European Black Alder

(*Alnus glutinosa*)

Best Management Practices in Ontario

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Ontario

Foreword

These Best Management Practices (BMPs) provide guidance for managing invasive European Black Alder (*Alnus glutinosa*) in Ontario. Funding and leadership for the production of this document was provided by Environment Canada – Canadian Wildlife Service. The BMPs were developed by the Ontario Invasive Plant Council (OIPC) and its network of partners. The goal of this publication is to facilitate the invasive plant control initiatives of individuals and organizations concerned with the protection of biodiversity, agricultural lands, infrastructure, crops and natural lands.

These BMPs are based on the most effective and environmentally safe control practices developed through research and experience. They reflect current provincial and federal legislation regarding pesticide usage, habitat disturbance and species at risk protection. These BMPs are subject to change as legislation is updated or new research findings emerge. They are not intended to provide legal advice, and interested parties are advised to refer to the applicable legislation to address specific circumstances. Check the website of the Ontario Invasive Plant Council (www.ontarioinvasiveplants.ca) for updates.

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For more information on invasive plants in Ontario, visit www.ontario.ca/invasivespecies, www.ontarioinvasiveplants.ca, www.invadingspecies.com or www.invasivespeciescentre.ca

Front and back cover photo courtesy of Don Sutherland.

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Photo courtesy of Robert Vidéki, Doronicum Kft. Bugwood.org

European Black Alder foliage.
Photo courtesy of Leslie J. Mehrhoff, University of Connecticut, Bugwood.org.

Introduction

European Black Alder, *Alnus glutinosa* (L.) Gaertn., is an invasive tree that is also known as Black Alder or European Alder. It is a member of the Birch (Betulaceae) family. The name *Betula alnus* var. *glutinosa L.* is an accepted synonym for this plant. For the purposes of this document, the accepted common name of European Black Alder and scientific name of *Alnus glutinosa* will be used.

This document has been developed to help guide the effective and consistent, and where necessary, adaptive management of this invasive plant across Ontario. These BMPs emphasize targeting control efforts in areas where small populations of European Black Alder are present, but have not yet become dominant.

European Black Alder is native to Europe and western Asia, where it is often used as firewood, as a papermaking and particle board fibre and in joinery. It was introduced to North America by early settlers for use as a windbreak, for landscaping and as a firewood species. It is still occasionally planted deliberately for soil rehabilitation in degraded sites. It was probably first brought to North America in the late 19th century.

European Black Alder is a threat to wetland and riparian species and habitats in Ontario. Its aggressive and rapid growth shades out native tree species. It is a nitrogen-fixing plant, meaning it converts atmospheric nitrogen and adds it to the soil through its roots.

This changes the chemical composition of the soil, making it difficult for some native species to survive. These changed soil conditions can also encourage the establishment and growth of other non-native invasive species.

This tree grows in wet to moist soils and prefers full sun. It can be found within wetlands and wetland margins, riparian areas, and in wet forests or in upland areas where the water table is close to the surface. It is dispersed long distances by intentional plantings or by seeds that have been transported in moving water (i.e. along canals, beaches, streams and rivers). Seeds can also be spread short distances by wind in the spring/summer/fall or along the crust of snow in the winter. Birds, such as Goldfinches, Siskin and Redpolls, do feed on the cones in the winter, but they likely don't spread seeds far as they often split the seeds open while eating them. It also spreads through root suckers once it has established in an area or if the main trunk has died.

Description

European Black Alder is a deciduous tree that grows in a narrow upright shape to a height of up to 15 m. It may also grow as a large shrub, particularly in less suitable growing conditions. It frequently exhibits coppiced growth with multiple stems growing from a single root mass. It is closely related to other alders (*Alnus*), as well as to birches (*Betula*), hazels (*Corylus*), Blue Beech (*Carpinus caroliniana*) and Hop-hornbeam (*Ostrya virginiana*). It is an early-successional colonizing species. This means it grows quickly in areas where the ground has been disturbed. It is winter-hardy, and can survive temperatures as low as -54° Celsius. In North America, European Black Alder is sometimes used in rehabilitation of acidic sites or mine reclamation. However, because of its invasive tendencies, it is not recommended for widespread planting. Though it can live for about 100 years, European Black Alder grows very quickly for only the first 10 years or so (up to 1m per year in optimum conditions), and it requires constant access to water. It cannot control transpiration (evaporation of water via the leaves), so it requires a lot of water.

European Black Alder foliage.

Photo courtesy of Hayley Anderson.

Identification

Bark/Branches:

The bark of European Black Alder is smooth and greenish brown when it is young. As the tree matures it turns greyish brown with short warty, horizontal stripes (called lenticels) and shallow cracks. The twigs are sticky when young, and produce stalked buds that are purplish in colour.

European Black Alder develops lenticels as the tree matures.

Photo courtesy of Hayley Anderson

Leaves:

The leaves are simple, alternate and leathery. They have serrated margins (double-toothed), and a rounded shape with either a blunt tip or indented tip. The indented tip is an excellent way to quickly identify European Black Alder. Young leaves feel sticky when touched but become smoother with age. The leaves are usually up to 13 cm long, and 5-8 cm wide with raised veins on the underside. The leaves will remain on the tree well into the fall. The leaves are rich in nitrogen and add additional nitrogen to the soil as they decompose.

European Alder leaves often have an indented tip which is a key identification feature.

Photo courtesy of Hayley Anderson

Male catkins are thin, reddish brown and drooping.

Photo courtesy of Robert Vidéki, Doronicum Kft., Bugwood.org

Roots:

European Black Alder roots very quickly and can extend roots as deep as 5 m to access groundwater. European Black Alder has a two-tiered root system. In the first growing season, it develops shallow, surface roots which contain the nodules that host bacteria that aid in fixing nitrogen. In subsequent growing seasons it develops deeper roots (called second tier roots) to reach groundwater. The roots can also sprout new growth (root suckers) to help the species spread.

Flowers/Fruit:

European Black Alder is monoecious - both male and female flowers grow on the same tree. The thin, reddish brown drooping male flowers (catkins) develop in the fall, overwinter on the tree and expand in spring before the leaves emerge. In the spring, female flowers (also referred to as catkins) emerge and are fertilized by pollen from male catkins (usually from other trees, but they are self-compatible). After they are fertilized, the female catkins harden into cone-like fruit which produce small winged seeds. The female 'cones' grow in clusters near the branch tips and these remain green until the seeds are released (usually in late September/early October). They then begin to turn brown. European Black Alder can flower in its second growing season. They produce an average of 60 seeds per cone and up to 4,000 cones per tree on mature trees. The seeds contain an air bladder which helps them to float in water. European Black Alder mostly spreads via seeds. They usually germinate within the first year.

Female catkins are cone-like in appearance and remain green until the seeds are released.

Photo courtesy of Piero Amorati, ICCroce - Casalecchio di Reno, Bugwood.org

Habitat

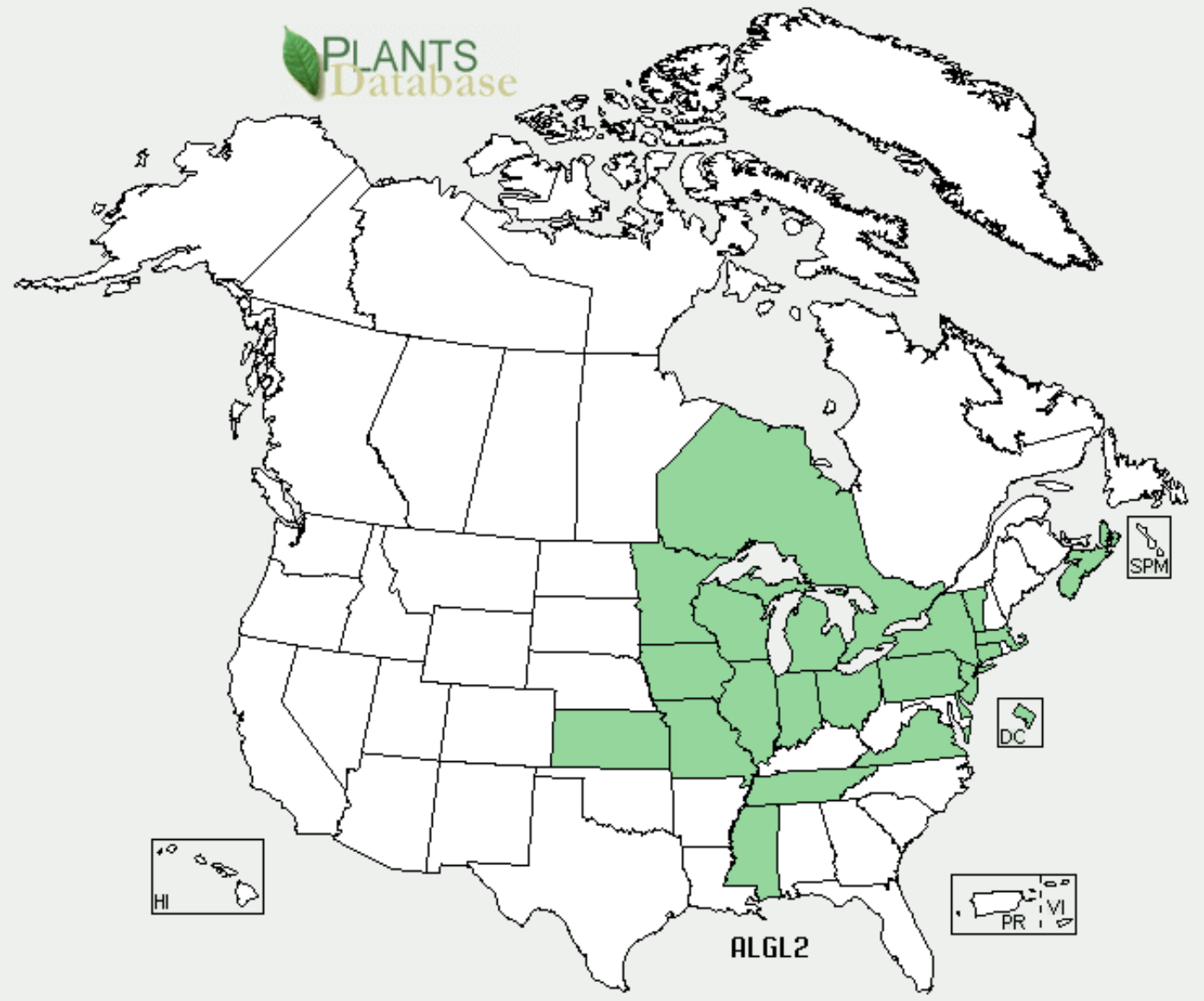
European Black Alder grows best in wet soils and full sun. It thrives in wetlands or in riparian and littoral areas. In its native range, it prefers sites with a high water table and deep, rich soil. However, it is tolerant of poor soil and low pH and is sometimes used for mine reclamation. It has also been found to grow in compact clay soils, and can survive limited droughts or floods. European Black Alder can also grow in early successional forests, along forest edges and roadsides and in yards or gardens.

European Black Alder can be found along forest edges.

Photo courtesy of Don Sutherland.

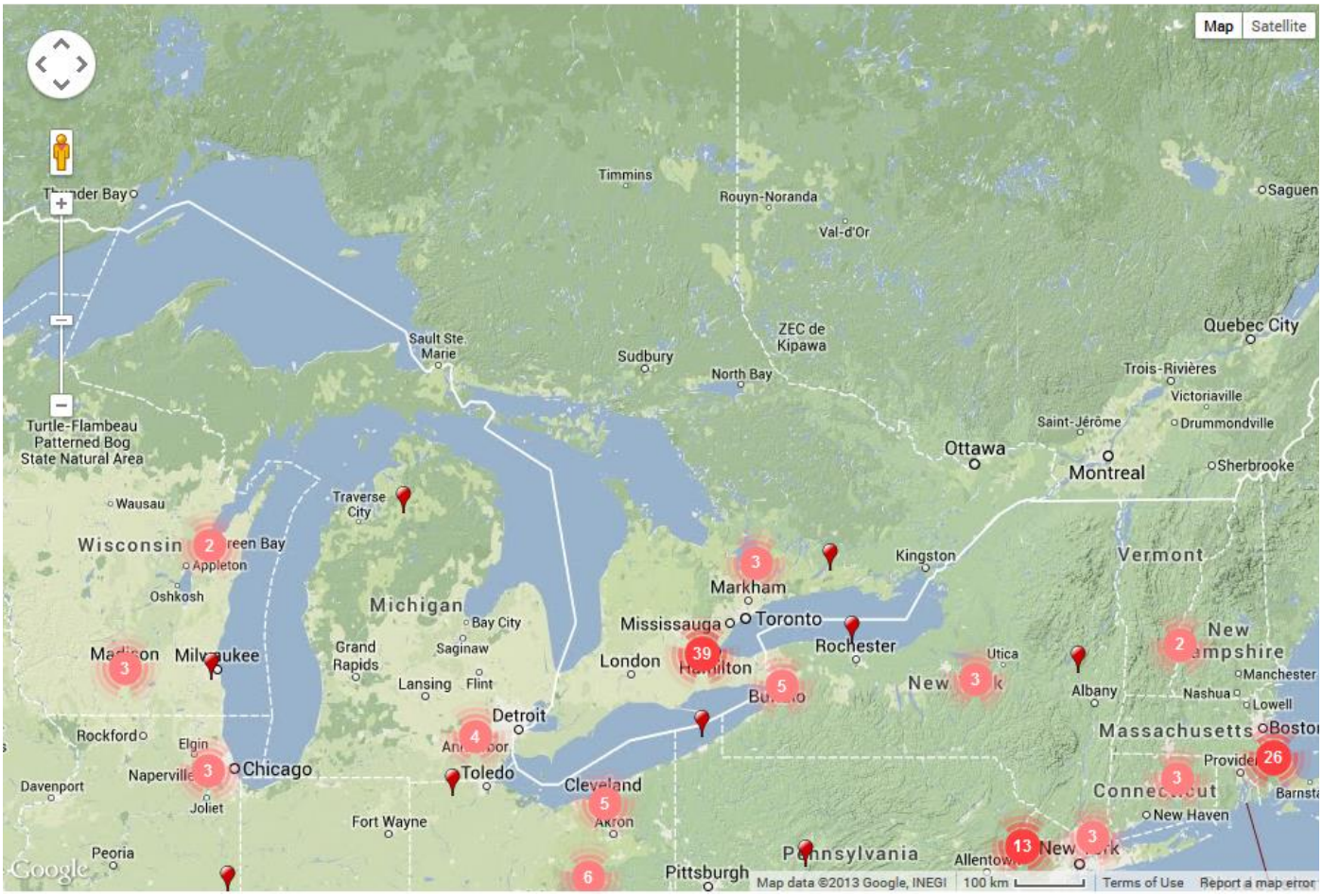
Distribution

Its native range occurs across much of Europe – from Scandinavia to Morocco. In Ontario, European Black Alder distribution is not well documented. There are very few records in EDDMapS (Ontario's Early Detection and Distribution Mapping System), with most of these sightings being reported near Long Point on Lake Erie. Experts say that it is also well-established in Brant, Durham, Elgin, Haldimand, Halton, Hamilton, Niagara, Norfolk, Peel, Metro Toronto, South Mississauga, Pickering, Prince Edward County and Frontenac. It is reportedly widespread and well-established in Peterborough and Northumberland Counties. It is still planted to aid in rehabilitation of mine sites or in heavily disturbed areas. It can be found across North America from Ontario to Newfoundland and as far south as Tennessee in the U.S. European Black Alder has also been identified as invasive in New Zealand, Australia, Chile, and South Africa.



European Black Alder Distribution in North America.

Photo courtesy of USDA Plants Database.



European Black Alder has not been widely reported in Ontario.

Photo courtesy of EDDMapS Ontario.

European Black Alder along forest edge.

Photo courtesy of Leslie J. Mehrhoff, University of Connecticut, Bugwood.org.

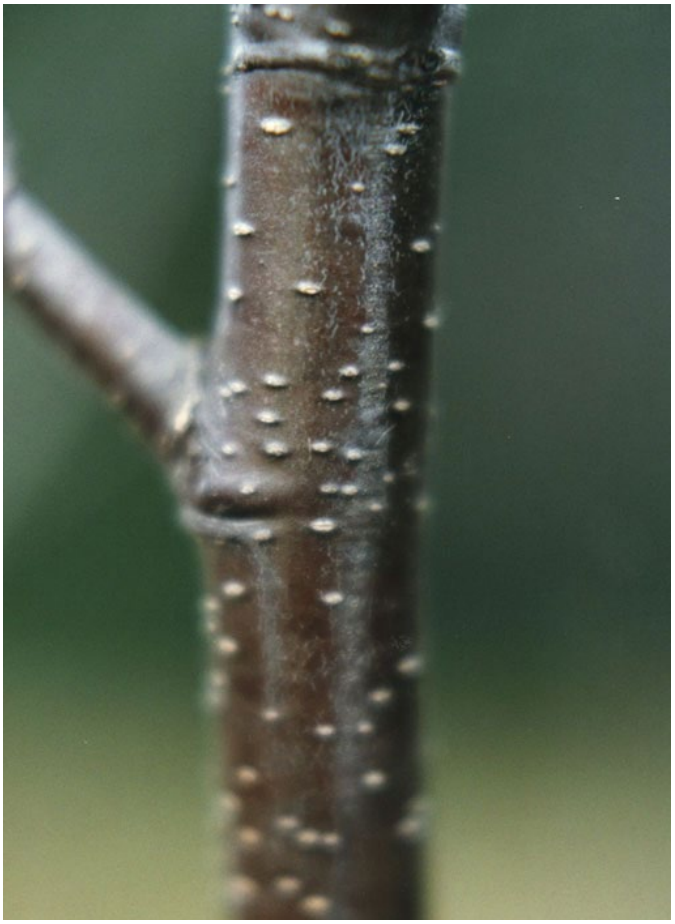
European Black Alder.

Photo courtesy of Robert Vidéki, Dornicum Kft., Bugwood.org.

Look-alikes

Speckled Alder (*Alnus incana*):

Speckled Alder (also known as Grey Alder, Tag Alder) is a native species widespread across North America. It is not very common in Southern and Southwest Ontario but can be found in greater numbers in Northern Ontario on the Canadian Shield. It is also found in wetland areas, because it requires moist soils and full sun. It is known as Speckled Alder because of the prominent lenticels (white spots, like salt on a pretzel) on the bark of older trees. Similarly to European Alder, the catkins expand in the spring just before pollination.



Speckled Alder has prominent lenticels.

Photo courtesy of Bill Cook, Michigan State University, Bugwood.org

Green Alder (*Alnus viridis ssp crispa*):

Green Alder (also known as Mountain Alder) is a native species common in North America. Its range does not currently overlap with European Black Alder, as it is found almost exclusively in the Boreal Forest on the Canadian Shield. It prefers dry, upland sites and gravelly/rocky areas. It is a shrub which does not grow as tall as the other alders and often forms dense thickets.

Green Alder has smooth bark with no lenticels.

Photo courtesy of Robert Vidéki, Doronicum Kft., Bugwood.org

	European Black Alder (*Alnus glutinosa*)	Speckled Alder (*Alnus incana*)	Green Alder (*Alnus viridis* **ssp** *crispa*)
	 Photo courtesy of Malcolm Storey.	 Photo courtesy of Bill McIlveen.	 Photo courtesy of Brett Marshall, Sault College, Bugwood.org
Height	• Up to 25 m • 30 cm diameter • Frequently grows as single stemmed tree/shrub	• Can be up to 15 m but rarely taller than 5 m • 12 cm diameter • Always in a multi-stemmed shrub form	• Up to 12 m (usually much shorter than *A. incana*)
Bark/ Branches	• Smooth and greenish-brown when young • Greyish brown and warty when older • Horizontal stripes and shallow cracks	• Paler than Black Alder (grey, reddish or brown) • Thin and smooth when young • Prominent lenticels when older	• Smooth grey bark, continues to be smooth as it gets older
Leaves	• Up to 13 cm long • 5-8 cm wide • Alternate • Coarsely double-toothed • Sticky underside when young • Blunt-tipped or indented at the tip	• 5-11 cm long • 4-8 cm wide • Alternate • Coarsely double-toothed • Not sticky when young • Tip is pointed and not blunt	• 3-8 cm long • 2-6 cm wide • Alternate • Fine, small teeth, not double-toothed • Sticky underside when young • Tip is pointed and not blunt
Fruit/ Seeds	• Flowers (male catkins) expand before leaves appear • Seed catkins are on long stalks	• Flowers (male catkins) expand before leaves appear • Seed catkins are on short stalks	• Flowers (male catkins) expand at the same time as leaves appear

There have been reports of hybrids between European Black Alder and Speckled Alder in Toronto. These species look like Speckled Alder and occur in clumps but grow to 15 m tall. This hybridization has not yet been confirmed through genetic testing.

Impacts

Biodiversity

European Black Alder can degrade wetland, riparian and littoral habitats. It forms mono-specific stands that out-compete native species in as little as 10 years, blocking them from water, nutrients, and sunlight. Because European Black Alder grows so rapidly, it can quickly out-shade native species. It is easily spread through water and can become established in most soils, posing a threat to Ontario's native vegetation. The potential hybridization with the native Speckled Alder threatens the genetic diversity of Speckled Alder in Ontario.

European Black Alder continues photosynthesis well into the fall (at least until November). This gives it a competitive advantage over native species which go dormant earlier.

European Black Alder produces a greater accumulation of leaf litter than most native species. This additional leaf load, and the excess nitrogen released from decomposing alder leaves, changes the structure of the soil in our forests and wetlands. This creates an inhospitable environment for native species.

The European Black Alder's dense root structure can change the hydrology of watercourses. It can increase the risk of flooding in areas where it is established by increasing sediment accumulation.

European Black Alder poses a direct threat to two species at risk in Ontario - Swamp Rose Mallow and Common Hoptree. Swamp Rose Mallow is classified as a species of special concern and is found only on the coastal marshes of lakes Erie, Ontario and St. Clair where European Black Alder can out-compete it for space and nutrients. Common Hoptree is a threatened species in Ontario. It is a shrub or small tree that grows along the water's edge in sandy shoreline and alvar habitats of Lake Erie, Lake St. Clair and Lake Ontario in the Niagara Region. The excess nitrogen and nutrients created by European Black Alder threaten this species. Common Hoptree has evolved to grow in nutrient-poor soil. Increased nutrients cause increased competition from other species. This is the same for many Ontario species, not just Common Hoptree. Currently, Common Hoptree and European Black Alder are not growing in the same area, but if it spreads further on Pelee Island, Common Hoptree could be threatened.

European Black Alder threatens Swamp Rose Mallow, a species at risk in Ontario.

Photo courtesy of Donald Kirk

Regulatory tools

Federally

European Black Alder is not a federally regulated plant species.

Provincially

European Black Alder is not a provincially regulated plant species.

Municipal – Property Standards Bylaw

Municipalities can choose to pass a property standards bylaw under the Building Code Act to address the presence of weeds deemed noxious or a threat to the environment, human health and safety. A municipality can regulate European Black Alder due to concerns for the environment.

European Black Alder.

Photo courtesy of Don Sutherland.

European Black Alder flowers.

Photo courtesy of Gil Wojciech, Polish Forest Reasearch Institute, Bugwood.org.

Best Management Practices

Controlling European Black Alder infestations before they become established will reduce its impacts on biodiversity, the economy and society. In much of Ontario, even established populations could be eradicated. However, efforts should first focus on protecting high quality native habitats and those that are home to species at risk.

Control plans should include integrated pest management principles. Integrated Pest Management (IPM) is a holistic decision-making process that uses all necessary techniques to suppress pests effectively, economically and in an environmentally sound manner. IPM principles sustain healthy, functional landscapes while protecting human health. This means using existing knowledge about the pest species and its surrounding environment to prevent and fight infestations, and may require more than one type of measure to be successful. It is also important to note that European Black Alder control is much more successful when heavily infested sites are re-planted with native species that are able to out-compete new growth. European Black Alder is a colonizer species and thrives on disturbance (including disturbance caused by control measures). It will likely re-invade or re-sprout from root suckers if restoration measures are not taken.

Once European Black Alder has been confirmed at a location, a control plan should be developed based on infestation size, site accessibility, potential for spread and the risk of environmental, economic or social impacts. Site specific conditions such as native plant diversity, wildlife usage and water table fluctuations should also be considered when developing control plans. A detailed inventory and assessment of each site should be done before starting any control efforts. This will help minimize any negative impacts by ensuring appropriate methods and timing are used.

If confronted with an established infestation of European Black Alder, land managers should try to prevent further spread by removing isolated seedlings and small populations (satellite infestations) outside of the main infested area. When action is taken early it can significantly reduce the cost of control.

With large infestations and limited time and resources, control work can seem daunting. It is important to develop a feasible, long-term strategy with the following considerations:

1. Try to remove the outlying populations (isolated plants or satellite populations) first, to prevent further spread. European Black Alder does not start producing seed until its 3rd year, so older plants should be removed first to prevent seed spread. If removing the tree is not an option immediately, the branches can be removed to prevent seed spread (if they haven't gone to seed yet).
2. Concentrate on high-priority areas such as the most productive or sensitive part of an ecosystem or a favourite natural area.
3. Consider dedicating a certain time each year to control efforts. Make it a joint effort with neighbouring landowners/land managers.

4. Plan to replant native tree and shrub species once the European Black Alder population is eradicated or under control. This will help jump-start natural succession and increase biodiversity in the area.
5. Follow-up monitoring is crucial to remove seedlings that may sprout after initial control efforts.

The following BMPs can be used as a guide in the development of a control plan. A number of natural resource considerations should be applied before starting control plans, including Species at Risk and habitat disruption.

Natural Resource Considerations

Managers are responsible for ensuring that their projects follow all relevant laws, including the Endangered Species Act (ESA). If protected species or habitats are present, an assessment of the potential effects of the control project or permits may be required. Consult with your local MNR district office early in your control plans for advice. If controlling European Black Alder in riparian areas, impacts to shoreline health and watercourse/aquatic health must also be considered. Consult with your local Conservation Authority for advice.

Setting Priorities

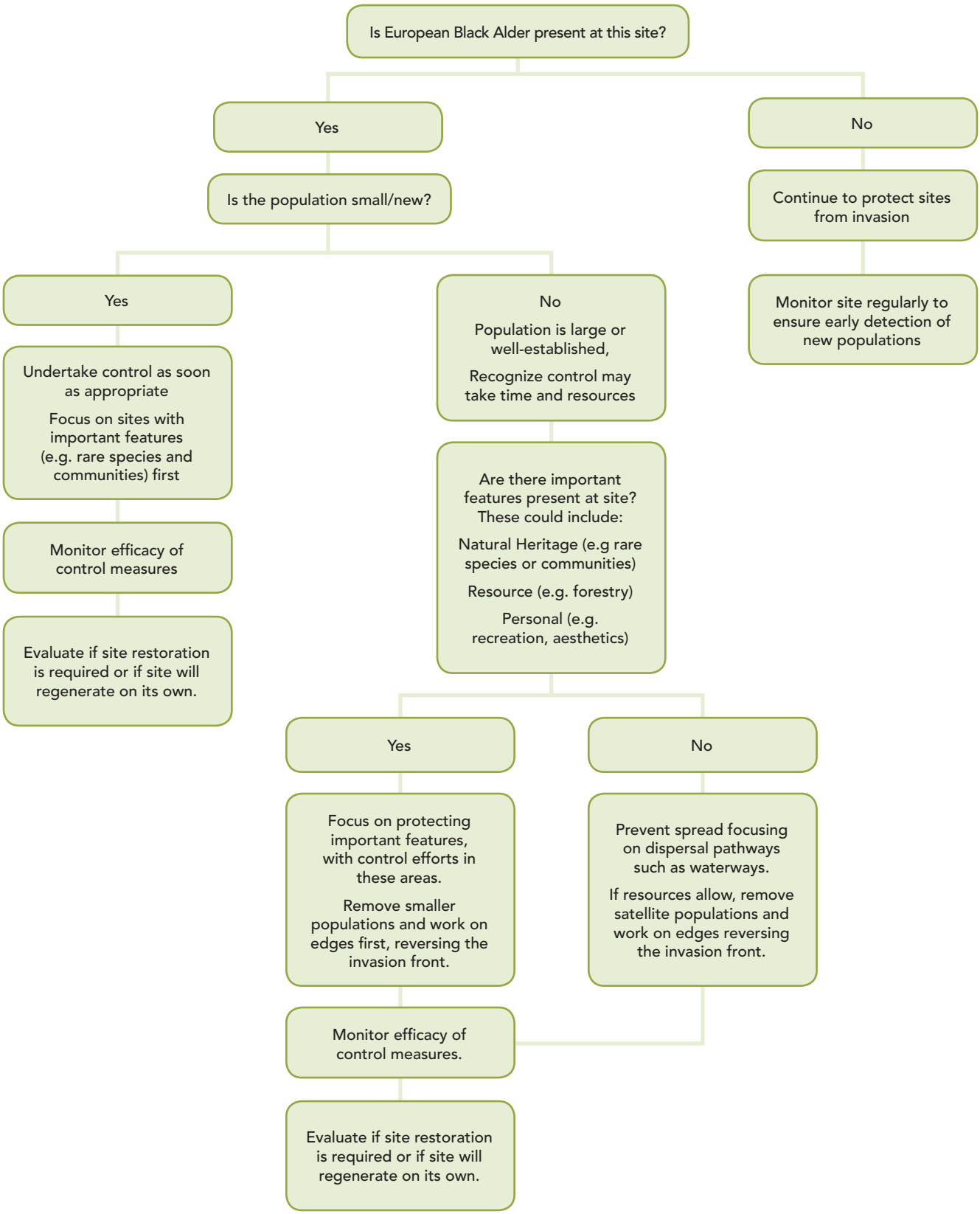
When creating management plans, it is important to make the most of your resources by prioritizing invasive species control. The following will help you to prioritize control of European Black Alder.

Site Prioritization

(*This section modified from "The Landowners Guide to Managing and Controlling Invasive Plants, published by Credit Valley Conservation*)

1. Protect areas where European Black Alder is absent or just appearing (consider where spread might occur and mode of spread – i.e. first protect along river-banks, lake shores or recently disturbed areas).
2. Protect rare species and communities. These include federal, provincial and regionally listed rare species.
3. Protect important habitats and land values (i.e. forestry, maple syrup production).
4. Cost and effort: Will the area where European Black Alder has invaded require restoration or can it be left to regenerate naturally? (Note – it is usually recommended to restore treatment areas to make them more resilient to future invasions).

This flow chart can help land managers choose which site to first focus control efforts:



Assessing Regeneration vs. Restoration

Consider the following factors:

- **Level of disturbance at the site**

What is the level of disturbance at the site? Was it a heavily invaded site? (e.g. a lot of disturbance was caused during control measures) Will it continue to be disturbed? (e.g. through seasonal flooding, beach use or trail use/management).

- **Invasive Species Biology**

What is the biology of the invasive species removed and is there a seed bank to consider? (European Black Alder forms a seed bank).

- **Re-invasion Risk**

Are there invasive species nearby which could re-invade the site from nearby trails or watercourses or other pathways of introduction?

- **Existing native vegetation**

What native vegetation is left? How long before it regenerates by itself? Does it need help?

Prioritizing within a Control Area

1. Focus on large blocks of un-invaded areas and keep them free of invaders
2. Control small, younger, outlier (satellite) populations first
3. "Unfragment" the boundaries of invaded areas by removing outlying plants
4. Reverse the invasion, expand the un-invaded area outward

It is crucial to prioritize control by determining where the satellite populations are, and eradicating those before they join larger populations.

Control Measures

Control measures must be continued for at least five years to ensure that seedlings/the seed bank is depleted. Many of these measures, if done only once, will actually increase densities by stimulating re-growth. If an area is cleared of European Black Alder for one season, but more management is required, it should be planted immediately with an annual cover crop or covered with leaves or mulch. This will prevent seedlings sprouting and other invasive plants from germinating in the disturbed soil until active control measures are complete and restoration takes place. This may also jump-start restoration by providing habitat for native species to grow. If control measures are taking place near shorelines, ensure that erosion won't be caused or accelerated by management techniques.

Manual Control

Pulling:

Small seedlings can be hand-pulled any time. Ensure that the ground is soft and that the plant is pulled from the base of the stem. A weed wrench can be used for seedlings too large to pull by hand. Pulling will disturb the soil and bring additional seeds to the surface, causing them to germinate. If only done once, pulling may actually increase the population.

Mowing/Cutting:

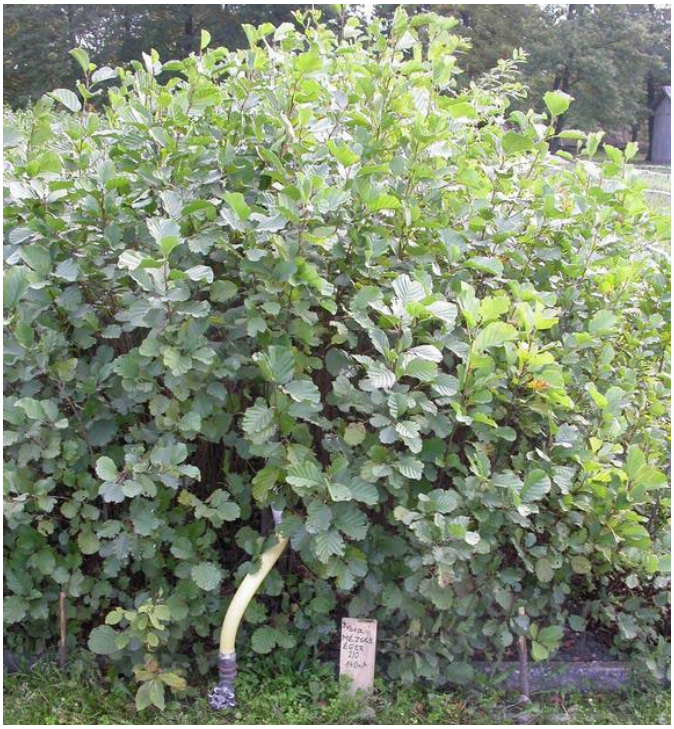
Cutting is the preferred control method for adult European Black Alder. Cutting must be done in conjunction with herbicide treatment to the stump to prevent re-sprouting. Otherwise the Alder will re-sprout multiple stems with dense branches.

European Black Alder fruit.

Photo courtesy of Leslie J. Mehrhoff, University of Connecticut, Bugwood.org.

Girdling

Girdling can be time-consuming, but it is an effective method of control. A strip of bark and inner bark (*phloem*) that is at least 10cm wide should be removed for girdling to be effective. This treatment should also be done in conjunction with herbicide treatment to prevent the tree from healing itself or suckering.



European Black Alder.

Photo courtesy of Norbert Frank, University of West Hungary, Bugwood.org.

Cultural Control

Shading:

European Black Alder is intolerant of shade; this can be used as an advantage during control programs. If large trees are cut down and overplanted with native species that grow quickly they may shade out any European Black Alder seedlings that will grow.

Chemical Control

Herbicide Application:

Herbicides must be applied in accordance with all label directions. For an up-to-date list of herbicides labelled for European Black Alder control, visit the Pest Management Regulatory Agency's web site at www.pmra-arla.gc.ca. The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)'s Publication 75, Guide to Weed Control is an excellent reference for all aspects of weed control, and includes a section on invasive plant management. To determine if a federally registered herbicide is also classified for use in Ontario, visit http://app.ene.gov.on.ca/pepsis/.

It has been reported that the best time for chemical control is during the fall, as the trees will take up the herbicide better as it prepares for winter. Monitor control areas to see if additional chemical control is required. If herbicide application is performed in the spring, the heavily flowing sap may hinder successful treatment.

Foliar Spray:

Refer to the label of the herbicide you are using for rates and instructions for foliar application. Foliar application is only suggested for smaller saplings or shrubs as spray drift would be a concern when spraying taller trees.

Cut Stump Treatment:

Some herbicides can be applied directly to the cut stump of European Black Alder. This is generally the preferred method for land managers and can be used in place of foliar spray if there are concerns over spray drift. Follow label instructions for the appropriate herbicide concentration and application methods.

Basal Bark Treatment:

Basal bark treatment is the use of herbicide applied directly to the bark of European Black Alder. Some herbicides can be applied directly to the trunk, where a broad band of at least 10 cm is sprayed around the lower section of the trunk. Follow label instructions for the appropriate herbicide concentration and rates of spray.

Anyone using a pesticide is responsible for complying with all federal and provincial legislation. Most non-domestic (i.e. commercial, restricted etc.) herbicides can only be applied by licensed exterminators. For more information, refer to the Ontario Pesticides Act and Ontario Regulation 63/09 (available on http://www.elaws.gov.on.ca), or contact the Ontario Ministry of the Environment (http://www.ene.gov.on.ca/environment).

Another consideration is that European Black Alder often grows near standing water in Ontario. Commonly used herbicides typically cannot be applied within 15 m of standing water.

Legislation governing pesticide use:

The Ontario Pesticides Act and Ontario Regulation 63/09 provide natural resources, forestry and agricultural exceptions which may allow chemical control of invasive plants on your property. Other exceptions under the Act include golf courses and for the promotion of public health and safety.

Natural Resources Exception

A 'natural resources' exception exists for the use of prohibited pesticides to manage, protect, establish or restore a natural resource. This exception allows the use of certain prohibited herbicides for control of invasive plants on your property, provided your project meets specific conditions and you obtain the necessary approvals.

If your project meets the natural resources criteria specified in section 33 of Ontario Regulation 63/09 and includes the use of pesticides in accordance with Integrated Pest Management principles outlined in the BMP guide you will need to contact the Ontario Ministry of Natural Resources (www.ontario.ca) to obtain a written letter of opinion from the MNR Regional or Branch Director.

Forestry Exception:

If European Black Alder is within a forest*, and the person applying the herbicide has a forestry applicators license, chemical control may fall under the exception for forest management, and a letter of opinion may not be required. Class 9 pesticides can be used under the forestry* exception to protect trees from pests and to control competing vegetation.

*O. Reg. 63/09 defines 'forest' and 'forestry' as:

- Forest means a treed area of land that is one hectare in size or larger and is not used for producing an agricultural crop as part of an agricultural operation.
- Forestry means activities relating to any of the following: harvesting, renewing, maintaining or establishing a forest, protecting forest resources derived from a forest, and accessing a forest for these purposes.

Refer also to the Ministry of Environment's factsheet titled "Pesticides Act and Ontario Regulation 63/09 Private Land and Woodlot Owners April 2011" http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/stdprod_085367.pdf

Agriculture Exception:

There is an exception for the use of Class 9 pesticides for uses related to agriculture by a farmer. This exception may apply to the control of European Black Alder in agricultural fields or near farm operations.

A farmer is an individual who owns or operates an agricultural operation.

An agricultural operation is an agricultural, aquacultural or horticultural operation and includes:

- Growing, producing or raising farm animals;
- Production of crops, including greenhouse crops, maple syrup, mushrooms, nursery stock, tobacco, trees and turf grass, and any additional agricultural crops;
- Activities that are part of an agricultural operation such as maintenance of a shelterbelt for the purposes of the agricultural operation; and,
- The production of wood from a farm woodlot, if at least one of the activities described earlier is carried out on the property where the farm woodlot is located.

Refer also to the Ministry of the Environment's factsheet titled "Pesticides Act and Ontario Regulation 63/09 Agriculture May 2011" http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/stdprod_080128.pdf.

Biological Control

Biological control is the use of an herbivore, predator, disease or other natural enemy to reduce established invasive species populations. Most invasive species have no natural enemies in their new habitats. Biological control aims to re-establish an ecological balance by selecting highly host-specific natural enemies. These could be from the country of origin or from the introduced country (i.e. Milfoil Weevils which are stocked in greater quantities than normally found to provide control of Eurasian Water Milfoil). These natural enemies are then introduced where the invasive species is a problem. This is only done after extensive testing in the country of origin or quarantine, to ensure that the potential biocontrol agent is host-specific to the targeted invasive species. This method has been used successfully for invasive plants in North America, including Purple Loosestrife (*Lythrum salicaria*), Leafy Spurge (*Euphorbia esula*), Diffuse Knapweed (*Centaurea diffusa*) and St John's Wort (*Hypericum perforatum*).

There are currently no biological control agents available for European Black Alder, and no programs to identify any. There are many species which will feed on European Black Alder, but most do not cause enough damage to the plants to provide control. However, some species which it hosts can cause some damage. These include: the striped alder sawfly, the European alder leaf miner, alder flea beetle, and woolly alder aphid.

Disposal

European Black Alder that has been cut can be pieced up and burnt as firewood. It can also be composted, or sent to municipal composting facilities. Ensure that this occurs before the female fruits start to drop seed. If the trees have already begun producing seed, put the twigs/seeds in to garbage bags and send them to the landfill.

Control Measures Summary

Method	Population Characteristics	Description of Control	Notes
Pulling	• Small to medium populations, young trees	• Removal of entire seedling by pulling or using a weed wrench	• Roots must be removed
Girdling	• Small to medium population, adult trees	• A 10 cm band of outer and inner bark is removed to cut off nutrient supply • The tree will die slowly if done correctly	• Band must be at least 10 cm to ensure it doesn't grow back • Should be used in conjunction with herbicide application
Shading	• Any size of population, dependent on resources	• European Black Alder is intolerant of shade • Planting native, fast growing species can create shade that will prevent seedling growth or future invasions	• This is more of a long-term preventative measure • It will take time for the planted species to grow large enough to provide shade
Foliar Spray	• Large populations of small, low growing trees	• Spraying of herbicide on the leaves, which is then absorbed into the tree.	• There can be spray drift which may impact non-target species
Basal Bark Spray	• Small to large populations, any age of tree	• Spraying of herbicide on the lower section of the stem which is then absorbed into the tree	
Cut Stump Herbicide Application	• Small to large populations, adult trees	• Used in conjunction with cutting to prevent new shoots from sprouting on cut trees	• Herbicide should be applied within five minutes of cutting to ensure it is absorbed

Restoration

Restoration is a critical aspect of invasive plant management. Site restoration will result in healthier ecosystems more resistant to future invasions. Monitor all restoration activities to ensure native species are becoming established, and continue removal of invasive plants that remain onsite.

Types of Restoration

During Control:

Mulching:

Mulching sites immediately after invasive species control (i.e. mechanical or chemical control of European Black Alder) may aid in the recovery of native species and other species from invading when the Alder dies back. Mulching reduces light availability and allows more shade-tolerant native plant species to germinate and colonize the gaps left by Alder removal. Because European Black Alder is a nitrogen-fixing species, adding mulch with a high carbon content that is appropriate for that habitat can help restore the soil and promote growth of native species.

Seeding:

Seeding an area with an annual cover crop or native plant species that is appropriate for that habitat, immediately after management activities, can help prevent other invasive species from growing. This will give desirable native species the chance to establish themselves. It is important to consider future restoration and control plans when seeding.

After Control:

Soil Rehabilitation:

European Black Alder creates extra nitrogen which alters the soil. After control it is important to restore soil to pre-invasion nutrient levels. Mixing the different layers of the soil together in restoration areas can help balance nutrient levels. This allows native plants to re-establish.

Planting:

When choosing plant species for restoration, consider what is native to the area and ensure that seed or plant mixes reflect this. If there are invasive plants nearby which may colonize the control area, consider planting larger native species stock to out-compete or shade invasive seedlings. Wait until all management is complete before re-planting with large stock, as it may be difficult to distinguish between newly planted native species and invasive seedlings. While planting, add carbon-rich mulch to the soil. This will reduce nitrogen levels and support native species which are better able to grow in nutrient-poor soil. Wood mulch can be used. It usually needs to be reapplied after three years.

Preventing the Spread

Everyone can help prevent the spread of European Black Alder by following these tips:

☑ Report it.

If you think you see European Black Alder in an area where it has not been intentionally planted, take a picture, record the location and contact the Invading Species Hotline or visit EDDMapS at www.eddmaps.org/ontario. For more information and guidance call the Invading Species Hotline at **1-800-563-7711** or visit www.invadingspecies.com or www.ontarioinvasiveplants.ca.

☑ Watch for it.

Learn what European Black Alder looks like. Monitor hedges, property boundaries, riparian areas, fence lines and trails. Detecting invasive plants early can make it easier and cheaper to remove or control them.

☑ Stay on trails.

Avoid traveling off-trail, especially in areas known to have European Black Alder or other invasive species.

☑ Stop the spread.

Inspect, clean and remove mud, seeds and plant parts from clothing, footwear, pets (and horses), vehicles (including bicycles), and equipment such as mowers and tools. Clean vehicles and equipment in an area where plant seeds or parts aren't likely to spread (e.g., wash vehicles in a driveway or at a car wash) before travelling to a new area.

☑ Keep it natural.

Try to avoid disturbing soil and never remove native plants from natural areas. This leaves the soil bare and vulnerable to invasive species.

☑ Use native species that are indigenous to your area.

Try to use local native species in your garden. Don't plant European Black Alder and if you have removed it, try to replant with native species. Don't transplant invasive species such as European Black Alder. Encourage your local garden centre to sell non-invasive or native plants. The Grow Me Instead guides list alternatives to plant instead of invasive species.

Tracking the Spread

Locations of European Black Alder have not been documented in many parts of Ontario. There are gaps in our understanding of its provincial distribution and the scale of its invasion in many locations.

Several reporting tools have been developed to assist the public and resource professionals to report sightings, track the spread, detect it early and respond quickly. These include:

1) EDDMaps is an on-line reporting tool where users can view existing sightings of European Black Alder and other invasive species in Ontario, and document their sightings.

This tool, at www.eddmaps.org/ontario is free to use.

2) The toll-free Invading Species Hotline (**1-800-563-7711**) and website (www.invadingspecies.com), which individuals can use to report sightings verbally or on-line.

If you think you have European Black Alder on your property or if you see it in your community, please report it. You will be asked to send in photos of the leaf, bark and flower for identification.

Best Management Practices Documents Series:

Common Buckthorn Best Management Practices for Ontario

Dog-strangling Vine Best Management Practices for Ontario

Giant Hogweed Best Management Practices for Ontario

Japanese Knotweed Best Management Practices for Ontario

Phragmites (Common Reed) Best Management Practices for Ontario

Garlic Mustard Best Management Practices for Ontario

Additional Publications from the Ontario Invasive Plant Council:

Clean Equipment Protocol for Industry

Compendium of Invasive Plant Management

Grow Me Instead! Beautiful Non-Invasive Plants for Your Garden, a guide for Southern Ontario

Grow Me Instead! Beautiful Non-Invasive Plants for Your Garden, a guide for Northern Ontario

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