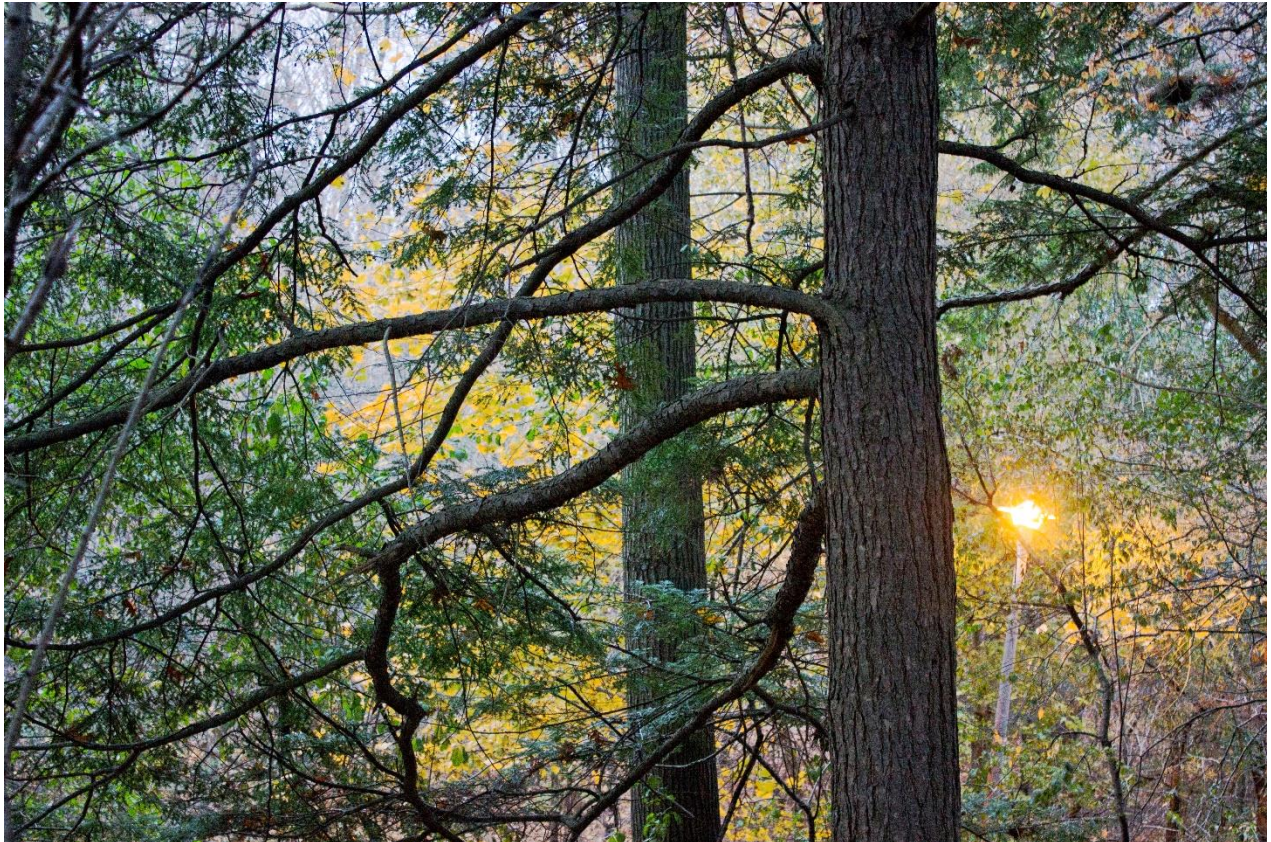


# RAPID SURVEYS TO ASSESS OLD-GROWTH EASTERN HEMLOCK FORESTS IN THE GREATER TORONTO AREA

*Preliminary Results Bulletin #7, January 2019*

BY M. HENRY AND P. A. QUINBY



**Ancient Forest Exploration & Research (AFER), Powassan, Ontario**  
[info@ancientforest.org](mailto:info@ancientforest.org); [www.ancientforest.org](http://www.ancientforest.org)

## SUMMARY

The Greater Toronto Area (GTA) is a highly urbanized landscape with a severe reduction in natural forest cover. However, significant natural areas exist including old-growth forests in downtown Toronto that date back to early settlement. Eastern hemlocks 144 to 182 years old were found in Sunnybrook Park and Serena Gundy Park, and in nearby Sherwood Park an eastern hemlock tree was aged at 188 years old.

Some forests in the GTA appear to predate settlement. A white cedar-eastern hemlock swamp (forest) at Scotsdale Farm (near Georgetown) had trees reaching at least 250 years in age, and it is believed that older trees may be found there. While areas such as this were likely harvested, some were never fully cleared leaving a generation of trees that predate settlement. Other old-growth forests that we visited in the GTA fit this pattern, including Maple Nature Reserve, Bolton Resource Management Tract, and Seneca College King Campus. All were found to have trees 200-250+ years old.

## INTRODUCTION

We visited sites in the municipalities of Toronto, Peel and York in the Greater Toronto Area (GTA) as part of our Eastern Hemlock Project. This study is one of many field surveys undertaken with the following goals:

- use maps, literature, and field data to identify and characterize old-growth eastern hemlock forests in anticipation of the arrival of hemlock woolly adelgid (HWA),
- collect field data to confirm visual characteristics of old age in eastern hemlock trees, and
- raise the public profile of eastern hemlock as an old-growth and foundation species that is currently under threat.

The GTA is a highly urbanized area where natural vegetation cover has been dramatically reduced. For example only 17% forest and wetland cover remains within the Toronto Region Conservation Authority (TRCA) region, and it is expected that under current urbanization trends, species will continue to disappear from a landscape that is less able to support them (TRCA 2010). However, even in the most highly urbanized areas, significant natural areas exist including numerous old-growth forests that have value for recreation, education, research, and as high-quality habitat (North-South Environmental 2012).

## WEST DON VALLEY

On November 15, 2017 we visited four locations in the West Don Valley/Burke Brook areas.

### SHERWOOD PARK

Most of the old-growth forest in Sherwood Park occurred in the large block north of Mount Hope Cemetery, however the ridge running along the west side of Burke Brook south of Blythwood supported eastern hemlock groves. We dubbed this “Ball Diamond Ridge”, which is a narrow strip of forest between the paved trail and a field and ball diamond that widened out to an eastern hemlock grove to the north at the stairway. It didn’t look impressive, however, we cored two eastern hemlock trees and found a maximum age of 168 years. There was some eastern hemlock regeneration from one to four meters in height and there was some Norway maple in the canopy and some regenerating on the forest floor. Erosion on the slope (dogs cross through the fences) and garlic mustard were also common. This small patch had some old-growth features including logs and snags (mostly decay class 1-2, but some 3-4); relatively old eastern hemlock trees were common.

The main block of Sherwood Park was a highly significant urban old-growth forest, likely the best example of old-growth forest in the City of Toronto. Eastern hemlock was a minor component of this forest occurring as scattered trees and small groves. The old-growth forest communities here were found on flat terraces compared with ravines where old-growth forests are more common on the steep slopes. Most of the old forest occurred in the dog-off-leash area north of Mount Hope Cemetery where large oaks and maples up to one metre in diameter and at least 200 years old were found. Scattered white pine and eastern hemlocks were also found there. The forest had features of natural forests that are rarely present in an urban area, including numerous suppressed eastern hemlocks, tall mature trees, snags, and fallen logs.

### **Sherwood 2 - Core and Tree Photo**

#### ***Eastern Hemlock***

Lat: 43.717382

Long: -79.388821

Ring count: 122 yrs.

Core: full (missed center)

Estimated age: 146+ yrs.

DBH: 36.0 cm

Height: 18.6 m

Height of first branch: 6 m

This diminutive tree was typical of those on the ridge. Signs of age were not pronounced (moderate taper, some larger branches, slight sinuosity).



### **Sherwood 3 - Core and Tree Photo**

#### ***Eastern Hemlock***

Lat: 43.717382

Long: -79.388821

Ring count: 144 yrs.

Core: full

Estimated age: 168 yrs.

DBH: 51.4 cm

Height: 16.3 m

Height of first branch: 7.3 m

Some large branching, including a significant stovepipe branch was located high on this tree. There was moderate taper on trunk.



#### **Sherwood 4 - Core and Tree Photo**

##### ***Eastern Hemlock***

Lat: 43.716731

Long: -79.384245

Ring count: 135 yrs.

Core: full

Estimated age: 159 yrs.

DBH: 58.2 cm

Height: 22.4 m

Height of first branch: 9.5 m

This was a relatively large straight tree growing in the shade of a red oak. There were few characteristics of old age/suppression. There was moderate taper on the trunk.



#### **Sherwood 5 - Core and Tree Photo**

##### ***Eastern Hemlock***

Lat: 43.715968

Long: -79.38501

Ring count: 164 yrs.

Core: full

Estimated age: 188 yrs.

DBH: 51.4 cm

Height: 19.5 m

Height of first branch: 4 m

This tree was growing near the edge of a woodland/cemetery. A fallen red oak nearby was 95 cm diameter, and 183 rings were counted 4.5 m up the tree (making it over 200 years old). This oak was likely shading the hemlock for almost its entire life. This hemlock tree had trunk sinuosity, low taper, a distinct lean, large twisting upper branches and a somewhat flat top.



## SERENA GUNDY PARK

Small groves of relatively old eastern hemlock trees occurred south and west of the West Don River in Serena Gundy Park, including a grove growing on a knoll southwest of the bridge over the West Don River. The forests of Serena Gundy Park were more or less contiguous with those in Sunnybrook and Wilket Creek Parks, making it a very significant urban natural area.

### Serena 1 - Core and Tree Photo

#### *Eastern Hemlock*

Lat: 43.718865

Long: -79.354138

Ring count: 158 yrs.

Core: full

Estimated age: 182 yrs.

DBH: 67.9 cm

Height: 24.3 m

Height of first branch: 11 m

This was one of a few old trees scattered among younger trees and was growing beside the trail near where it connects to a field.



### Serena 2 - Core and Tree Photo

#### *Eastern Hemlock*

Lat: 43.719027

Long: -79.355047

Ring count: 121 yrs.

Core: full

Estimated age: 145 yrs.

DBH: 57.4 cm

Height: 20.1 m

Height of first branch: 6 m

This tree was part of an eastern hemlock grove growing on a small hill southwest of the bridge over the West Don River. Many of the old eastern hemlocks in this grove were likely of a similar age.



### **Sunnybrook 1 - Tree Photo**

#### ***Eastern Hemlock***

Lat: 43.723846

Long: -79.366385

Ring count: 144 yrs.

Core: full

Estimated age: 168 yrs.

DBH: 58.7 cm

Height: 25 m



### **Sunnybrook 2 - Tree Photo**

#### ***Eastern Hemlock***

Lat: 43.724085

Long: -79.365462

Ring count: 145 yrs.

Core: full

Estimated age: 169 yrs.

DBH: 89.3 cm



## **OTHER GTA SITES**

### **MAPLE NATURE RESERVE**

The Maple Nature Reserve is located adjacent to the Maple Uplands Area of Natural and Scientific Interest (ANSI), which is located mostly west of Dufferin Street and north of Teston Road. However, the boundary does extend into the upper part of the East Don Valley. The TRCA has designated this area as an Environmentally Significant Area (ESA). The Maple Nature Reserve is part of a large natural area that provides connectivity between the Oak Ridges Moraine and the Don Valley riparian corridor (TRCA 2010).

We visited the site in October and November of 2018 and were impressed with the age and natural feel of the white cedar-eastern hemlock forest and adjacent hardwood-hemlock forests. A ring count of an eastern hemlock log yielded 173 rings, for a minimum age of around 180 years. These eastern hemlocks form part of a significant complex of mature and old-growth forests including upland hardwood forest and coniferous swamp forest.

### **BOLTON RESOURCE MANAGEMENT TRACT**

Several pockets of old-growth eastern hemlock occurred within and adjacent to the Bolton Resource Management Tract along the Humber Valley Heritage Trail. No trees were cored, and the oldest ring counts from cut logs indicated that the trees were approximately 130 years old. However, visual characteristics of eastern hemlocks indicated that trees were commonly 150 years old or more. One of the best examples of old forest occurred on the other side (NW) of Castlederg Side Road. Approximately 100 m from the road, the trail went near old-growth eastern hemlocks mixed with younger yellow birch trees. Visual characteristics suggested that the eastern hemlocks were commonly 150-200 years old. Some trees had characteristics of older trees and one was estimated at 250+ years old.

There were countless ash logs; most appeared to be red ash that were cut for trail safety. Ring counts from some of these trees indicated that they reached at least 130 years old, and old-growth ash trees appeared to have been a significant component of the forest. Ash trees remaining in this forest should be evaluated for resistance to emerald ash borer (EAB). A study of ash forests attacked by EAB in Ohio found rates of putative resistance to EAB of around 1% (Knight et al. 2012). Silvicultural management of ash, other than removal of hazard trees, is detrimental to ash populations, can accelerate EAB-related decline of remaining ash trees, and may eliminate resistant trees that are valuable for producing seed stock for restoration (Foster and Orwig 2006, Knight et al. 2012, MaMA 2018).

The *Monitoring and Managing Ash (MaMA) Program* is a U.S.-based initiative to use citizen science data to record locations of resistant ash trees for conservation, research and breeding programs (MaMA 2018). The MaMA website provides management guidelines that are applicable to all Ontario ash species. Although MaMA is a U.S.-based initiative, there may be opportunities for collaboration with Canadian organizations.

In Canada, the Forest Gene Conservation Association (FGCA) is seeking trees with viable seed to bank ahead of the emerald ash borer impact, as well as trees that have survived an EAB infestation without being treated by TreeAzin (FGCA 2018). The FGCA has set up an iNaturalist project to gather reports from citizen scientists (<https://www.inaturalist.org/projects/ontario-native-ash-seed-and-survivor-dna-collection>).

### **SENECA COLLEGE KING CAMPUS**

King Campus of Seneca College had pockets of old-growth forest surrounding a small lake and wetlands (TRCA 2012). Some of the oldest trees occurred in a small sugar bush near the campus entrance, extending across the road to the lakeshore. The forest had old sugar maples and had many beech trees that have largely died, or have deformed bark caused by beech bark disease. A ring count from a log showed that some of the large beech trees were over 180 years old when they died. Several standing and downed dead ash were also present in the forest.

Old eastern hemlock forest occurred near the lake west of Eaton Hall and can be reached by the Woodland Passage Trailhead. White cedars and eastern hemlocks in the wetland were small but some are likely 150-200 years old or more. Following the trail further up the ridge another grove of old hemlocks at least 150 years old occurs. Invasive species in the forest include goutweed and periwinkle.

### **SCOTSDALE FARM**

This historic farm was gifted to the Ontario Heritage Trust by Stewart and Violet Bennett in 1982. The couple had farmed there for 40 years, raising Arabian horses and shorthorn cattle. However, less well known is that the

property also has sugar maple forest that we estimated to be 150-200+ yrs. old and a white cedar-eastern hemlock swamp with trees that were over 250 years old. An eastern hemlock that fell across the trail was over 250 years old. White cedars and eastern hemlocks nearby were likely of a similar age. The swamp was greater than 50 ha in size and had trees with old-age characteristics including southwest of Trafalgar Road where an eastern hemlock log was estimated to be 240+ yrs. old.

## REFERENCES

- Forest Gene Conservation Association (FGCA). 2018. **Help Us Find Ash Seed and EAB Survivors**. Available at: <https://fgca.net/2018/09/help-us-find-ash-seed-and-eab-survivors/>
- Foster, D. R. & D. A. Orwig. 2006. Preemptive and salvage harvesting of New England forests: when doing nothing is a viable alternative. **Conservation Biology** 20:959–970.
- Knight, K. S. et al. 2012. **Dynamics of surviving ash (*Fraxinus spp.*) populations in areas long infested by emerald ash borer (*Agrilus planipennis*)**. In: Proceedings of the fourth international workshop on the genetics of host-parasite interactions in forestry: Disease and insect resistance in forest trees. Gen. Tech. Rep. PSW-GTR-240. Albany, CA. pp. 143-152.
- Monitoring and Managing Ash (MaMA). 2018. **Monitoring and Managing Ash** (MaMA) – A citizen-science-driven program for conservation and mitigation. Available at: <http://www.monitoringash.org/>.
- North-South Environmental, 2012. **Environmentally Significant Areas (esas) in the City of Toronto**. Prepared for Toronto City Planning. 109 pp. Available at: [https://www.researchgate.net/profile/Vladimir\\_Kricsfalusy/publication/316256779\\_Environmentally\\_Significant\\_Areas\\_ESAs\\_in\\_the\\_city\\_of\\_Toronto/links/58f7d782a6fdcc86f8123506/Environmentally-Significant-Areas-ESAs-in-the-city-of-Toronto.pdf](https://www.researchgate.net/profile/Vladimir_Kricsfalusy/publication/316256779_Environmentally_Significant_Areas_ESAs_in_the_city_of_Toronto/links/58f7d782a6fdcc86f8123506/Environmentally-Significant-Areas-ESAs-in-the-city-of-Toronto.pdf).
- Toronto and Region Conservation Authority (TRCA). 2010. **Maple Nature Reserve and Adjacent Lands, Terrestrial Biological Inventory and Assessment**. Available at: <http://trca.on.ca/dotAsset/187492.pdf>.
- Toronto and Region Conservation Authority (TRCA). 2012. **Seneca College King Campus Terrestrial Biological Inventory and Assessment**. Available at: <https://trca.ca/app/uploads/2016/02/SenecaCollegeKingCampusMarch2012.pdf>.