

2014 MUSKOKA WATERSHED

REPORT CARD

MOON RIVER SUBWATERSHED

The Moon River Subwatershed is 71,588 hectares in area and is located in the western portion of The District Municipality of Muskoka, flowing from Lake Muskoka at Bala in the Township of Muskoka Lakes westerly through both the Moon and Musquash Rivers in the Township of Georgian Bay and finally emptying into Georgian Bay.

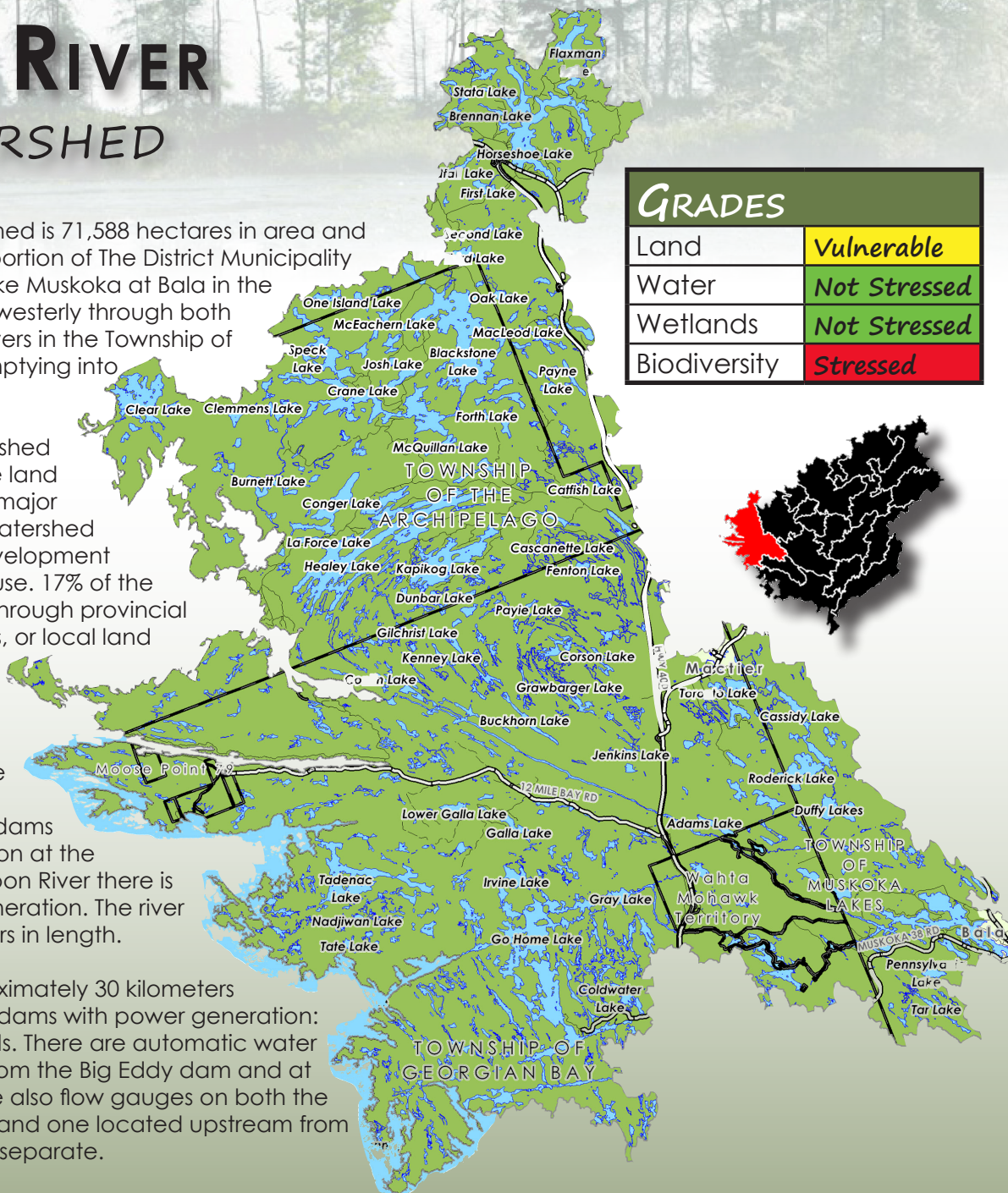
Less than 5% of the subwatershed is developed and 49% of the land is Crown land. There are no major urban areas within the subwatershed and shoreline residential development comprises most of the land use. 17% of the subwatershed is protected through provincial parks, crown nature reserves, or local land trusts. There are 37 small lakes in the subwatershed.

The subwatershed is divided into two distinct reaches: the Moon River and Musquash River branches. There are 2 dams at Bala with power generation at the Burgess Dam site. On the Moon River there is one dam with no power generation. The river is approximately 35 kilometers in length.

The Musquash River is approximately 30 kilometers in length and there are two dams with power generation: Big Eddy and Ragged Rapids. There are automatic water level gauges downstream from the Big Eddy dam and at both dams in Bala. There are also flow gauges on both the Moon and Musquash Rivers and one located upstream from the point at which the rivers separate.

GRADES

Land	Vulnerable
Water	Not Stressed
Wetlands	Not Stressed
Biodiversity	Stressed



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

Stewardship Works!



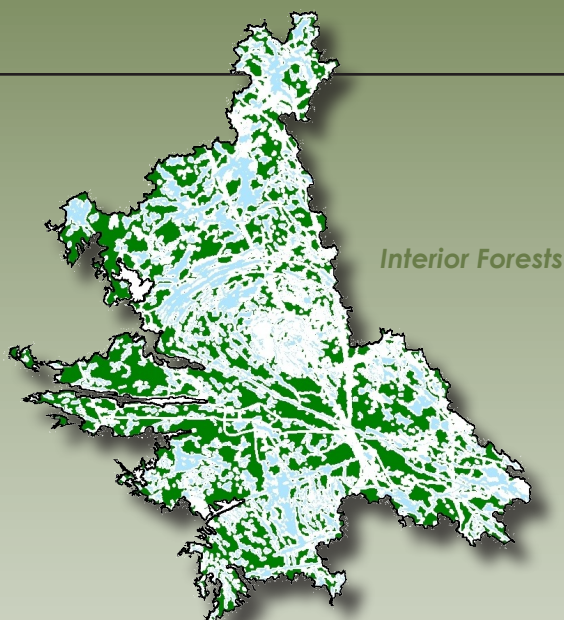
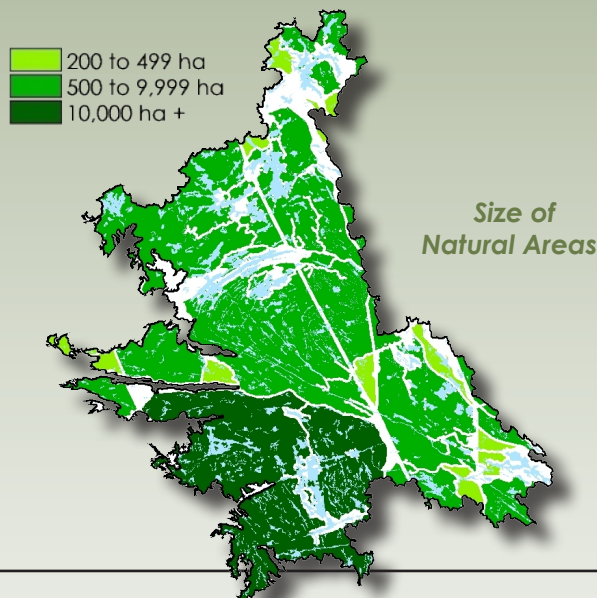
Muskoka
WATERSHED COUNCIL

Land:

- Not Stressed
- ✓ Vulnerable
- Stressed

96% of the Moon River Subwatershed is in natural habitat. The predominant vegetation community is rock barren and relative to other Muskoka subwatersheds, forest cover is sparse. The rock outcroppings provide the iconic picturesque wind-blown pine landscape of the area. For this reason, interior forests are not a significant component of the landscape.

The rock barrens are home to 21 species at risk. Four



are endangered, seven are threatened and ten are of special concern.

The subwatershed is part of the Georgian Bay Biosphere Reserve. Biosphere reserves are internationally recognized by the United Nations Educational, Scientific and Cultural Organization (UNESCO). The Georgian Bay Biosphere Reserve is one of over 500 UNESCO biosphere reserves throughout the world and currently one of only 16 in Canada.

Indicator	Moon River Subwatershed		Muskoka Watershed		Description
	Value	Grade	Value	Grade	
Size of Natural Areas	79%	Vulnerable	79%	Vulnerable	Areas of natural cover that are 200 ha or greater. Natural cover includes forest, lakes, rock barrens and wetlands.
200 - 499 ha	5%		7%		
500 - 9,999 ha	51%		52%		
10,000 ha +	23%		20%		
Interior Forest	38%	Vulnerable	58%	Not Stressed	Interior forest is a forested area with a 100-metre forested buffer surrounding it.
Road Density	0.18 km/km ²	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	<5%	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	75-85%	Vulnerable	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	Moon River Subwatershed		Muskoka Watershed		Description
	# Lakes	Grade	# Lakes	Grade	
Total Phosphorus Concentration	21	Vulnerable	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%	12		73		
BG + 30% to BG + 50%	4		27		
> BG + 50%	5		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	41	Not 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	8		161		
1.5 - 2.0 mg/L	9		138		
> 2.0 mg/L	24		78		

The Moon River Subwatershed is dominated by the Moon and Musquash Rivers fed by several small lakes and streams.

River Subwatershed, eight lakes have less than 1.5 mg/L, which is the critical level for survival for several species.

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. Five lakes in the Moon River Subwatershed are above the established lake threshold level.

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. Only 4% of the shoreline of lakes in the Moon River Subwatershed has been altered.

As a result of acid deposition, calcium has leached out of many lakes across Muskoka. In the Moon



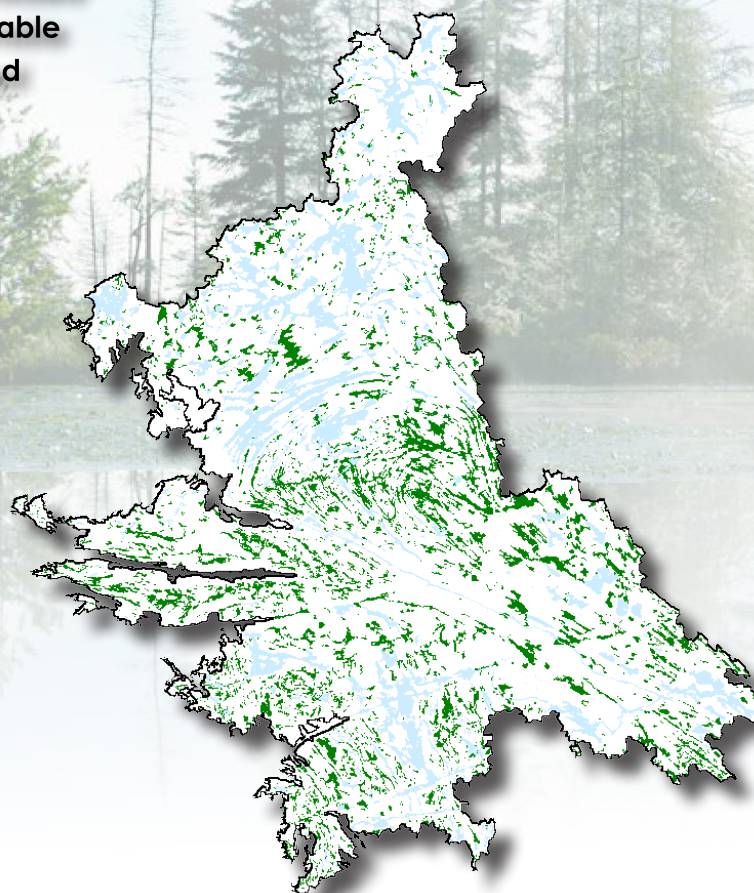
Wetlands:

- ☒ Not Stressed
- ☐ Vulnerable
- ☐ Stressed

The Moon River Subwatershed has over 7,900 ha of wetlands covering 11% of the subwatershed. 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
Moon River	11.05	<p>The Moon River Subwatershed is experiencing development at the top end of the subwatershed in the Bala Reach. Bala was one of the first areas of settlement in Muskoka and historic development has defined the development envelope for the community. As such, conflict with wetlands arises from time to time. Filling has been noted in the wetland associated with Carr Lake and, although some areas seem to fill naturally with woody plants, the northwest segment has been filled with rock blasted to create a basement for a house being built on River Street.</p> <p>The Bala Sports Park has been built on what was once a wetland. The Sports Park is a raised rectangle of earth with ditching/drainage on the north, east and south sides. The remains of the wetland are easily seen on the eastern side. Bits of wetland remain in the drainage area on the north and south sides.</p> <p>The lower portions of the subwatershed are a mix of Crown land and large private land holding with minimal development pressure.</p> <p>The wetlands in the upper subwatershed, in the Bala reach area, are in fair condition. The wetlands in the lower portions of the subwatershed are in good condition.</p>	Not Stressed

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	Moon River Subwatershed		Muskoka Watershed		Description
	# Species	Grade	# Species	Grade	
Species at Risk Habitat	21	Stressed	22	Vulnerable	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.
Endangered	4		5		
Threatened	7		7		
Species Concern	10		10		
Alien Invasive Species*	3	Stressed	10	Stressed	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.

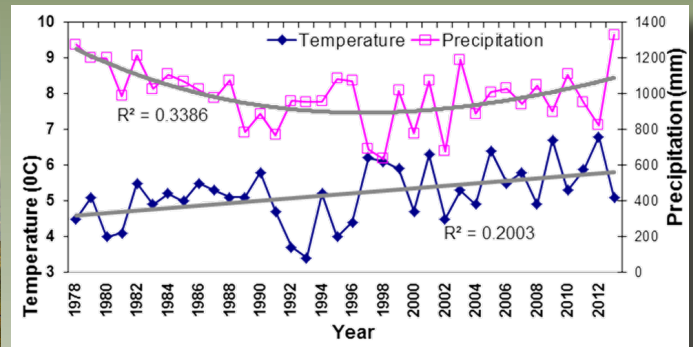
* Includes the Spiny Water Flea in the large recreational lakes. Spiny Water Flea will collapse the biodiversity of a lake.



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)

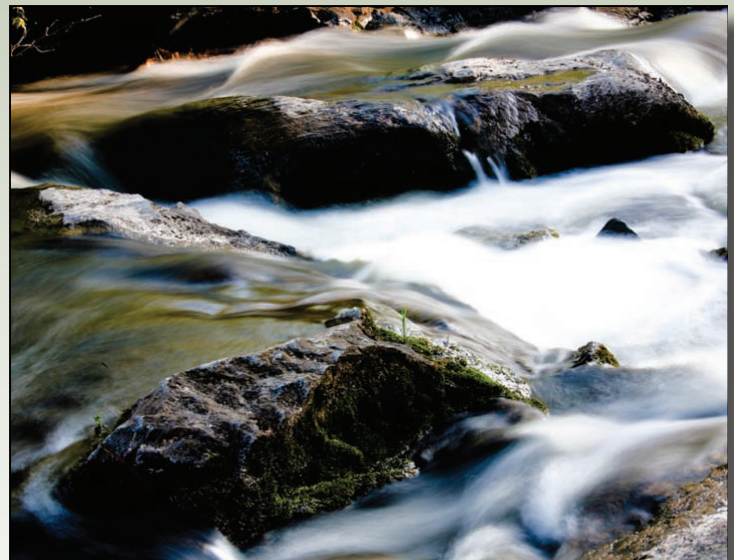


Stewardship Works: help protect the watershed

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.