Emerald Ash Borer Management Plan

The Municipality of South Dundas
Environmental Services Department
September 2020

Introduction

The Emerald Ash Borer (EAB) is a non-native insect tree pest which has the ability to completely eliminate ash trees from the urban, rural, and natural forests of South Dundas. Ash is an important colonizing species on abandoned agricultural lands which makes up the majority of South Dundas forest.

Trees are an important part of the ecological system in South Dundas. Ash trees are known to have contributed to several beneficial aspects in the Municipality such as:

- Offering shade that helps reduce urban heat islands, and reduce cooling bills in the summer
- Provinding wind blocks reducing heating bills and snow drifts in the winter
- Filter air pollution by capturing carbon from the air and creating oxygen in return
- Providing habitat for birds and other animals
- Increasing property values
- Reducing storm water run off

It is recommended that the ideal tree canopy for urban areas is between 30-40 %. Based on a South Nation Conservation Authority 2016 report on Forest Cover, South Dundas currently has a total forest cover (including rural areas) of 31.5%, and saw a decrease in tree canopy between 2008-2014 by 4.1%. Of the forest cover 91% of it was located in treed lots, 3% in plantation farms, and 6% in hedgerows. It is estimated that 30% of South Dundas' tree canopy is comprised of ash trees.

Even with the effective planning, implementation of control measures, and re-planting efforts, the Municipality's forested landscapes will experience a dramatic change as a result of the ongoing invasion of this beetle. There is currently no pesticide or elimination method that has proven successful in the prevention or control of EAB. Through the implementation of specific actions outlined in this management plan, the Municipality will be better prepared to take effective efforts to minimize the risks, loss of benefits, and costs associated with EAB infestation.

This document presents an Action Plan for the management of EAB and ash trees in the Municipality of South Dundas, Ontario.

The Municipality's forested landscape will see a dramatic change because of ongoing invasion of the Emerald Ash Borer.

Background

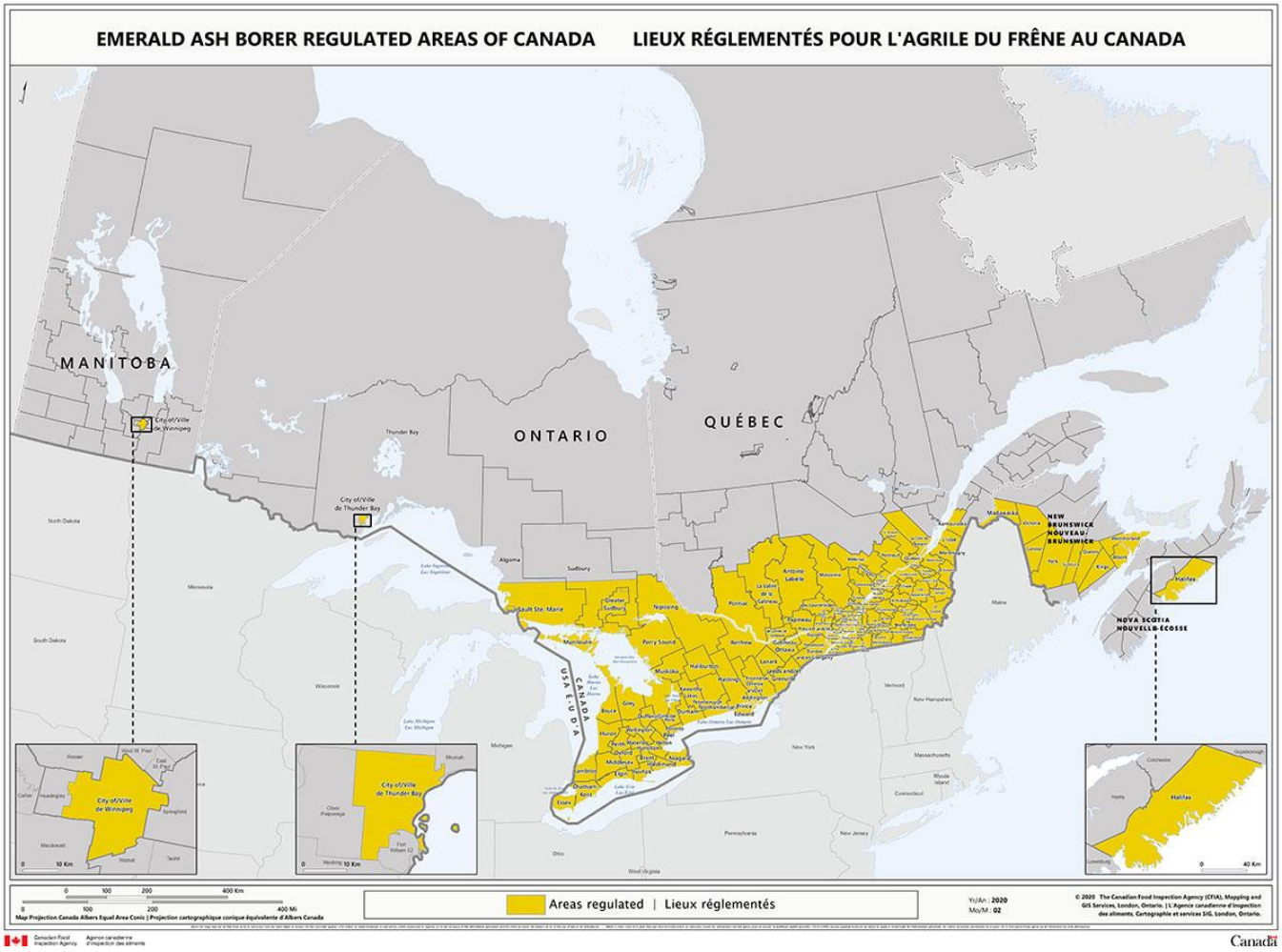
The Emerald Ash Borer (EAB) is an Asian species native to China, Japan, Taiwan, Korea, Mongolia, and the Russian Far East. In 2002 the beetle was detected, for the first time, in Windsor Ontario. Data from tree ring analysis indicated that the beetle had probably been present in Windsor since the early 1990s.

Since 2002 there has been a continued annual spread of EAB across Ontario. The spread of the insect is partially due to its annual migration, but is largely attributed to the movement of ash tree wood for manufacturing as well as recreational uses.

For this reason, the CFIA placed a complete ban on the movement of ash except within the quarantined zone. The quarantined zone has expanded over the past decade and was last updated in 2020 and is illustrated in Image 1.

In North America, five species of native ash have been attacked by the EAB. All five of these species occur in Canada and all species but blue ash are highly susceptible. Although documented, blue ash seems to be somewhat resistant to EAB attacks. Ash trees are an important component in many forest communities in Canada and are extensively planted throughout many Municipalities.

Image 1: Emerald Ash Borer Quarantined Zone, CFIA 2020.



The Emerald Ash Borer

- Life History

In Canada, beginning in late May adults of the EAB emerge by chewing out through the bark of the host tree, creating a characteristic “D” shaped hole. The adults then eat the host foliage for a period of up to two weeks prior to mating and egg laying. Males located females using pheromonal and visual cues.

Once mated, females lay their eggs in bark crevices or under bark scales on the branches and trunks of host trees. Larvae hatch from the disk-shaped eggs after 1-2 weeks of incubation depending on the temperature. The newly hatched larva then tunnels out the bottom of the egg, down through the layers of the bark until they reach the interface between the bark and the wood where they feed and excavate “S”-shaped tunnels. The larva then pupates inside a chewed chamber in the bark . After overwintering, about 80% of the larvae mature, with the other 20% requiring a second winter to complete development.

- Emerald Ash Borer-Ecology

The prepupae of the EAB is able to withstand minimum temperatures of about -30˚C, due to antifreeze compounds. Under bark temperatures are often higher than air temperatures allowing the beetle to survive in most areas where ash occurs naturally. In more northern climates the two-year life cycle for prepupae slows population increase and natural spread.

Recent surveys in Canada have suggested that some native parasitoids are having an impact on EAB populations and may potentially be exploited as biocontrol agents. Currently woodpeckers are the only known native predator that feeds extensively on the borer.

- Attack and Damage

Adult borer’s feed on the foliage, but the larvae feeding on the bark and sapwood results in ash tree mortality. The trees transportation system which moves nutrients throughout the tree and brings water up from the roots, is destroyed by the feeding of the larvae resulting in the death of the tree by girdling.

Signs and symptoms of an infected tree include:

Crown dieback

Bark deformities

Woodpecker feeding holes

D-shaped emergence holes

Shoots growing out of the trunk, roots and branches of the trees

An infected tree does not present signs or symptoms until the population of beetle is well established.

- Widespread Impacts

Ash is an important component of many different habitats. In stream side habitats, the loss of these trees will result in erosion of soils into streams and changes in water temperature with increased solar exposure. In wooded areas the gaps caused by ash tree mortality will affect microclimates of the forest and facilitate the invasion of exotic plant species.

Ash tree loss will also result in reduced biodiversity in forests, limiting the number of herbivores that depend on ash for food. In urban areas the loss of ash trees will impact windbreaks, temperature mitigation, pollution abatement, runoff prevention, property values, and provision of habitat for wildlife.

South Dundas Emerald Ash Borer (EAB) Plan

The Effects of EAB on our Municipality

The loss of ash trees on public and private lands will have a significant impact on the Municipality's urban tree canopy that requires a proactive approach to mitigate the issue. The Municipality has hundreds of ash trees whose average life span is 70-85 years along township streets and in active parks. It is unknown at this time how many trees are in the Community's forested properties or along roadways. During a tree assessment in Municipal parks it was determined there were approximately 172 ash trees. Trees are beneficial to the environment because they create oxygen, improve air quality, conserve water, prevent soil erosion, provide food and shelter for wildlife and provide shade benefiting climate control. Trees also increase property values and contribute to the quality of life in neighborhoods.

EAB has the ability to attack and kill healthy ash trees with devastating effects. Once EAB is detected almost all untreated ash trees in the vicinity can be expected to die within 10-15 years. With the presence of EAB in Ontario since 2002, the Municipality can use the knowledge, experience, and lessons learned by other municipalities, the province, and federal government to actively manage EAB.

Based on EAB infestations in other Ontario municipalities, it is understood that EAB populations increase exponentially 5-10 years after EAB has been detected. Tree mortality rate is very slow in the first 3 years, increasing significantly in years 5 to 8 and gradually leveling off as the ash population is reduced.

EAB was detected in 2013, meaning that infestations in the community are 7 years old and is why the Community has witnessed the tree mortality rate increase dramatically in 2019 and 2020. The Municipality anticipates losing another large amount of ash trees into 2023 with the potential to continue to see ash trees die off until 2028.

The Scope of the EAB Management Plan

Ash trees are an integral part of South Dundas' urban forest on both public and private lands. The publicly owned urban forest occurs along streets and in parks and open spaces. Privately owned trees are located on residential properties, institutional and commercial properties and in privately held woodlots. Maintenance of trees on private property is the responsibility of the property owner.

This plan applies to ash trees that are located on Municipality of South Dundas publicly owned lands such as parks, open spaces, and boulevards. Due to the arrival of EAB over the past few years, these ash trees will need to be removed and replaced with alternative trees. The plan describes these options along with addressing the need for public education and an EAB communication plan.

Removal and safe disposal of all affected trees that have become a hazard by trained Municipal staff and/or professional tree specialists is essential to maintain public health and safety. Once cut down, all ash must remain within the quarantined zone (image 1) and can be disposed of by burning, chipping, or mulching.

There are many desirable options to replace the ash trees with native shade trees. A complete list of species can be found in Attachment 1. Replacement of trees is important to the maintenance of healthy, natural shade structures, for the health of the environment, the community, residents, and the various plant and animal species within South Dundas. Replacement of significant ash trees with a different species is best prior to removal to allow the replacement tree to mature and flourish under the canopy of the ash tree scheduled for potential removal.

Removal and replacement are the only proven option to address EAB, at this time. At present less than 50% of treated ash trees have survived in communities affected by EAB.

Goals of the EAB Management Plan:

1. To ensure the health and safety of residents and visitors to the Municipality.
2. To mitigate the loss of significant ash trees.
3. To provide for the removals of affected ash trees; and
4. To provide public education and awareness.

Section 1- Identification of Ash Trees

The Municipality has provided a link on its website to explain what residents should look for to identify ash trees on their property.

On Municipal property, the Municipality's arborist identified ash trees on Municipal publicly owned lands to create the inventory of significant ash trees. The criteria to determine the significance of an ash tree is based on location, size, and health. Location considers proximity to other forests (especially untreated ash trees), position of tree within a park, trail, or other green space, usefulness to recreational activities and access to the ash tree within the Municipal land. Size is the measurement of the diameter of the ash tree. Health is determined by investigating if there is any evidence of EAB presence, assessing any faults, splits, or weaknesses, to the main structure of the ash tree and/or signs of damage caused by nature or non-natural causes.

An ash tree is considered significant if it is:

1. A prominent focal point of a park space and provides significant usefulness to recreational activities; and
2. Is sufficient in size- greater than 25cms in diameter

Due to the onset of the ash borer infestation, all 172 ash trees were identified as significant. Table 1 outlines where, geographically in the Municipality, the significant ash trees are present.

Table 1- Significant Ash Trees in South Dundas

Municipal Location	Number of Significant Trees	Areas Located (Park, Waterfront, etc)
Morrisburg	81	19 waterfront 62 parks
Iroquois	55	12 waterfront 43 parks
Williamsburg	0	0
Matilda	36	36
Winchester Springs	0	0

Staff will continue to monitor the health of the ash trees which have been identified as significant and any ash trees on newly developed Municipal park or trail space.

Assessing Health of Ash Trees

Once an ash tree has been affected by EAB there will be:

- Evidence of crown death or thinning
- New sprout growth at base of tree; and/or
- Decay of the bark as well as EAB entrance and exit holes in the bark

Every year, staff will reassess the health of ash tree population on Municipal owned lands to determine the scope of work being required for the following season. The completed inventory will continue to be updated annually for the significant ash trees in the Municipality.

Section 2- Mitigating the Loss of Significant Ash Trees

The 172 remaining significant ash trees which have been identified will be replaced in over the next 8 years (pending budget approval) as illustrated in Table 2.

Table 2: Significant ash trees to be replaced in from 2021-2028.

Municipal Location	Removal 2020-2021	Removal 1-2 years	Removal 2-7 years
Morrisburg	24	26	31
Iroquois	17	19	19
Williamsburg	0	0	0
Matilda	2	17	17
Winchester Springs	0	0	0

Municipal staff will select a replacement tree from the recommended list in Attachment 2. Trees will be replaced as close as safely possible to the significant ash tree depending on underground services, nearby healthy trees, and other existing environmental conditions.

The cost of each replacement tree is anticipated to be $500.00 for a total of $20,500.00 in 2021, and $31,000 in 2022 for replacement trees.

Section 3- Removal of Affected Ash Trees

There are currently ash trees on Municipal property that are not currently considered under this plan but will be added as the tree inventory increases. Regardless of location, ash trees will be removed when they are no longer healthy and when they become a hazard to the public. This includes all the ash trees that are located on Municipal property (e.g. parks, open spaces, boulevards).

When an unhealthy EAB affected ash tree has been identified Municipal staff will determine when the tree needs to be removed and if the tree can be removed by Municipal Staff. The tree will need to be cut down and prepared for burning by cutting into 24” lengths or would be chipped/mulched on site and utilized by the Municipality in nearby garden beds, where ash trees are not present.

Any ash tree that cannot be safely removed by Municipal staff will be red tagged for removal and listed in the inventory for preparation of a tender for tree removal.

A replacement tree, selected from the recommended list in Attachment 2, will be planted for each ash tree that requires removal.

For general removal expenses, starting in 2021 an additional $65,000 should be added to Parks and Recreation's existing annual tree cutting budget to cover the costs of removing ash trees as required. Staff would budget for tree replacement separately from ash tree removal in order to account for any potential grant opportunities for tree replacements, the estimated costs of which are outlined in Section 2.

Section 4- Provide Public Education and Awareness

Due to the perceived amount of Ash trees that will be required to be removed, the Municipality will prepare public communication tools to inform residents as to why trees in specific locations are being removed.

Website

Include all of the EAB information on the Municipal website which will include links to South Nation Conservation tree programs, a printable brochure, the CFIA quarantined area, and a list of recommended replacement trees.

Social Media

Broadcast through social media all of the EAB information including links on how to access the Municipality's EAB Management Plan.

Brochures

Print the tri-fold brochures and distribute them through municipal buildings within the Municipality.

Attachments

Attachment A- Recommended Replacement Trees

These trees are native to Eastern Ontario and grow naturally in the United Counties of Stormont, Dundas, and Glengarry. They are adapted to the local climate and are hardier and easier to maintain than non-native species. Some have quite specific soil and moisture requirements and may not do well in all sites, so it is important to appropriately choose the correct tree for replacement based on the site.

Common Name	Tree Description	Planting Tips
Alternate-Leaf Dogwood	10-meter-tall deciduous tree with white flowers in the spring and dark berries in midsummer	Evenly moist soils with partial shade, or full sun with ample moisture. Prefers well drained, deep soils.
American Beech	A 25-meter-tall deciduous tree with nuts.	Prefers moist, well drained soils with shade, should be planted in an area with rich soils
American Elm	A 35-meter-tall deciduous tree with tiny flowers in the spring and winged seeds in late spring, early summer.	Is adaptable to all soil types, prefers full sun locations and rich well-drained soils.
American Mountain Ash	A 10-meter-tall deciduous tree, unrelated to its ash counterpart, with white flowers in the spring and orange berries in the late summer.	Is adaptable to all soil types, can tolerate shaded areas.
Balsam Fir	A 30-meter-tall coniferous tree, with sticky sap and long cones.	Tolerates all levels of soil moisture and types and is shade tolerant
Balsam Poplar	A 25-meter-tall highly fragrant, deciduous tree with hanging catkins and fluffy seeds in the spring.	Prefers moist, rich, well drained soils and prefers full sun.
Basswood	A 35-meter-tall deciduous tree with fragrant yellow flowers and grayish brown fruit.	Prefers rich, moist, well drained soils. Is tolerant to all levels of sunlight.
Bitternut Hickory	A 20-meter-tall deciduous tree with bitter inedible nuts.	Prefers rich moist soil and full sun.
Black Cherry	A 22-meter-tall deciduous tree with small white flowers in the spring and edible bitter fruit in August and September	Is tolerant to all types of soils and moisture levels but requires full sun.
Black Spruce	A 30-meter-tall long living coniferous tree with dark bluish green needles and small cones that can stay on the tree for up to 30 years.	Tolerant to a variety of soils, moisture levels, and light conditions.

Black Willow	A 12-meter-tall deciduous tree with multiple trunks and narrow pointed leaves.	Prefers moist soils and can tolerate seasonal flooding. Prefers full sun.
Blue Beech	An 8-meter-tall deciduous tree with bluish green leaves and small nuts in the late fall	Prefers rich moist well drained soil and tolerates seasonal flooding, it can tolerate shade and full sun if there is ample moisture.
Bur Oak	A 30-meter-tall deciduous tree with large leaves and mid-sized acorns.	Tolerates a variety of soils, moisture levels, and light conditions.
Butternut	A 25-meter-tall deciduous tree with a short lifespan and edible nuts.	Prefers moist to moderately dry well drained rich soils in valleys or slopes but requires full sun.
Chokecherry	A 9-meter-tall deciduous tree with white clusters of flowers in the spring and fruits in early fall.	Prefers moist, rich, well drained soil and full sun.
Eastern Hemlock	A 30-meter-tall coniferous tree with scaly bark and large oval cones that fall in early winter.	Requires moist soils and shade.
Eastern White Cedar	A 15-meter-tall, long living, coniferous tree with small cones that grow in clumps.	Grows in a variety of moist soils but cannot tolerate road salt. Prefers full sun or partial shade.
Eastern White Pine	A 35-meter-tall, coniferous tree with long needles bunched in pairs of 5. The cones are relatively large and fall every 3-5 years.	Tolerates all soil types, moisture levels, and light conditions.
Gray Birch	A 12-meter-tall, short living, deciduous tree with chalky white bark in its adolescence.	Tolerates all soil types and moisture levels, requires full sun.
Hawthorns	A 12-meter-tall deciduous tree with rough shredding bark with clusters of white flowers, thorns, and apple like fruits.	Prefers moist to dry high pH soils, with full sun or partial shade.
Ironwood	A 12-meter-tall deciduous tree with hanging flowers in the spring and clusters of fruits.	Prefers moist to dry well drained acidic soils in shaded areas. It can tolerate full sun if there is ample moisture.
Largetooth Aspen	A 20-meter-tall, short living, deciduous tree with round toothed leaves.	Prefers moist to dry soil types and requires full sun.
Northern Hackberry	A 15-meter-tall deciduous tree with long leaves and fruits persisting into winter.	Prefers wet to dry soil types with a wide pH range. Prefers full sun or partial shade.
Peachleaf Willow	A 20-meter-tall deciduous tree with blossoms in the spring.	Requires moist soils and full sun.

Pin Cherry	A 12-meter-tall deciduous tree with white blossoms and bright red fruits.	Tolerates different soils and moisture levels but requires full sun.
Pin Oak	A 20 meter all deciduous tree with small flowers and acorns,	Prefers moist rich acidic soils or heavy clays, prefers full sun or partial shade.
Red Maple	A 25-meter-tall deciduous tree with red leaves in the fall and maple keys that float down from the tree in early summer.	Grows best in moist soil but can tolerate different moisture levels. Tolerates some shade but prefers full sun.
Red Oak	A 30-meter-tall deciduous tree with larger acorns.	Can tolerate a variety of soils, moisture levels and light conditions.
Red Pine	A 30-meter-tall coniferous tree with shiny dark green needles in bunches of two.	Tolerates poor, rocky, sandy soil and a variety of moisture levels. Prefers full sun.
Service Berry	A 12-meter-tall deciduous tree with clusters of white flowers and berries in mid-summer.	Prefers moist to dry soils that are well drained. Tolerates partial shade to full sun.
Sugar Maple	A 35-meter-tall long living deciduous tree. As Canada's natural tree, the sugar maple is known for its brilliant fall colors and maple keys.	Prefers moist, deep, and rich soils. Tolerates shade but grows best in full sun.
Swamp White Oak	A 22-meter-tall deciduous tree with acorns.	Prefers moist, rich, slightly acidic soils and can tolerate seasonal flooding. Will grow in partial shade or full sun.
Tamarack	A 20-meter-tall coniferous tree that sheds their needles in the autumn and has small brown cones.	Tolerates a variety of soils and moisture levels but requires full sun.
Trembling Aspen	A 25-meter-tall deciduous tree that has fluffy seeds in the spring and white bark.	Tolerates a variety of soils and moisture levels but requires full sun.
White Birch	A 25-meter-tall deciduous tree that is covered in thin, smooth white bark that peels off in large sheets.	Tolerates a variety of moisture levels and soil types but requires full sun.
White Oak	A 30-meter-tall long living deciduous tree with moderately sized acorns.	Tolerates a variety of moisture levels and soil types but requires full sun.
White Spruce	A 24-meter-tall long living coniferous tree with large cones. This tree is often harvested for a Christmas Tree.	Tolerates a range of moisture, soil types and shade.

Yellow Birch	A 25 meter tall tree, longer living then its relatives, with catkin flowers that form in the late summer and stay on the tree all winter.	Prefers moist, rich soil and is moderately shade tolerant.

Attachment B- Brochure for Residents

The information below will be included in a brochure available for residents regarding the Emerald Ash Borer and resources for Residents to utilize.

Emerald Ash Borer Plan

A public education brochure for residents of South Dundas regarding the EAB Program on Public Lands.

What is the Emerald Ash Borer?

The Emerald Ash Borer (EAB) is a non-native insect tree pest which has the ability to completely eliminate ash trees from the urban, rural, and natural forests of South Dundas.

How will the EAB impact South Dundas?

It is estimated that 30% of South Dundas' tree canopy is comprised of ash trees. The EAB will likely result in the die off of 30% of the existing tree canopy by 2028.

What is the importance of Ash trees?

Ash trees are an important colonizing species on abandoned agricultural lands and allow for increased biodiversity in an area. Ash Trees also:

- Offer shade that helps reduce urban heat islands and reduce cooling bills in the summer.
- Provide wind blocks reducing heating bills and snow drifts in the winter.
- Filter air pollution by capturing carbon from the air and creating oxygen in return.
- Provide habitat for birds and other animals.
- Increase property values.
- Reduce storm water run-off.

How do I know if an Ash Tree is infected with EAB?

- Crown dieback
- Bark deformities
- Woodpecker feeding holes
- D-shaped emergence holes
- Shoots growing from the roots, branches and truck

An infected tree does not present signs or symptoms until the population of the beetle has been well established.

Emerald Ash Borer Plan

The Municipality currently has an EAB plan in place, the following are the steps to sustainably address the EAB in South Dundas from 2021 to 2028.

1. Identify a significant ash tree and determine if the tree is infected with EAB.
2. If infected, determine level of infection and rate as high, medium or low priority removal.
3. High priority trees will be removed immediately, and wood chipped or burned. Once trees in an area are removed, high caliper trees will be planted in the same area as replacement.

4. Medium and low priority removals will be identified for under canopy tree planting. These locations will receive a small slipper tree to grow underneath the ash tree, so when the tree is removed, another tree is existing and established in its place.

Goals of the EAB Management Plan

1. To ensure the health and safety of residents and visitors to the Municipality.
2. To mitigate the loss of significant ash trees.
3. To provide for the removal of effected ash trees.
4. To provide public education and awareness.

Questions?

Contact the Municipal office, mail@southdundas.com or call 613-534-2673.