



CHAPTER 7 – INTERIOR FORESTS

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WHAT IS INTERIOR FOREST AND WHY IS IT IMPORTANT IN MUSKOKA?

The informative guide, now in its 3rd edition, *How much habitat is enough?* (Environment Canada, 2013), reviews an extensive literature on the use of habitat by various species. For forested habitat, this guide focuses on seven different attributes of the habitat. These are;

- the total amount of forest across the landscape (percent forest cover);
- the presence of large, contiguous patches of forest habitat;
- the shapes of forested areas (because a long, narrow forest will have more edge and less interior than a more circular patch of forest of the same area);
- the percentage of forest that is interior forest as opposed to forest edge;
- the proximity of patches of forest to each other;
- the extent to which roads and other features are fragmenting formerly contiguous forest;; and
- the quality of the forest habitat in terms of the degree to which it encompasses areas representative of old growth, younger aged forest, wetlands and so on.

Each of these attributes provides a separate assessment of the quantity, or the quality of the forest habitat available in a region, which in turn measure the adequacy of the forest habitat for supporting wildlife and providing ecological services. This Report Card explores three of these attributes; this chapter concerns interior forest, [Chapter 8](#) relates to the fragmentation of forested landscape, and [Chapter 14](#) deals with ecosystem integrity, another approach to assessing quality of an environment.

Interior forest habitat is located deep in the forest, secluded from the impacts of forest edge development and open habitats (Burke, Elliott, Falk, & Piraino, 2011). The interior forest in

Muskoka is primarily comprised of shade-tolerant and late-successional species such as sugar maple, American beech, basswood, ironwood, hemlock, and eastern white cedar. A group of mid-tolerant shade tree species such as eastern white pine, red pine, red oak, bur oak, swamp white oak, ash, yellow birch and black cherry are less common, but still important in interior forest in Muskoka.

While the environmental changes are gradual as one moves from the forest edge to the deep interior, interior forest has conventionally been defined as that forest at least 100 metres from a road or other edge. This convention is based primarily on study of forest birds, with some evidence from study of forest mammals and reptiles. Birds are commonly used in studies of forest health because they integrate biological, physical and chemical conditions required to support healthy populations when choosing where to nest (Burke, Elliott, Falk, & Piraino, 2011). Birds are a particularly effective barometer of forest size and shape, since many of our native species need large expanses of interior forest habitat. Many forest-nesting birds shun edges because of the increased risk of predation or nest parasitism, as well as inhospitable temperature and moisture conditions, or insufficient food. Forest edges are also more susceptible to human disturbance (Burke, Elliott, Falk, & Piraino, 2011).

In North American forests, interior-forest bird species begin to occur about 100 metres in from a forest edge (Dunford and Freemark, 2004; Nol et al., 2005; Weber et al., 2008). Nor is it just birds. Many of Muskoka's wildlife species also depend on interior forest habitat (Environment Canada, 2013). The development of roads, agricultural fields, houses and other human-made structures in otherwise forested landscapes create lots of forest-edge habitat, while reducing the amount of interior forest. In this way, these types of changes on the landscape alter the composition of species present as interior-forest species drop out. Diversity is reduced, and ecosystem quality is degraded.

Ecosystem services of interior forest habitat are similar to those of all forests but these areas are naturally more protected from outside intrusion and are a key foundation for the ability of a watershed to function naturally. Ecosystem functions include the filtering and absorption of water into the ground, absorption of large amounts of carbon dioxide that would otherwise be released into the atmosphere, and photosynthesis (plants use energy from sunlight and nutrients from the soil and air to yield the organic molecules and oxygen that are essential to the survival of living things). These ecological services and more are essential to wildlife well-being, as well as human health.

For all these reasons, a measurement of the percentage of interior forest at least 100 metres from a forest edge is a useful indicator of forest quality, and therefore of ecological health. A region with large areas of contiguous forest (and therefore lots of interior forest) will support a richer, more diverse community of birds, other wildlife, and plants than will one with the same amount of forest, but much subdivided so forest-edge habitat is a higher proportion of the total. Data on bird species from five locations in southern Ontario show that there is a marked decline in number of bird species present when total forest cover on the landscape is reduced beyond 15% and the great majority of these losses of birds are interior-forest species (Environment Canada, 2013). Based on such studies, Environment Canada's recommendation for forests in Ontario is a minimum of 15% of the terrestrial landscape be in forest, with a minimum of 10% of the area in interior forests.

HOW IS INTERIOR FOREST MEASURED IN MUSKOKA?

While it may be true that interior forest bird species in southern Ontario continue to occur in places where forest comprises less than 15% of the landscape (with interior forests about 10%), it would be unwise, in the Muskoka watersheds, to use this level of deforestation as a threshold for degradation. This region had very high natural cover of forests prior to European settlement, and much of the landscape remains forested. We need benchmarks that reflect that very healthy condition, and we adopted such a set of benchmarks in previous report cards.

To determine the amount of interior forest in each quaternary watershed, we have followed the same procedure used in 2018, with the considerable help of the geoinformatics staff at the District Municipality of Muskoka (DMM). Using a land use layer from the Ontario Ministry of Natural Resources and Forestry (MNR), the forested areas of Muskoka were identified, and a 100-meter buffer was applied to the periphery to account for the forest edge effect. The remaining area is interior forest and the amount was calculated in hectares per quaternary watershed. This area of interior forest was then expressed as a percentage of total land area of each watershed (area not including area of lakes). Currently, interior forest across the Muskoka watersheds covers 61% of the land surface.

With advice from local ecologists, we have designated made-in-Muskoka benchmarks based on the interior forest indicator:

- **Not Stressed:** More than 50% of the land surface of the quaternary watershed is interior forest. Greater than 50% interior forest at the watershed scale will ensure that interior forest bird species and sensitive mammals have adequate habitat and that there is minimum

conflict with humans. These areas are less likely to be impacted by invasive species. The forest's capacity to provide ecosystem services will be strong.

- **Vulnerable:** Between 20% and 50% of the land surface of the quaternary watershed is interior forest. When 20% to 50% of the watershed land surface is interior forest, there has likely been moderate loss of habitat available for most interior species. However, amount remaining is unlikely to lead to loss of such species, and ecosystem services will continue to be provided. Invasive species may pose a greater risk.
- **Stressed:** Less than 20% of the land surface of the quaternary watershed is interior forest. Where there is less than 20% interior forest at the watershed scale, interior-forest bird species, and sensitive mammals will have reduced and possibly inadequate habitat and there will be more conflict with humans. Ecosystem services will likely have been diminished.

RESULTS

Table 14 summarizes the amount of interior forest habitat in each quaternary watershed. There is a total of 381,935 hectares of interior forest across the Muskoka watersheds, representing 61% of all land surfaces. At the quaternary watershed scale, interior forest cover varies from approximately 32% in the Sparrow Lake-Severn River Watershed to over 79% in the Distress Pond-Big East River Watershed.

Table 14. Amount (hectares) of interior forest habitat in each quaternary watershed.

Quaternary Watershed	Area of Interior Forest (ha)	Land area of Watershed (ha)	Interior Forest (%)	Grade
Baysville Narrows-South Branch Muskoka River	20,179	30,441	66.29%	Not Stressed
Blackstone Harbour	7,698	14,663	52.50%	Not Stressed
Cache Creek-Black River	21,607	30,481	70.89%	Not Stressed
Distress Pond-Big East River	33,881	42,631	79.47%	Not Stressed
Hollow River	25,660	34,331	74.74%	Not Stressed
Kahshe River	12,218	22,738	53.73%	Not Stressed
Lake Muskoka-Muskoka River	16,678	38,153	43.71%	Vulnerable
Lake Rosseau	35,062	62,036	56.52%	Not Stressed

Quaternary Watershed	Area of Interior Forest (ha)	Land area of Watershed (ha)	Interior Forest (%)	Grade
Lake St. John-Black River	17,638	34,785	50.70%	Not Stressed
Lake Vernon	22,446	33,839	66.33%	Not Stressed
Little East River-Big East River	17,820	25,270	70.52%	Not Stressed
Little Lake-Severn River	14,718	28,025	52.52%	Not Stressed
Moon River Bay	10,536	21,400	49.24%	Vulnerable
Musquash River	16,092	28,332	56.80%	Not Stressed
North Branch Muskoka River	25,892	44,034	58.80%	Not Stressed
Oxtongue River Outlet	19,597	24,987	78.43%	Not Stressed
South Branch Muskoka River Outlet	22,304	33,632	66.32%	Not Stressed
South Georgian Bay Shoreline	14,179	26,909	52.69%	Not Stressed
Sparrow Lake-Severn River	6,507	20,146	32.30%	Vulnerable
Tea Lake-Oxtongue River	21,221	28,783	73.73%	Not Stressed
Overall	381,935	625,616	61.05%	

** Calculated as total watershed area minus all lake surfaces present to yield total land area. This approach builds on past reporting methodologies and is endorsed by local ecologists. It is also consistent with the methodology for the fragmentation indicator.*

WHAT DOES IT ALL MEAN?

Most quaternary watersheds are graded as not stressed. Just three are graded vulnerable: Sparrow Lake-Severn River in the Severn River-Lake Simcoe watershed, and Moon River Bay and Lake Muskoka-Muskoka River in the Muskoka River watershed. Of these three, only Sparrow Lake-Severn River is very far below the 50% level judged as unstressed. The great majority of quaternary watersheds within the Muskoka watersheds have ample amounts of interior forest at present. Still, all should continue to be sustainably managed to retain these important interior forests, and efforts should be made to ensure that areas of forested land within Sparrow Lake-Severn River do not become further degraded.

WHAT CAN YOU DO?

Visitors from all over the world come to Muskoka to see its scenic forested landscape. However, as new infrastructure is built to accommodate residents and visitors alike, forest health may be threatened.

- If you live on a large property, organizations such as the Ontario Woodlot Association (www.ontariowoodlot.com) have developed many resources to assist landowners who wish to explore management options for their forests. For instance, sizable properties may enrol in the Managed Forest Tax Incentive Plan or the Conservation Land Tax Incentive Plan through the Ministry of Natural Resources and Forestry.
- A Landowner's Guide to Selling Standing Timber booklet (www.ontariowoodlot.com/publications/owa-publications/landowner-guides/a-landowner-s-guide-to-selling-standing-timber).
- A Landowner's Guide to Careful Logging booklet (www.ontariowoodlot.com/publications/owa-publications/landowner-guides/a-landowner-s-guide-to-careful-logging).
- The Landowners' Guide to Controlling Invasive Woodland Plants booklet (www.muskokawaterweb.ca/the-landowner-s-guide-to-controlling-invasive-woodland-plants).