

EMERALD ASH BORER MANAGEMENT PLAN

County of Northumberland

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PURPOSE

Emerald Ash Borer (EAB; *Agrilus planipennis*), an invasive species from Asia, has been spreading in the Northumberland County since its first confirmed occurrence in the County in 2013. Northumberland County's Forest Service Staff identified the creation of an EAB Management Plan in the Council-approved Forest Services Strategic Plan (2016-2020). The intent of the EAB Management Plan is to reduce the financial, environmental and public safety impacts associated with EAB by strategically managing ash trees on County roads and properties while delivering a public awareness campaign on the threat posed by EAB and the actions that the County is taking.

ALIGNMENT WITH NORTHUMBERLAND COUNTY'S STRATEGIC PLAN

The County of Northumberland has long recognized the benefits of healthy tree and forest cover since the establishment of the now 5500 acre County Forest in 1924. The "ecological and aesthetic value of trees" is also recognized in the Forest Conservation By-Law approved in 2015 (By-Law 2015-27).

Development of an Emerald Ash Borer Management Plan was identified in the Forest Service's Strategic Plan under Sustainable Infrastructure & Services (Strategic Action 2.8). An Emerald Ash Borer Management Plan also supports Forest Services' following strategic Priorities and Actions:

- (1.4) Improve outreach and communication for private land stewardship programs.
- (1.5) Improve outreach for invasive species and develop strategies for their identification, management and for early detection of new invasive species that can have negative economic impacts.
- (2.1) Continue to create, maintain and update management plans, including asset and infrastructure plans.
- (3.1) Develop and maintain a leadership role in County-wide natural heritage conservation through programming, partnerships and integration in public policy.

An EAB Management plan also supports the County's corporate strategic plan by supporting the pillars of Sustainability and Community.

This Plan compliments the asset management efforts in the Transportation Master Plan, Cycling Master Plan and Forest Master Plan by optimizing the performance of infrastructure and operations. Supporting Northumberland County's 2015 corporate strategic plan, trees along County roads and at County owned properties should be proactively managed to "develop and maintain existing levels of service and infrastructure without compromising the ability of future generations to meet their needs."

BACKGROUND

The Emerald Ash Borer is a non-native, invasive wood-boring beetle that attacks and kills healthy ash trees. Emerald Ash Borers have killed more than 40 million ash trees (genus *Fraxinus*; Pennsylvania State University, 2009) and threatens billions more across North America (Government of Canada, 2014). This pest is generally acknowledged as the single most destructive forest pest to enter North America and is expected to cost Canadian municipalities \$2 billion over a 30-year period (Government of Canada, 2016).

In August 2002, the Canadian Food Inspection Agency (CFIA) confirmed the presence of EAB in Windsor, Ontario. EAB has spread throughout Ontario and Quebec despite efforts of the agency to control the infestation. Figure 1 shows the Canadian Food Inspection Agency's regulated areas for Emerald Ash Borer which is basically the extent of EAB's current range.

EAB can travel 20 km in a day (Taylor et al. 2010) but is also spread via the transportation of firewood, nursery stock, wood chips and harvested timber. Infested ash trees die within 5-8 years after showing signs of dieback. The presence of EAB in Northumberland County was confirmed by the Canadian Food Inspection Agency in June 2013. Forest Service staff anticipates that EAB will kill most, if not all, of Northumberland County's unprotected ash trees within the next decade.

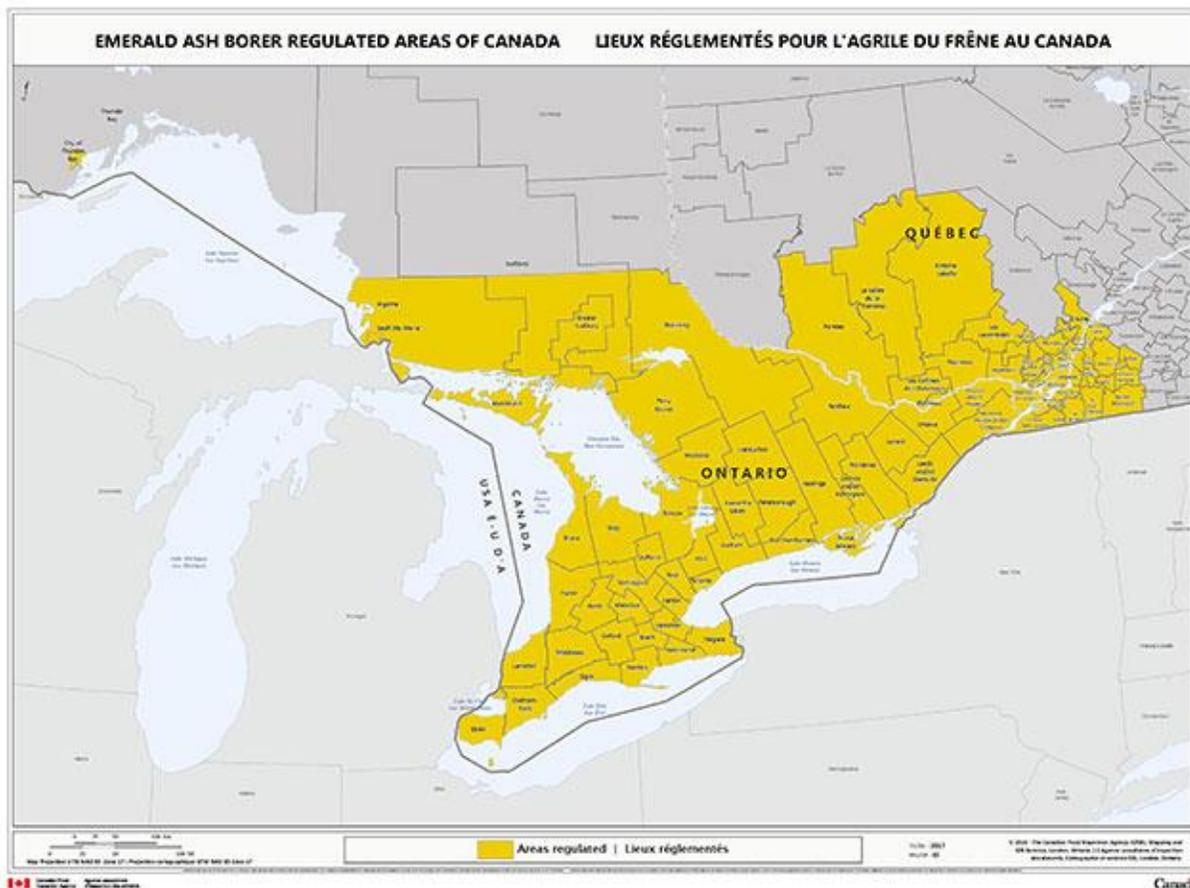


FIGURE 1. CANADIAN FOOD INSPECTION AGENCY 2013 REGULATED AREAS MAP FOR EMERALD ASH BORER (from www.inspection.gc.ca, 2017).

ASH IN NORTHUMBERLAND COUNTY

Ash trees are a native tree species that are found throughout Southern Ontario and have often been planted in parks, yards and along streets as they can tolerate urban stressors like poor soil conditions, air pollution and salt

damage. Ash trees grow best in rich, moist, well drained soils containing a high content of nitrogen. Dense concentrations of ash trees are found in the Northeast area Northumberland County, particularly in the Municipality of Trent Hills. Some of the impacts of ash canopy loss will be increased storm water runoff, reduced carbon sequestration and air pollution filtration, and the loss of aesthetic values.

The County of Northumberland is responsible for trees located on County road allowances, County Forest, and other County owned facilities. There are approximately 6373 ash trees on County roads and 162 at facilities, not including ash trees in the County Forest or trees that are in areas of County property away from any facilities.

Ash is not a major component of the County Forest due to the habitat, but there are clusters in the area of Bowmanton and Beagle Club roads (Carstairs Forest), the pond east of the Scout Camp and along the edges of the Burnley Creek Wetland.

BIOLOGY AND LIFE CYCLE

EAB is in the family Buprestidae (Order Coleoptera) a group of metallic, wood-boring beetles. Adults are a dark metallic green, approximately 10 mm in length, and approximately 3 mm wide. Similar species from the Buprestidae family and within the *Agilus* genus can be mistaken for Emerald Ash Borer.

EAB adults emerge in late May after overwintering in bark and begin to feed on ash leaves, then females lay eggs under the ridges of bark. Hatched larvae then bore into the inner bark to feed behind the bark (the cambium) and create S-shaped galleries which disrupt the water and nutrient transport and causes dieback. Over time bark becomes brittle, branches begin to break and finally the tree fails, often at the trunk. Once signs and symptoms of infestation have developed the tree is usually very infested. Where EAB is established, trees can be attacked and killed in as little as two growing seasons, but generally it takes 5 years or longer.



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FIGURE 2. EAB LARVA (Eric R. Day, Virginia Polytechnic Institute and State University, Bugwood.org 2014)



FIGURE 3. EMERALD ASH BORER ADULT FEEDING ON ASH LEAF (Leah Bauer, USDA Forest Service Northern Research Station, Bugwood.org 2012)

GOALS

The goals of this EAB management plan are to:

- 1. Minimize liability and risk posed by hazard trees.**
- 2. Plan and budget for EAB management.**
- 3. Maintain and enhance the social, economic and environmental benefits gained from tree cover.**
- 4. Provide public awareness about EAB.**

COUNTY APPROACH

Forest Service staff have considered possible management actions and have determined that the most beneficial approaches that meet the County's corporate strategic plan as well as the purpose and objectives of this plan are:

- Managing ash trees on Northumberland County property
- Development of a public awareness campaign

This plan will focus directly on County owned ash trees. This includes all ash trees within the County road allowance, ash trees on County owned properties, and ash trees within the County Forest. The actions associated with this portion of the management plan are:

- Inventory
- Removals
- Insecticide treatment of select trees
- Replacement planting partnerships

A public awareness campaign will be undertaken as a mechanism for supporting management of non-County owned trees (e.g., lower-tier municipality, private). The County recognizes the value of non-County owned trees to our community and an awareness campaign will provide support to residents and municipalities using our current resources.

MANAGEMENT

The EAB Management Plan is broken down into five core activities with management direction for each activity as follows.

ASH TREES IN RIGHT-OF-WAYS

Management Direction: Inventory, remove and replace ash along County roads, prioritize areas of high concentration over 7 years to minimize risk and liability. The Forest Service will support the Roads Department in managing ash tree removal.

The systematic removal of ash trees will ensure that managing the negative effects of EAB is undertaken in a proactive, cost-effective, and efficient manner. By reducing the probability of damage caused by tree failure, this strategy will limit hazardous conditions and minimize risk associated with dead and declining trees.

Additional Information

Ash trees within County Right-of-ways that pose a risk of affecting travelled roads have been counted (6373 trees) and mapped in road asset management sections (Appendix 2).

Identifying the cost of tree removals is difficult as there are many factors such as proximity to structures, power lines, or other hazards as well as tree size, waste disposal and travel distance required that affect the cost of removal.

A significant problem with the removal of this many trees is the amount of residue from the trees (i.e., branches and trunks). The solution must consider the volume of residues as well as the transport of EAB. There are few options for the large amount of chips that would be created from the tree branches through the removal program. Unless the chips are cut to less than 1", then it is unlikely that the larvae will be killed. The best option would be to have the chips taken to a temporary storage facility such as a transfer station or landfill and stored there for 1 year and then ground and added to current compost programs or given away/sold as chips. This would result in a significant amount of "brown" residue to the compost which may not be adequately offset by green residues, so

attention would need to be paid to volumes being brought in. As well, because of the risk of combustion of large chip piles, storage best practices need to be implemented.

To manage the larger “log residue”, it is suggested that the County stockpile logs at County waste facilities or transfer stations for 1 full winter, spring and summer to allow for emergence of most >90% of adults and larvae. Following this stockpiling, the County could:

1. sell non-sawlog quality wood to firewood producers demonstrating appropriate WSIB and insurance through tendered sales.
 - a. This wood could also be given away to the general public, but unfavourable concerns for such a program include resources required for administering the program and the liability in pickup, transport and processing of the material by private citizens (i.e., injury, vehicle damage, objects lodged in the wood).
2. sell sawlog quality wood to mills.
 - a. Recognizing that the potential for quality sawlogs along roadsides is very low and that some mills may not be interested especially due to potential for foreign objects such as nails and fencing in the timber.
3. provide sawlog or higher quality wood to people with business ideas that would create positive economic activity within the County.
 - a. The potential for a sustainable business to arise from this is relatively high as there will be a lot of material available from public and private lands over the next decade. Example business could include paddle or furniture manufacturers, small sawmills, carvers and other “cottage” industries.

ASH TREES AT FACILITIES

Management Direction: Inventory, protect, remove and replace ash trees at County facilities to minimize risk and maintain and enhance the social, economic and environmental benefits of tree cover.

Additional Information

Ash trees were inventoried (162 trees) at 26 County facilities (Appendix 3) and 100 of these trees were found at the Plainville Sand Dome. It is recommended that 26 apparently healthy ash trees (<30% canopy dieback, no signs of infestation) found at 4 County residential facilities should receive insecticide treatment (Table 3) while the remaining 136 trees should be removed and replaced.

It is recommended that the insecticide TreeAzin® be used for treatments. TreeAzin® provides up to 2 year control of EAB but annual treatment is required during peak infestation. Other insecticides should be continually considered based on regulations, costs, effectiveness and negative environmental effects (ex. negative effects of neonicotinoids on pollinators). The estimated cost of contracted TreeAzin treatment is \$8 per cm of tree. The total cost of treatment for all 26 trees is estimated to be \$10, 024. Currently, however, staff has appropriate pesticide licensing and training and therefore the cost to perform in-house is approximately one quarter of the price for purchasing of the product. County staff performed a first round trial of this in the summer of 2017.

TABLE 1. ASH TREES TO BE TREATED WITH INSECTICIDE

| Location | # Ash to be Treated | Total DBH (cm) |
|----------------------------|---------------------|----------------|
| Golden Plough, Cobourg | 2 | 48 |
| Holland Court, Port Hope | 5 | 419 |
| Sunset Court, Campbellford | 13 | 546 |
| Windemere, Cobourg | 6 | 240 |
| Meade St, Brighton | 1 | 140 |
| Total | 26 | 1253 |

ASH TREES IN COUNTY FOREST

Management Direction: Remove or protect ash trees as part of Hazard tree risk management, silvicultural operations or ecological restoration planning.

Additional Information

Ash trees are a small component of the County Forest. Ash along Forest roads and trails will be removed as part of the Hazard Tree Management Plan. Ash within the County Forest will be managed as part of the Silviculture operations or the ecological restoration initiatives.

Trees at the following locations have been and should continue to be treated with TreeAzin.

- Beagle Club Road parking lot; two large trees that provide shade, aesthetics and public awareness possibilities
- Universal Trail; 21 large trees along trail that provide shade, aesthetics and prevent hazards
- Pond in compartment 31; mature ash trees that protect wetland values and are being conserved for potential conservation value

Presently treatment will continue with TreeAzin, but other insecticides would be considered based on treatment costs and effectiveness as well as their approval under Forest Stewardship Council (FSC®) regulations and their impacts on the environment (e.g., neonicotinoids).

REPLACEMENT PLANTING

Management Direction: Replace ash trees removed along right-of-ways through partnerships to compensate the loss of ecosystem services at a replacement ratio of approximately 1:10 (removal : replacement).

Additional Information

The loss of trees and their benefits will be compensated by partnering with other organizations that have existing projects (possible examples shown in Table 2). In each program landowners apply to receive subsidized trees to plant and care for on their property. Plantings within right-of-ways would not be permitted to ensure that there are no future infrastructure conflicts with the trees. The preferred programs to subsidize in this program are those that would result in a diversity of species being planted over a large geographic area.

TABLE 2. REPLACEMENT PLANTING PROGRAM WITH EXAMPLE PROGRAM AND COST ESTIMATES

| Program | Trees Planted /Year | Trees over 5 Years | \$/Tree | \$/Year |
|--|---------------------|--------------------|---------|-------------|
| Ganaraska Region Conservation Authority- Trees for Rural Roads | 2000 | 10000 | \$12.50 | \$25,000.00 |
| Forests Ontario 50 Million Trees | 10000 | 50000 | \$0.50 | \$5,000.00 |
| Total | 12000 | 60000 | \$13.00 | \$30,000.00 |

PUBLIC AWARENESS

Management Direction: Increase public awareness about the threat of EAB and provide information on solutions to manage the effects of EAB. As well, the County will need to ensure that homeowners near removals understand that the removals will be happening as this will have an impact on the buffers and views of some houses.

Ideally, the County could enter into agreements with some homeowners that would like to have County-owned trees near their houses treated, but a policy and agreement would need to be created and resources would be needed for administration of such a project.

Additional Information

The public awareness campaign will assist the public in recognizing signs of EAB infestation, the potential impacts and options for management is important to the overall success of this plan and includes:

- the threat of Emerald Ash Borer
- how to identify ash trees and the signs of EAB infestation
- the responsibilities of residents to monitor privately-owned trees which may die and become hazardous as a result of EAB infestation;
- what to look for in a reputable tree service company
- an appropriate plant list to replace removed trees
- what to do with residual wood

Communications may take the form of:

- informational brochures and handouts
- information on County website
- attendance and information and events and public speaking engagements
- print and radio advertising
- signage in the County Forest at the Beagle Club Road parking lot and along the Universal Trail

For a sample of example information see Appendix 4.

DELIVERY STRATEGY

Table 3 outlines a timeline for the Emerald Ash Borer Management Plan’s delivery.

TABLE 3. MANAGEMENT STRATEGIES FOR EMERALD ASH BORER.

| Action | Responsibility | Status |
|--|--|-----------------------|
| Inventory ash trees on County roads and properties | Forest Service | Completed Summer 2016 |
| Remove ash trees at County Facilities | Contractor with Facilities Staff Oversight | 2017 – 2018 |
| Treat 26 selected ash trees bi-annually at County Facilities | Forest Service | 2017 - 2027 |
| Continue to treat selected ash trees in County Forest | Forest Service | 2017-2027 |
| Remove ash trees along County Roads | Contractor with Roads and Forest Service Oversight | 2018 – 2024 |
| Communicate with public regarding EAB | Forest Service | 2018- ongoing |
| Replace removed ash trees with appropriate tree species | In partnership with Forest Ontario and GRCA | 2018 - 2022 |
| Undertake annual review of EAB management plan and update County Council | Forest Service | Annually |

REFERENCES

Government of Canada. 2013 Canadian Food Inspection Agency, Regulated areas map for emerald ash borer. http://www.inspection.gc.ca/DAM/DAM-plants-vegetaux/STAGING/images-images/pestrava_agrpla_ministerial_image1a_1372765048219_eng.jpg

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