

Rapid Assessment of Large Trees in an Unprotected Endangered Eastern Hemlock Old-Growth Forest at the Northeast End of Manitou Lake, Algonquin Park, Ontario

Field Notes No. 3

Ancient Forest Exploration & Research (AFER)

(www.savealgonquinoldgrowth.org; www.ancientforest.org)

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Photo: Outward Bound Canada, Manitou Lake, Algonquin Park 2019

“Large old trees are declining across much of the planet... Targeted research is needed to better understand their key threats and devise strategies to counter them. Without such initiatives, these iconic organisms and the many species dependent on them could be lost or greatly diminished.” (Lindenmayer et al. 2012)

At AFER we:

- treat old-growth forests as “non-renewable resources”, which is not consistent with the practice of mining them or logging them;
- we consider biodiversity conservation needs at local, provincial, federal and international scales;
- we support the Government of Canada’s official commitment to increase protected areas in Canada to 30% of the land base; and
- we support the *New York Declaration on Forests* to ban logging of natural forests by 2030 (Climate Focus 2015).

Introduction

Ecosystem services provided by old-growth forests (OGF) include *regulating services* that affect climate, floods, disease, wastes, and water quality; *cultural services* that provide scientific, educational, recreational, aesthetic, and spiritual benefits; *supporting services* such as soil formation, photosynthesis, and nutrient cycling; and *provisioning services* such as food and water (Millennium Ecosystem Assessment 2005). Large and/or old trees that are typical of OGFs have been characterized as keystone ecological structures (e.g., unique wildlife habitat) in forests, savannas, farmlands, and urban landscapes (Lindenmayer et al. 2012).

In particular, “Because large-diameter trees constitute roughly half of the mature forest biomass worldwide, their dynamics and sensitivities to environmental change represent potentially large controls on global forest carbon cycling. [Protecting] ...existing large-diameter trees or those that can soon reach large diameters [is] a simple way to conserve and potentially enhance ecosystem services” (Lutz et al. 2018). In fact, one large tree can remove the same amount of carbon from the atmosphere within a year as is contained in one mid-sized tree (Stephenson et al. 2014).

However, it is now generally accepted that OGFs in Ontario, south of the Boreal Forest region, are rare ecosystems at minimum. More likely, they are endangered, as has been documented for North America’s red and eastern white pine OGFs (Quinby 1993, EAB 1994). In addition, “the loss of large old trees in many ecosystems around the world poses a threat to ecosystem integrity” (Lindenmayer et al. 2012). The effective stewardship of OGFs and large old trees depends on an understanding of the composition and amount of what remains, where it is located, and how much is protected. The purpose of this project was to perform the first rapid assessment of large trees in an unprotected endangered eastern hemlock OGF at the northeast end of Manitou Lake. Roughly 77% (51 ha) of this stand is available for logging.

Study Area

This eastern hemlock forest OGF is located at the northeast end of Manitou Lake (~66 ha; 165 ac), which is located in the northwest section of Algonquin Park, Ontario (Figure 1). At a fine scale, forest resource inventory maps indicate that this forest is composed of the following species and relative abundances: eastern hemlock 50%, sugar maple 20%, yellow birch 10%, white cedar 10% and balsam fir 10% with an estimated stand age of 140 years (Figure 2).

Figure 1. Location of the Study Area and Large Trees, Northeast Manitou Lake, Algonquin Park (numbers refer to individual trees – see Table 1)

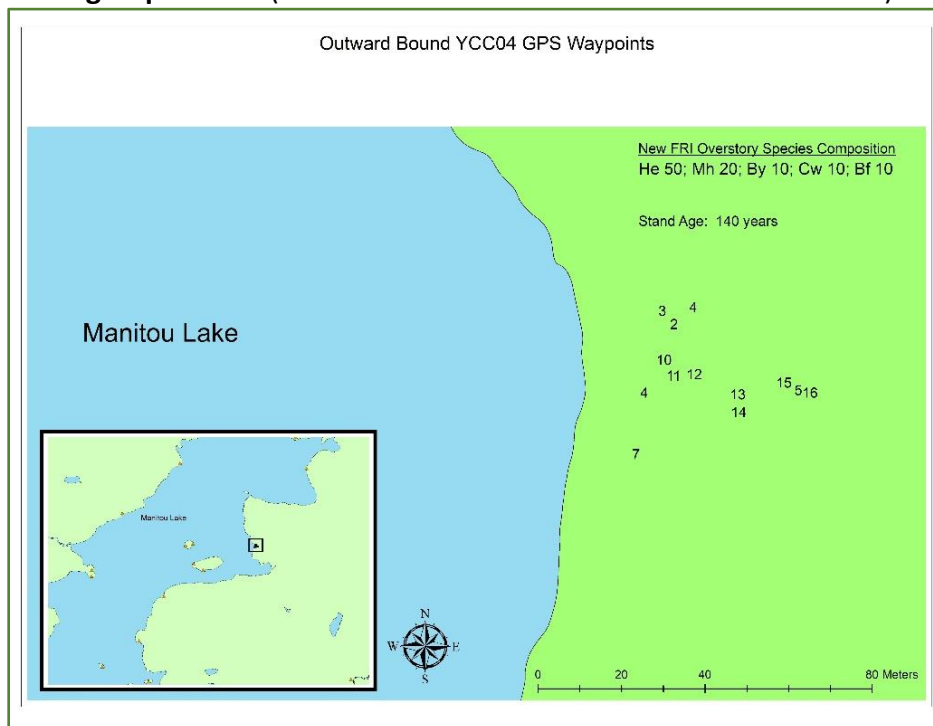
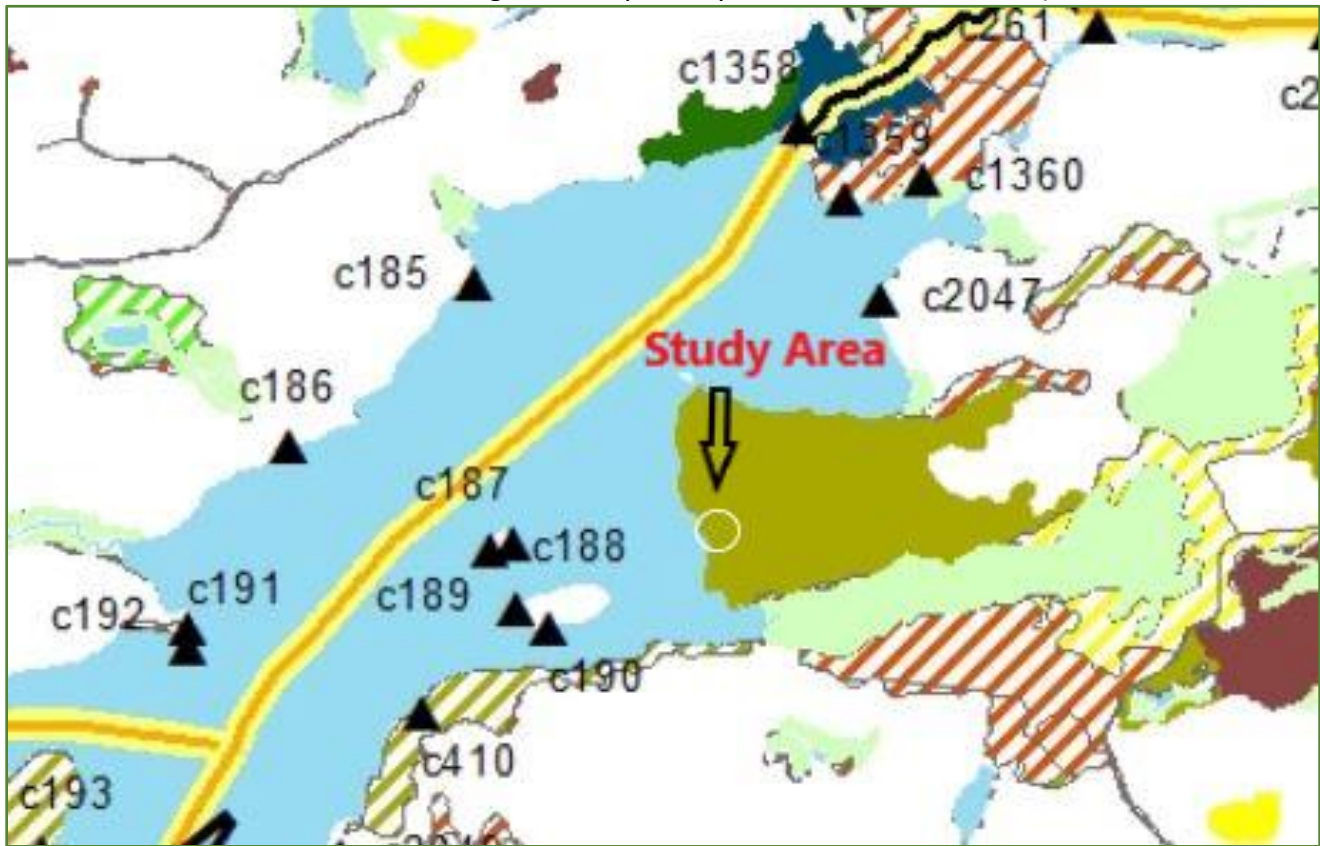
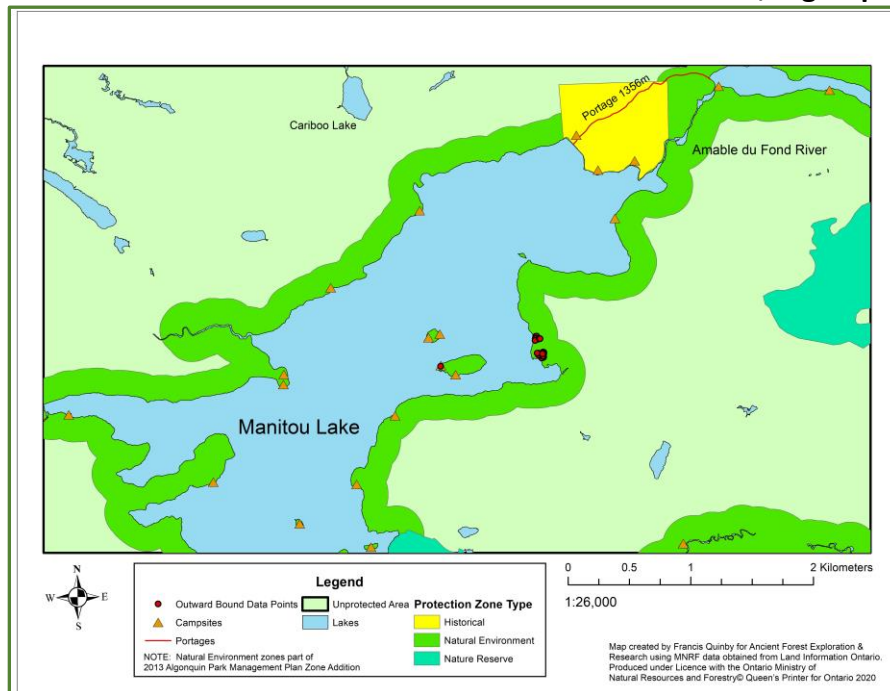


Figure 2. Location of the Study Area within the Eastern Hemlock Stand, Northeast Manitou Lake, Algonquin Park (olive green area = the hemlock stand that was sampled; white circle = area sampled; numbers & triangles = campsites; yellow line = canoe route)



There is a 200 m strip of shoreline in this stand that is protected (Figure 3), which makes up roughly 15 ha (~23%) of the 66 ha eastern hemlock-northern hardwood stand.

Figure 3. Protected Buffer Zone around Eastern Manitou Lake, Algonquin Park



Methods and Results

The OGF was accessed from Manitou Lake during the summer of 2019. Live and dead eastern hemlock trees at least 40 cm in diameter (at least 140 yrs. old) were found and assessed. Based on Quinby (2020), it is highly unlikely that any of the 10 measured trees was younger than the minimum age specified for old growth (140 yrs.) by OMNR (2003). Each large tree was identified, measured for DBH (diameter at breast height (4.5 ft.)), located with a GPS unit and photographed. All samples were obtained within the 200 m protected shoreline zone.

A total of nine large old live trees and one large snag (dead standing tree) were assessed ranging from 43-65 cm DBH (diameter at breast height - 4.5 ft) as shown on Figure 1 and Table 1. More likely, these large trees are all much older than the minimum age, however, this can only be determined by using an increment borer to extract a core for a ring count. No cut stumps were observed during this survey. Further assessment of the portions of this forest not visited during this study is required to adequately evaluate its composition and integrity (presence of cut stumps). Assuming the remainder of this OGF is similar to the area assessed, the ecosystem services value of this ~ 165 acre OGF is roughly ten times greater than its timber value (Collings & Quinby 2020), and therefore in our opinion, is best left in a natural, unlogged condition.

Table 1. Large, Old Trees Identified in the Northeast Manitou Lake Old-growth Hemlock Forest: Species, Diameter and Location

Tree Number	Species	Diameter (cm)	Status	Latitude	Longitude
14	Hemlock	65	dead	46.033291	-78.976391
16	Hemlock	60	alive	46.033329	-78.976175
2	Hemlock	58	alive	46.033484	-78.976585
15	Hemlock	56	alive	46.033352	-78.976250
3	Hemlock	54	alive	46.033513	-78.976620
1	Hemlock	52	alive	46.031493	-78.986716
6	Hemlock	49	alive	46.033283	-78.976683
4	Hemlock	48	alive	46.033519	-78.976524
5	Hemlock	48	alive	46.033335	-78.976206
7	Hemlock	43	alive	46.033206	-78.976712

Photographs

Photo 1. Tree #16 - Eastern Hemlock (60 cm dbh)

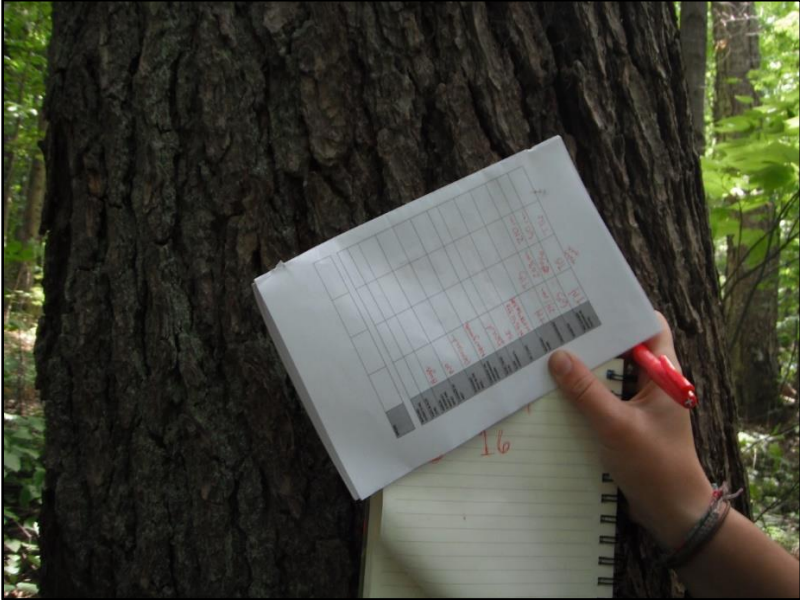


Photo 2. Tree #2 - Eastern Hemlock (58 cm dbh)



Acknowledgements

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