as they go about their day-to-day lives. It is the citizens of Muskoka who must generate the interest and enthusiasm to create, continue and expand local projects which lead to positive actions and results.

Stop the spread of invasive species

- Purchase non-invasive or native plants from a reputable dealer.
- Never dispose of domestic plants or animals into the wild.
- Inspect and wash your boat, ATV and other equipment and let dry for at least 6 hours before moving to a new lake or area.
- Do not move species from one area to another.



Retain buffers and leave shorelines in a natural state

- Maintain a wide buffer of native plants and trees around shorelines of lakes and rivers.
- Minimize boat speed (eliminate wake) in all near-shore areas and particularly in areas with known loon nests.
- Avoid grassed lawns in the waterfront area and minimize use of fertilizers.

Protect wetlands

- Leave wetlands alone.
- Keep recreational vehicles out of wetlands. Explore by kayak or canoe instead.

Maintain natural areas

- Limit cleared areas in the rural and waterfront area.
- Do not create new roads.

Reduce your personal impact

- Reduce your use of electricity and fossil fuels.
- Maintain your septic system.
- Improve the energy efficiency of your home and vehicle. Treat electricity as a luxury.
- Reduce waste by reusing, reducing, composting and refusing to buy items with excess packaging.