Rapid Assessment of Large Trees in the Unprotected Alfred Lake Old-Growth Forest, Algonquin Park, Ontario

Field Notes No. 1

Ancient Forest Exploration & Research (AFER)
(www.savealgonquinoldgrowth.org; www.ancientforest.org)

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"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 17% of the land base (Government of Canada 2018); 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 include *regulating services* that affect climate, floods, disease, wastes, and water quality; *cultural services* that provide 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 old-growth forests 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 old-growth forests 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 old-growth red and eastern white pine forests (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 old-growth forests 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 the unprotected Alfred Lake Old-Growth Forest, which may be the only unprotected old-growth forest in Algonquin that is readily accessible from a public road.

Study Area

The Alfred Lake Old-growth Forest is located within the Ralph Bice Old-growth Landscape (800 ha; 2,032 ac), which is located within Algonquin Park near the Town of Kearny, Ontario (Figures 1 and 2). At a fine scale, forest resource inventory maps indicate that the Forest is composed of the following species and relative abundances: yellow birch 60%, sugar maple 20%, red maple 10%, and white spruce 10% with an estimated stand age of 222 years. Based on our field work, however, significant amounts of eastern white pine and eastern hemlock also appear to be well-established in and near the stand. At the broad-scale, this old-growth stand can tentatively be described as a tolerant hardwood-hemlock-white pine forest. Further assessment of the portions of this forest not visited during this study is required to adequately evaluate its composition.

Methods and Results

The old-growth forest was accessed from the Magnetawan Lake Access Road (655525 E, 5059990 N) on the afternoon of July 21, 2018. A total of 14 trees were identified, located with a GPS, and measured for dbh, ranging from 51 to 100 cm (Table 1) along a ~1 km transect within the study area shown on Figure 2. The area surveyed included a small stream running through a valley with a significant amount of steep-sloped terrain, which may have prevented intensive logging of this area during the last logging event in the region.

Large trees are located along the Access Road as well as within the interior of the forest and their species included yellow birch, eastern hemlock, northern white cedar, sugar maple, eastern white pine and white spruce (Table 1). Based on the literature on age-diameter relationships for these tree species (Blum 1961, Burger 1961, Gilbert 1978, Leak 1985, Quinby 1991, Guyette and Dey 1995, Henry and Quinby 2006, Boulfroy et al. 2012), it is highly unlikely that any of the 14 measured trees was younger than the minimum age specified for old growth by OMNR (2003). 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.

Snags and logs with species and size variation were common. A number of small to medium-sized stumps (<10) were observed along the transect but were restricted to what appeared to be an old skidder trail that ran through a portion of the forest that was assessed. The forest was regenerating well with all species that occur in the upper canopy. A significant number of American beech were observed in the understory (saplings) including one immature individual (~20 cm dbh), however, no American beech were observed in the canopy. The young beech trees showed no signs of beech bark disease. Where eastern hemlock branches were accessible, they were checked for hemlock woolly adelgid – none were detected.

Figure 1. Ralf Bice Old-growth Landscape Including the Alfred Lake Old-growth Forest (blue boundary)

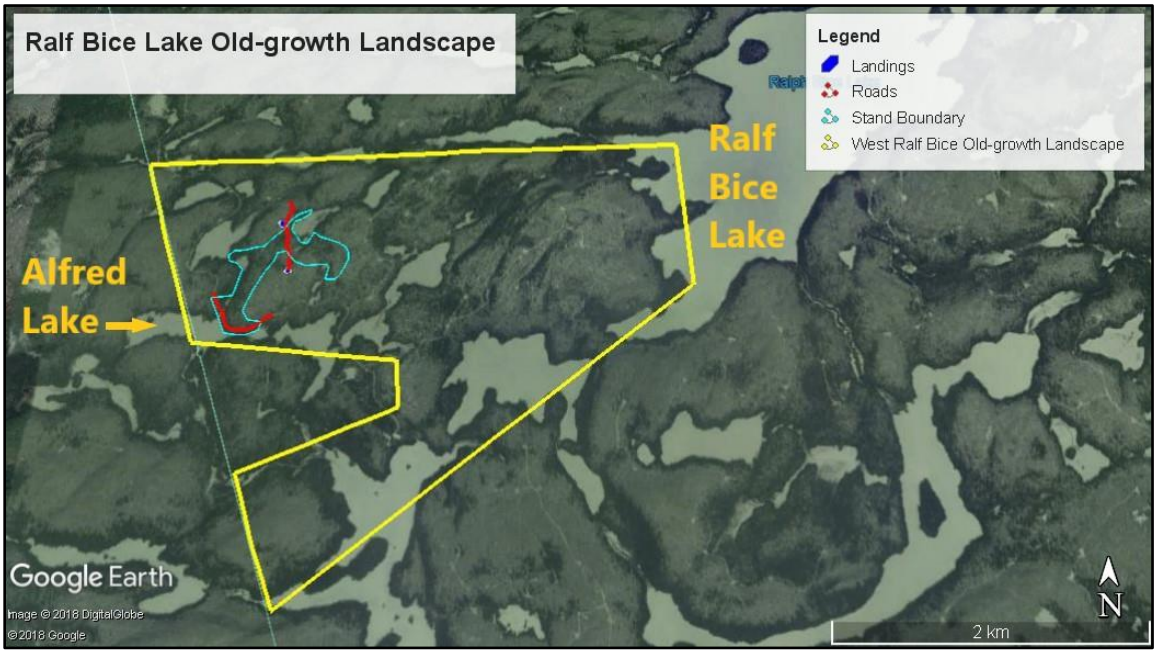

Figure 2. Alfred Lake Old-growth Forest with Study Area

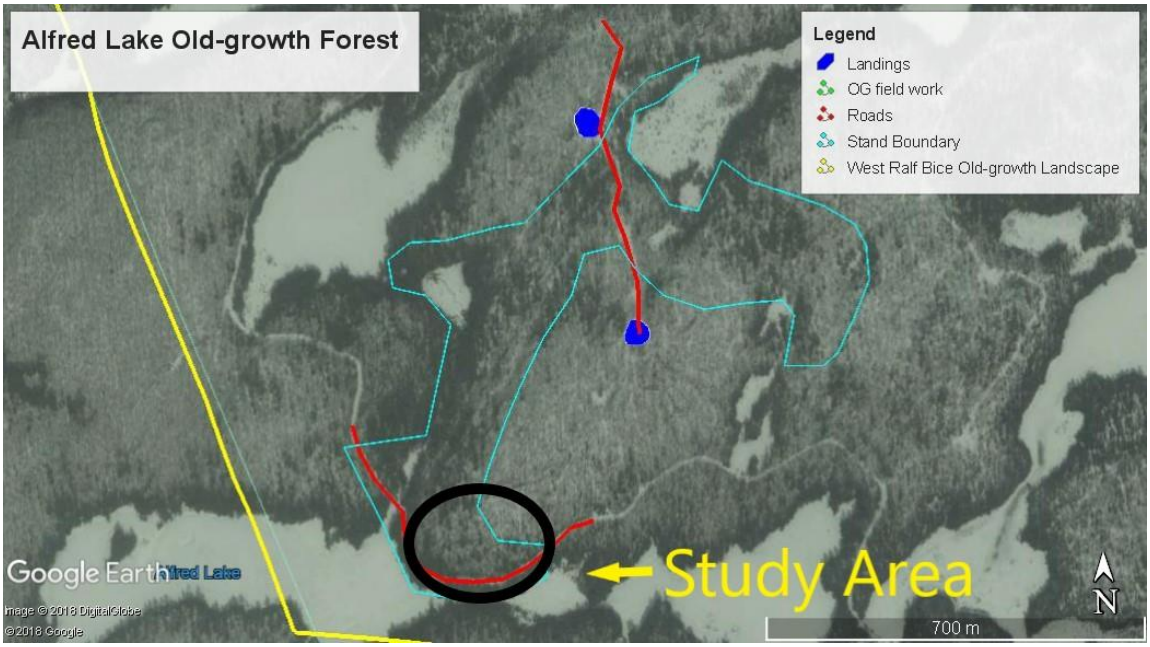

Table 1. Large, Old Trees Identified in the Alfred Lake Old-growth Forest: Species, Diameter and Location (ordered as encountered)

No.	Species	DBH (cm)	Location (east, north)
1.	Yellow Birch	84	17 T 655541 5059752
2.	Yellow Birch	76	17 T 655491 5059862
3.	Eastern Hemlock	62	17 T 655522 5059911
4.	Eastern Hemlock	57	17 T 655525 5059917
5.	Northern White Cedar (photo)	80	17 T 655542 5059902
6.	Eastern Hemlock	64	17 T 655540 5059899
7.	Eastern Hemlock (photo)	95	17 T 655556 5059942
8.	Sugar Maple	51	17 T 655572 5060044
9.	White Pine	62	17 T 655600 5060148
10.	White Pine (photo)	84	17 T 655579 5060137
11.	White Spruce	51	17 T 655575 5060157
12.	White Pine	76	17 T 655575 5060180
13.	Yellow Birch	81	17 T 655406 5060078
14.	Yellow Birch (photo)	100	17 T 655412 5059916

Photographs

Photo 1. Tree #5 - Northern White Cedar (80 cm dbh)

Photo 2. Tree #7 - Eastern Hemlock (95 cm dbh)

Photo 3. Tree #10 - White Pine (84 cm dbh)

Photo 4. Tree #14 - Yellow Birch (100 cm dbh)

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