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

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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 provisioning services such as food and water; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling (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 Bug Lake Old-Growth Forest located roughly 8 km northwest of Brent, Ontario (road access) located in the north-central portion of Algonquin Park.

Study Area

The Bug Lake Old-growth Forest is located roughly 2 km west of the northwest end of Cedar Lake, Algonquin Park (Figures 1 and 2). Public access to Bug Lake is provided by two backcountry portages; one runs southwest from the northwest end of Little Cedar Lake (820 m) and the other runs northeast from Ironwood Lake (760 m; see jeff’smap for Algonquin Park - http://www.algonquinmap.com/). At the broad-scale, this old-growth stand can be described as a tolerant hardwood-eastern hemlock forest landscape.

Methods and Results

The old-growth forest was accessed from the portage between Little Cedar Lake and Bug Lake on August 15, 2018 within the study area shown on Figure 2. The study area was primarily composed of a sugar maple-yellow birch-hemlock stand with scattered American beech on a hillside facing northeast and included an intermittent stream. A dense cluster of eastern hemlock trees was located at the crest of the hill along the Bug Lake shoreline at the end of the portage. Diameters of the trees in this eastern hemlock cluster ranged from roughly 25.0 to 65.3 cm dbh (diameter at breast height).

A total of 14 trees within 30 m of the portage were identified, located with a GPS, and measured for dbh ranging from 54.5 to 85.1 cm (Table 1). These large tree species included American beech, eastern hemlock, sugar maple and yellow birch (Table 1). Snags (mostly sugar maple) and logs with species and size variation were present in the areas surveyed and forest regeneration appeared to be healthy. No cut stumps were observed.

Based on the literature on age-diameter relationships for these tree species (Blum 1961, Leak 1985, Henry and Quinby 2006), it is highly unlikely that any of the 14 measured trees were 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.
Figure 1. Regional Location of the Bug Lake Old-growth Forest

Figure 2. Bug Lake Old-growth Forest and Study Area
Table 1. Large, Old Trees Identified in the Bug Lake Old-growth Forest: Species, Diameter and Location (ordered as encountered)

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>DBH (cm)</th>
<th>Location (east, north)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yellow Birch</td>
<td>71.6</td>
<td>17 T 687164, 5102321</td>
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<tr>
<td>2</td>
<td>Yellow Birch</td>
<td>54.5</td>
<td>17 T 687187, 5102348</td>
</tr>
<tr>
<td>3</td>
<td>Eastern Hemlock</td>
<td>58.5</td>
<td>17 T 687169, 5102359</td>
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<tr>
<td>4</td>
<td>Eastern Hemlock</td>
<td>65.1</td>
<td>17 T 687088, 5102395</td>
</tr>
<tr>
<td>5</td>
<td>Eastern Hemlock</td>
<td>58.5</td>
<td>17 T 687066, 5102412</td>
</tr>
<tr>
<td>6</td>
<td>American Beech</td>
<td>55.4</td>
<td>17 T 687047, 5102413</td>
</tr>
<tr>
<td>7</td>
<td>Yellow Birch</td>
<td>65.5</td>
<td>17 T 687015, 5102362</td>
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<td>70.0</td>
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<td>9</td>
<td>Yellow Birch</td>
<td>83.2</td>
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<td>10</td>
<td>Sugar Maple</td>
<td>73.9</td>
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<td>Sugar Maple</td>
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<td>12</td>
<td>Sugar Maple</td>
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<td>13</td>
<td>Yellow Birch</td>
<td>80.5</td>
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<tr>
<td>14</td>
<td>Eastern Hemlock</td>
<td>65.3</td>
<td>17 T 686833, 5102181</td>
</tr>
</tbody>
</table>

Photographs

Photo 1. Tree #1 - Yellow Birch (71.6 cm dbh)
**Photo 2.** Tree #13 - Yellow Birch (80.5 cm dbh)

**Photo 3.** Tree #6 - American Beech (55.4 cm dbh)
Photo 4. Tree #12 – Sugar Maple (85.1 cm dbh)

References


