

Wild Parsnip

(*Pastinaca sativa*)

Best Management Practices in Ontario



ontario.ca/invasivespecies

Foreword

These Best Management Practices (BMPs) provide guidance for managing invasive Wild Parsnip (*Pastinaca sativa*) in Ontario. Funding and leadership for the production of this document was provided by the Invasive Species Centre. The BMPs were developed by the Ontario Invasive Plant Council (OIPC), and its partners 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 known from recent 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

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Wild Parsnip.

Photo courtesy of Linda Haugen, USDA
Forest Service, Bugwood.org.



Wild Parsnip infestation.

Photo courtesy of Theodore Webster, USDA Agricultural Research Service, Bugwood.org.

Introduction

Wild Parsnip (*Pastinaca sativa*) is a tall monocarpic (short-lived) perennial plant in the carrot family (*Apiaceae*), native to Europe and Asia. It has been introduced to Canada, the United States, South America and New Zealand.

It was likely brought to North America by early European settlers who grew it as a root crop. Wild populations are thought to be a result of escaped cultivated plants. By 1943 there were reports of Wild Parsnip growing wild in every Canadian province. By the 1970's its range included the territories (with the exception of the area now known as Nunavut). Other common names include bird's nest, common parsnip, poison parsnip, and hart's eye.

Wild Parsnip grows quickly, forming dense stands, especially in disturbed areas. Seeds are dispersed by wind, water and on vehicles and equipment. It can become a problem particularly in abandoned agricultural areas.

The seeds of Wild Parsnip contain chemicals called furanocoumarins, which along with deterring herbivores from eating the plant, can also cause a burn-like rash (phytophotodermatitis) in people and livestock. This is the same toxin present in Giant Hogweed (*Heracleum mantegazzianum*) as well as several other members of the carrot (*Apiaceae*) family.

Description

Parsnip is a plant that is familiar to many of us in its culinary form. It has been grown as a root crop for centuries, with reports dating back to the Romans and Greeks and from medieval Europe on the plant being used as food for people and livestock. The first reports of a cultivated form in Canada are from the early 1600s, and “wild” populations were noted around European settlements. The entire plant has a distinct “parsnip” odour.

While not as widely grown as an agricultural crop as it once was, parsnip it still a staple in many of our kitchens. It is the wild variety of this plant that is causing concern and spreading along roadsides, agricultural fields, railroad embankments and other disturbed habitats. As the populations expand, more people come into contact with the plant, its invasive qualities and the toxic compounds that can cause serious burn-like rashes.

Height:

Wild Parsnip can grow to a height of 0.5 to 1.5 metres.



Wild Parsnip.

Photo courtesy of Owen Williams.

Stems:

Wild Parsnip has a single light green (sometimes purple tinged) deeply grooved, hollow stem (except at the nodes) and stands between 5 and 150 cm tall. It is smooth (with few hairs), and typically 2.5 to 5 cm in diameter.



The stem of Wild Parsnip is light green and deeply grooved.

Photo courtesy of Ohio State Weed Lab Archive. The Ohio State University, Bugwood.org.

Leaves:

The leaves of Wild Parsnip are alternate on the stem, pinnately compound, approximately 15 cm in length, with saw toothed edges. Leaves are further divided into leaflets that grow across from each other along the stem, with 2 to 5 pairs of opposite leaflets and one diamond-shaped terminal leaflet. The petiole (the stem of the leaf) on lower leaves is longer than that on leaves closer to the top of the stem.



Wild Parsnip leaves have distinct saw-toothed edges.

Photo courtesy of Ohio State Weed Lab Archive. The Ohio State University, Bugwood.org.

Roots:

Wild Parsnip has a thick funnel shaped taproot, which can grow to a depth of 1.5 metres. This root is where energy reserves are stored during its first year. It is thought to benefit the plant during times of drought, storing moisture and nutrients.



Wild Parsnip root.

Photo courtesy of Wikipedia.org, 2007.



Underside of Wild Parsnip leaves.

Photo courtesy of Owen Williams.

Flowers:

Wild Parsnip has small yellow, 5-petalled flowers growing in clusters that in Canada bloom from June through to October. Petals are yellow, usually without bracts or bractlets (small leaves at the base of the flower), with small or non-existent sepals (small leaves that protect flowers before they open). Flowers are arranged in 15 to 25 rays, of unequal length, and grow in a flat umbrella-shaped umbel that is 5 to 15 cm across.



Yellow flowers form flat umbrella shaped clusters.

Photo courtesy of Owen Williams.



Seed of Wild Parsnip. Seed dispersal takes place between August and November.

Photo courtesy of Bruce Ackley, The Ohio State University, Bugwood.org.

Fruit:

After flowering, Wild Parsnip plants produce a dry fruit or seed called a schizocarp. This fruit is about 6mm long, oval, and once matured, splits into 2 sections called mericarps, which are flat, smooth, round and 5 to 7 mm long. Each mericarp contains a seed, which matures in mid-summer. Seeds usually remain attached to the dead stalks and seed dispersal can take place between August and November (with September being the most common time). Seeds can remain viable in soil for up to 5 years.



Fruit of Wild Parsnip splits open to disperse the seed.

Photo courtesy of John Cardina, The Ohio State University, Bugwood.org.

Look-alikes

Wild Parsnip looks similar to several invasive and native plant species that grow in Ontario. Several of these plants, such as Giant Hogweed, share Wild Parsnip's toxic sap, so care should be taken if you are unsure of which plant you are dealing with.

	Wild Parsnip <i>(Pastinaca sativa)</i>  Photo courtesy of David McMurray.	Giant Hogweed <i>(Heracleum mantegazzianum)</i>  Photo courtesy of Ken Towle.	Cow Parsnip <i>(Heracleum maximum)</i>  Photo courtesy of Lynda Shores.	Queen Anne's Lace <i>(Daucus carota)</i>  Photo courtesy of Chris Evans, Illinois Wildlife Action Plan, Bugwood.org.	Angelica <i>(Angelica spp.)</i>  Photo courtesy of Owen Williams.
Stem	• 0.5 to 1.5 m	• 2.5 to 5 m	• 1 to 2.5 m	• 0.3 to 1.5 m	• 1.2 to 2.1 m
Flowers	• Yellow flower clusters 10 to 20 cm across	• Large, white umbrella-shaped flower clusters 30 to 90 cm across, made up of 50 to 150 small flower clusters	• White umbrella-shaped flower cluster • 10 to 30 cm across, made up of 15 to 30 small clusters	• White flower cluster 5 to 10 cm across • Pale pink before fully opened • Often single purple flower in centre of flower cluster	• Greenish-white globe-like flower clusters 8 to 25 cm across
Stem	• Green, 2.5 to 5 cm thick • Smooth with few hairs	• Hollow, 5 to 15 cm thick • Prominent purple blotches • Distinct, coarse, bristly hairs	• Hollow, 5 cm thick at base • Green, few to no purple spots • Soft and fuzzy hairs	• Green, 1 to 2.5 cm thick • Covered with fine bristly hairs	• Purple or purple blotched • Smooth (no hairs)

	Wild Parsnip <i>(Pastinaca sativa)</i>  Photo courtesy of David McMurray.	Giant Hogweed <i>(Heracleum mantegazzianum)</i>  Photo courtesy of Ken Towle.	Cow Parsnip <i>(Heracleum maximum)</i>  Photo courtesy of Lynda Shores.	Queen Anne's Lace <i>(Daucus carota)</i>  Photo courtesy of Chris Evans, Illinois Wildlife Action Plan, Bugwood.org.	Angelica <i>(Angelica spp.)</i>  Photo courtesy of Owen Williams.
Lifecycle	• Biennial (lives for 2 years) or perennial (lives longer than 2 years)	• Biennial/Perennial	• Perennial	• Biennial	• Perennial
Origin	• Invasive	• Invasive	• Native	• Invasive	• Native

Other native and non-native species that share similar appearances include Water Parsnip (*Sium suave*), Spotted Water Hemlock (*Cicuta maculate*) and Poison Hemlock (*Conium maculatum*).

Biology and Life Cycle of Wild Parsnip

Wild Parsnip is a member of the Apiaceae family; the same family as culinary plants such as carrot, celery, celeriac, fennel, anise, caraway, chervil, coriander, dill, lovage, parsley and weed plants such as Wild Carrot, Giant Hogweed, and Poison Hemlock.

Wild Parsnip is a tall “monocarpic perennial”; meaning it is a plant that matures, flowers and fruits once, and then dies.

Wild Parsnip reproduces only via seed (sexual reproduction) and seeds are carried and spread to new areas by wind and water, and on mowing or other equipment. One plant produces, on average, 975 seeds with a median dispersal distance of 3 metres (lighter seeds are carried further than larger, heavier ones). Growth of the plant begins in the spring and lasts through early autumn. In its more southern range, the plant may keep some of its leaves all winter.

The plant takes two or more years to mature, and spends its first year (or more) as a basal rosette growing close to the ground. During this first year as a basal rosette, the plant stores its reserves in a large taproot. Once the plant matures, it flowers, then dies.

Parsnip is still cultivated for human consumption. It is harvested in its first year of growth, just after the large taproot has formed. Wild Parsnip plants may actually be recent escapees of cultivated crops.

There are no known cases of Wild Parsnip hybridizing with other species.



First year Wild Parsnip plants grow as a basal rosette.

Photo courtesy of Ohio State Weed Lab Archive, The Ohio State University, Bugwood.org.



Wild Parsnip is often found in full sun, but can grow in semi-shade.

Photo courtesy of Michael Irvine.

Habitat

Wild Parsnip is most often found in areas exposed to full sun, although it can grow in the semi-shade of forests and riverbanks. It is tolerant of a variety of soils, but cannot survive in flooded environments. Its deep taproot is thought to be of benefit during times of drought. In its native range Wild Parsnip grows best in rich, moist alkaline soils, while in Canada it appears to do well in a variety of soil conditions.

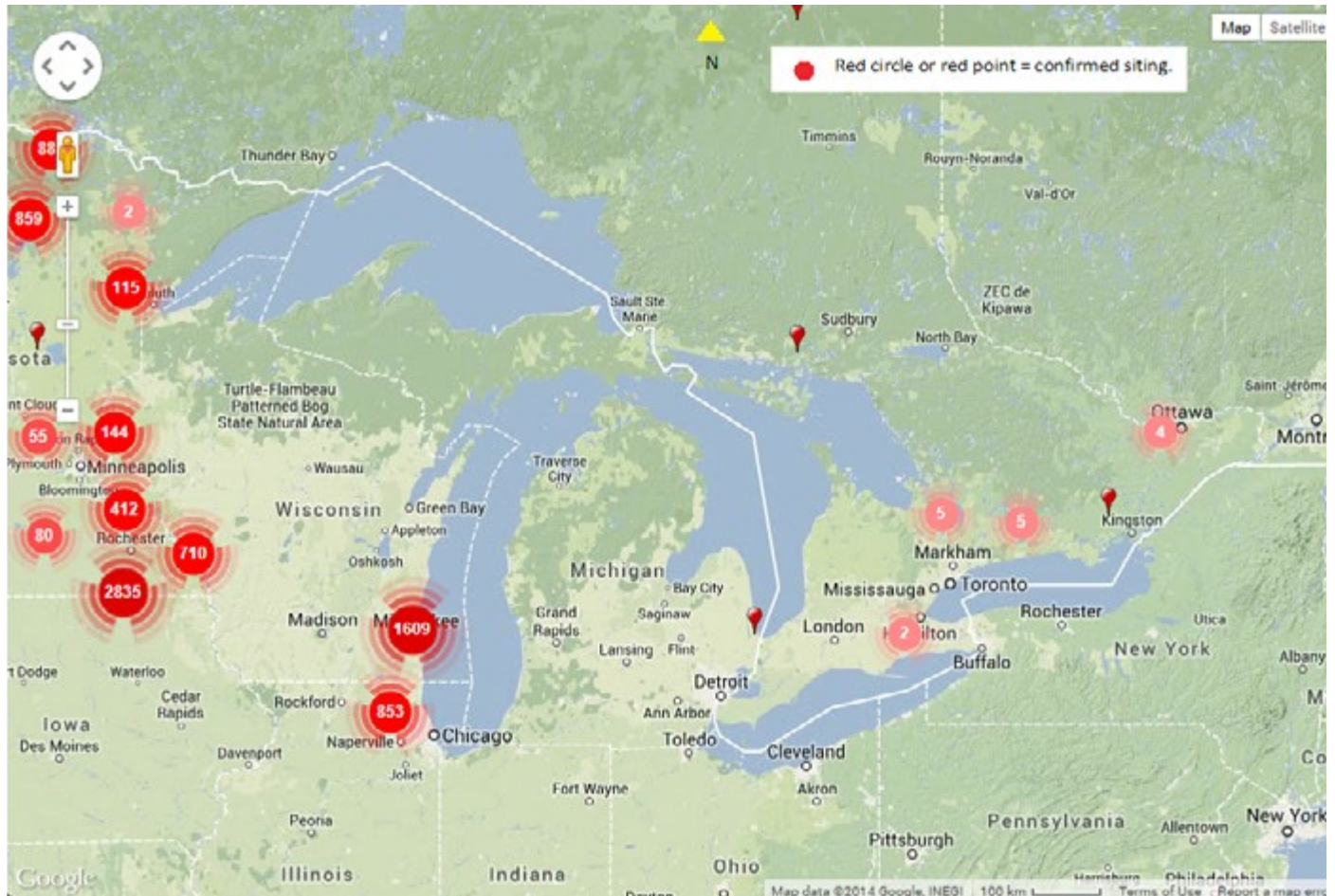
In Canada, Wild Parsnip is most often found in disturbed areas (i.e. railway embankments, roadsides, trails, shorelines, ditches, beaches, forest clearings and areas such as abandoned mine sites, quarries, and waste areas). Less common sites include cultivated fields, gardens, meadows, swampy lowlands and grassy areas.

Ontario populations are commonly found growing along fence rows, the edge of agricultural fields, watercourses and drainage areas. It often grows along with perennial grasses.

Distribution

Wild Parsnip is native to much of temperate Europe, Eastern Europe and western Central Asia (growing in Turkey, Iran, the Caucasus region, and the Western Himalayans).

During the last 15 to 20 years, Wild Parsnip has become increasingly common around eastern Ontario, with large populations east of Belleville and in western Quebec. It is now spreading west across the province. In the United States it's found in most states, with the exception of Alabama, Hawaii, Georgia and Florida.



Wild Parsnip Distribution Map courtesy of EDDMapS (www.eddmaps.org/ontario). The map point data is based on records contained in the Invasive Species Database, compiled from various sources as of February 13, 2014. This map is illustrative only. Do not rely on this map as a definitive distribution as it is subject to change based on additional confirmed invasive species sites. This map may contain cartographic errors or omissions.

Impacts

Biodiversity

Wild Parsnip invades disturbed areas such as roadsides, pastures, crop land and fields with reduced tillage use. It outcompetes native vegetation, particularly crowding out lower-growing plants.

It can also have an impact on pollinators, as honeybees do not visit the plant and it may displace other, more pollinator friendly plants, such as goldenrod (*Solidago spp.*).



Wild Parsnip can be found along recreational trails.

Photo courtesy of David Featherstone.

Agriculture

Wild Parsnip can reduce the quality of some agricultural forage crops. In agricultural operations using a no-till or reduced tillage system, it is a concern, as perennial weeds such as Wild Parsnip are able to take over.

It is not valuable as a forage plant, and in fact the chemical compounds in Wild Parsnip inhibit weight gain and fertility in livestock that feed on it.



Wild Parsnip can invade agricultural fields.

Photo courtesy of David Featherstone.



Wild Parsnip can invade disturbed areas such as roadsides.

Photo courtesy of JP East.

Health Risks

Both the wild and cultivated forms of parsnip contain toxic compounds, called furanocoumarins. These compounds can cause serious rashes, burns or blisters to skin exposed to the sap and then sunlight. The plant poses a risk to agricultural workers, those involved with vegetation control, and to people unknowingly exposed to the plant in the wild. The roots of Wild Parsnip (non-cultivated form) may also contain furanocoumarins, therefore it is recommended that the root of this plant not be consumed.



Wild Parsnip.

Photo courtesy of Bob Bowles.

Benefits

Unlike most invasive plants, parsnip (the cultivated variety, as opposed to the wild plant) plays a role in agriculture, and is grown in all Canadian provinces as an annual crop.

Because of its unique chemical make-up, Wild Parsnip is the subject of research for a variety of medical and other uses, including insect repellent, treatment of skin disorders such as psoriasis and its potential anti-fungal, anti-bacterial and anti-inflammatory properties.

Wild Parsnip has also shown promise in phytoremediation of soils contaminated by metals. Research has shown parsnip can absorb cadmium, nickel, lead and manganese.



Cultivated parsnip.

Photo courtesy of Kim Stoner, Connecticut Agricultural Experiment Station, www.extension.org.

Regulatory tools

Federally

Wild Parsnip is not a federally regulated species.

Provincially

Wild Parsnip is not a provincially regulated species.

Municipal – Property Standards Bylaw

Under the Building Code Act, municipalities are able to pass bylaws to address the presence of invasive plants. Municipalities can enact bylaws to control plants when there is a risk of negative impact to human health and safety.

Municipalities are also responsible for enforcing the Weed Control Act to reduce the infestation of noxious weeds. Municipalities can designate additional plants not listed on the Ontario Noxious Weed list as noxious within their own jurisdiction.



Wild Parsnip and Wild Carrot found along railroad tracks.

Photo courtesy of David Featherstone.

Best Management Practices

Controlling Wild Parsnip before it becomes locally established will reduce its impacts on human health, biodiversity, the economy and society.

It is important to use a control plan that incorporates integrated pest management principles. 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 control measure to be successful.

Once Wild Parsnip has been confirmed at a location, a control plan can 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 of each site is strongly recommended before starting control efforts to help ensure proper methods and timing are used to minimize negative impacts.

After an infestation of Wild Parsnip is confirmed, land managers should first focus their efforts on preventing spread by removing isolated plants and small populations (satellite infestations) outside 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.
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 neighboring landowners/land managers.
4. Plan to replant native tree and shrub species once the Wild Parsnip 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

You are responsible for ensuring that your project follows 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 could be required. Consult with your local MNR district office early in your control plans for advice. If controlling Wild Parsnip in riparian areas impacts to shoreline health must also be considered.

Setting Priorities

When creating management plans, it is important to make the most of resources by prioritizing invasive species control. The following will help you to prioritize sites and areas within sites for control of Wild Parsnip.

Site Prioritization

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

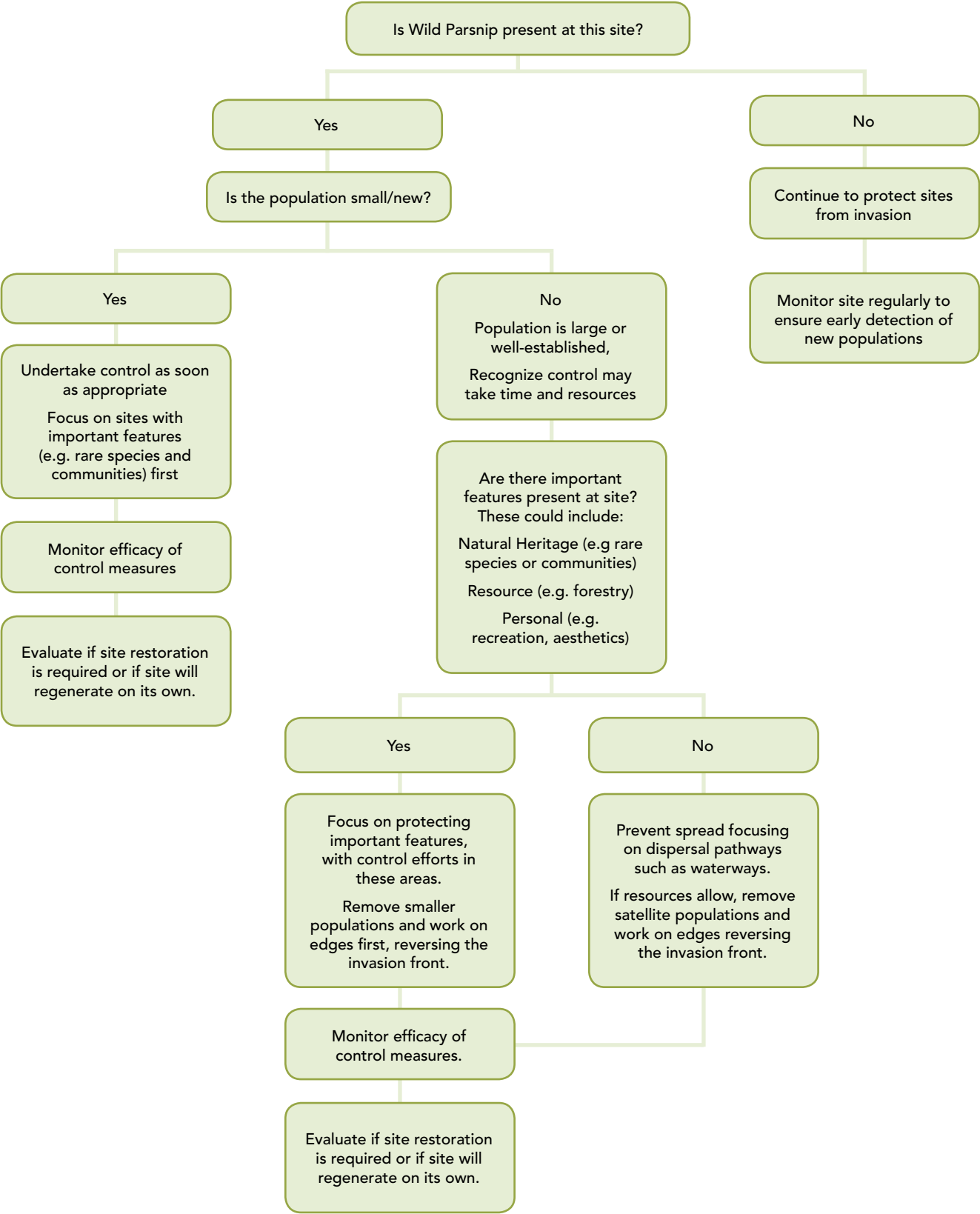
1. Protect areas where Wild Parsnip is absent or just appearing
2. Protect rare species and communities. These include federal, provincial and regionally listed rare species and communities.
3. Protect important habitats and land values (e.g. industry).
4. Cost and effort: Will the area where Wild Parsnip has invaded require resources for restoration or can it be left to regenerate naturally? (Note – it is usually recommended to restore control areas to make them more resilient to future invasions).

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 up with larger populations.

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 site? Was it a heavily invaded site? (i.e. a lot of disturbance was caused when things were removed) Will it continue to be disturbed? (i.e. through trail use and management)

- **Invasive Species Biology**

What is the biology of the invasive species removed and is there a seed bank to consider (there will always be a seed bank to consider when dealing with Wild Parsnip)?

- **Re-invasion Risk**

Are there invasive species in the area that could re-invade the site from certain pathways of introduction, such as nearby trails or watercourses?

- **Existing native vegetation**

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

If you answered yes to most of the questions above, it is most likely that the site will be re-invaded before it has a chance to regenerate on its own. Restoration will be needed to reduce the risk of re-invasion. **See page 26 for restoration methods.**

Control Measures

Controlling Wild Parsnip before it becomes well established will reduce its impacts to biodiversity, agriculture and society.

Health and Safety Considerations

Regardless of the management option, always wear protective clothing and eye protection when controlling Wild Parsnip.

The clear, watery sap of Wild Parsnip contains toxins that can cause serious reactions, including reddening, blistering and ulceration of the skin (known as phytophotodermatitis). Severe burns can occur if the sap contacts the skin and is then exposed to sunlight. Symptoms can occur within 48 hours and scarring and pigmentation can last for weeks and even months.

The general public, land managers and even field workers harvesting cultivated Wild Parsnip are at risk of phytophotodermatitis.

Keep pets and animals clear of Wild Parsnip, as the sap can be transferred on their fur.

When controlling Wild Parsnip, protective clothing, including waterproof gloves, long sleeve shirts and pants, and eye protection are necessary. Ideally, wear disposable “spray suit” coveralls over normal clothing (spray suits are commercial grade waterproof coveralls). Tape coveralls at the wrist to minimize potential skin exposure to the sap.

Remove protective clothing carefully to reduce the risk of skin coming into contact with sap that may be on your clothing.

1. Wash rubber gloves first with soap and water prior to removing other clothing.
2. Remove disposable spray suit or other protective clothing.
3. Wash rubber gloves again before removing them.
4. Lastly, remove protective eye wear.
5. Place non-disposable clothing in the laundry and wash yourself immediately with soap and water.

If you are exposed to Wild Parsnip sap:

- If skin comes into contact with sap, wash it thoroughly with soap and water.
- Avoid further exposure of the affected skin to UV/sunlight.
- If photodermatitis (burn like rash) occurs, seek medical attention.
- If there is a chance your eyes were exposed to direct contact with the sap, immediately flush the eye with water and seek immediate medical attention.

Manual Control

Because Wild Parsnip reproduces only by seed, the reduction or prevention of seed production is an important goal in any control program.

Mowing:

If timed correctly, mowing Wild Parsnip plants can be an effective way of controlling larger infestations. Infested areas should be mowed as soon as flower stalks appear, but before seeds set to prevent seed production. Poorly timed mowing can actually increase Wild Parsnip populations. Mowing, in July or August for example, can disperse the seeds. Mowing when the umbel starts to flower (May-June) can be effective at reducing fruit production. This is because energy reserves then have to go towards stem production instead of flower and seed production. Mowing can also allow sunlight to reach rosettes that are lower than the mower blades, allowing them to grow quickly. This control method needs to be repeated for several seasons for it to be effective.



Large infestation of Wild Parsnip.

Photo courtesy of David Featherstone.

Care must be taken when mowing to prevent the transfer of sap onto equipment and people. Proper safety equipment should be used (eye protection, water proof gloves and long sleeves and pants). Mowers and any other equipment used should be thoroughly cleaned after use on Wild Parsnip to prevent the spread of plant parts and spreading the sap (See: Clean Equipment Protocol for Industry available at <http://www.ontarioinvasiveplants.ca/index.php/municipalities>). Take caution after mowing, as mown plants are not as noticeable as full grown plants. Fresh mowed stems and new growth can be a hazard for people walking barefoot as they may not be visible or recognizable.

Pulling:

For small infestations, you can remove Wild Parsnip plants using a shovel. *Hand pulling Wild Parsnip is not recommended due to the risk of exposure to the toxic sap contained in the plant's leaves, stems and roots.* The best times for removing the plant are right after a rain when the ground is soft, or during times of drought (when the taproot shrinks). Severing the tap root with a hoe or other sharp object, before the plant goes to seed, 2.5-5 cm below the soil, can also be effective. Again, it is easiest in moist soil, and in the spring, when the taproot is a manageable size.

Follow up with site monitoring to check for re-sprouts and missed plants.

Tarping:

Tarping - covering the ground with a tarp - may be used in conjunction with other control methods. For example, after digging or mowing Wild Parsnip plants, the area can be covered with black plastic, smothering growth of new plants. Leave the plastic in place for at least one full growing season. Once the plastic is removed, replanting and restoration is advised.

Cultural Control

Wild Parsnip can be outcompeted by other plants, mostly in high-quality prairie settings and only if the growth of native plants is aggressive enough.

Tillage:

In agricultural settings where tillage is used, Wild Parsnip is not usually an issue.

Burning:

Burning does not control Wild Parsnip populations directly, but periodic burning can encourage the growth of native fire tolerant species, which can out compete Wild Parsnip.

Caution must be taken if burning an area containing Wild Parsnip. Burning could release sap into the air, potentially causing severe reactions to people downwind.



Tarpping a Wild Parsnip patch.

Photo courtesy of Parks Canada.

Chemical Control

Herbicide Application

Herbicides must be applied in accordance with all label directions. For an up-to-date list of herbicides labelled for Wild Parsnip 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/>.

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 www.e-laws.gov.on.ca), or contact the Ontario Ministry of the Environment (<http://www.ene.gov.on.ca/environment>).

Chemical Control Timing

Based on the life cycle of Wild Parsnip, the most effective time to apply a systematic herbicide is in the early spring on newly bolted plants (right after the flower stalks have grown) or rosettes and in the late fall on rosettes. Treating a Wild Parsnip plant in full flower would likely not prevent setting of the seeds and is not recommended.

Foliar Spray:

Refer to the label of the herbicide you are using for rates and instructions for foliar application. Spray only until the Wild Parsnip leaves are covered in herbicide. Avoid overspraying to the point that the herbicide is dripping off the leaves.

Wick or wiper applications:

Some herbicides may be applied directly to the leaves of Wild Parsnip, using a wick or wiper applicator. This is an alternative to foliar spray where there are concerns over drifting herbicides and impacts to surrounding species.

As glyphosate is translocated throughout an actively growing plant, foliar herbicide applications are most effective in spring on actively growing plants, followed with a subsequent summer application for missed plants or plants that have re-grown. Since glyphosate is non-selective and removes only the green vegetation that it comes into contact with, new seedlings will often germinate and emerge where glyphosate applications have occurred.

It is recommended that areas treated with glyphosate are covered in mulch 10-14 days after application to manage seedling germination. Herbicide treatments need to be repeated annually. If a plant is flowering, herbicides are not effective and control methods should focus on carefully removing the flower heads.

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.

Health or safety, plants poisonous to the touch:

The exception for plants that are poisonous to the touch allows the use of pesticides to control plants such as Wild Parsnip. Under this exception, only the use of herbicides listed in Class 10 (i.e. glyphosate) are allowed for use to control plants poisonous to the touch.



Wild Parsnip along a walking trail.

Photo courtesy of David Featherstone.

Forestry Exception:

A forest is defined as a treed area of land that is one hectare in size or larger. Class 9 pesticides may be used in a forest for the purposes of harvesting, renewing, maintaining or establishing a forest, protecting forest resources derived from a forest, and accessing a forest for these purposes under the forestry exception.

The control of Wild Parsnip may fall under the forestry exception; a Forestry Class of land exterminator license would be required to use commercial pesticides in a forest.

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



Wild Parsnip along fenceline.

Photo courtesy of John Kemp.

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 Wild Parsnip 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 prescribed under the Nutrient Management Act, 2002;
- 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.

Some activities are not included in the definition of an "agricultural operation", please 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 a herbivore, predator, disease or other natural enemy to reduce established populations of invasive species. Most invasive species have no natural enemies in their new habitats. Biological control aims to re-establish an ecological balance between the invasive species and its natural enemies by selecting highly host-specific natural enemies from the country of origin, and moving them to the country where the invasive species is a problem. This is only done after extensive host-range 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 many species which will feed on Wild Parsnip, but most do not cause enough damage to the plants to provide control. Deer and other large mammals will eat Wild Parsnip and small mammals and upland birds eat the seeds. A number of insects consume Wild Parsnip, but "sequential flower development" means that when Wild Parsnip is damaged, the plant will compensate by producing more flowers.

One of the challenges associated with implementing a host-specific biocontrol for Wild Parsnip in Ontario, is that the host-specific organism will not only feed on Wild Parsnip, but also cultivated parsnip, which could impact agricultural operations.



Some species will feed on Wild Parsnip.

Photo courtesy of David Featherstone.



Wild Parsnip.

Photo courtesy of JP East.

Disposal

Once you have removed Wild Parsnip plants from the ground, **DO NOT burn or compost**. If possible, leave the stems at the removal site allowing them to completely dry out. Taking safety precautions while handling the plant, place in black plastic bags and leave in direct sun for at least a week. Contact your municipality to check if these bagged plants may then be sent to your local landfill site.

Choosing the Best Control Method

		Isolated Plants	Small (.1-.5ha)	Medium (.5-2ha)	Large (more than 2 ha)
Density of Infested Area	Low Density (1-50 plants or less than 10% cover)	Pulling	Pulling, mowing, tarping, burning	Pulling, mowing, tarping, tillage, burning	Mowing, tarping, tillage, burning
	Medium Density (50-1000 plants or between 10% and 30% cover)		Mowing, tarping, burning, chemical	Mowing, tarping, tillage, burning, chemical	Mowing, tarping, tillage, burning, chemical
	High Density (more than 1000 plants or 30 – 100% cover)		Mowing, tarping, burning, chemical, biological	Mowing, tarping, tillage, burning, chemical, biological	Mowing, tarping, tillage, burning, chemical, biological

Control Measures Summary

Method	Population Characteristics	Purpose of Control	Notes
Pulling	Small to medium	Removal of all plants	Roots must be removed
Mowing/ Cutting	Small to large	Reduce seed production and plant density	Timing is critical
Tarping	Any size of population, dependent on resources	Reduce growth and seed production	Use in conjunction with other control methods
Tillage	Medium to large	Reduce growth and seed production	For use on agricultural land
Burning	Any size of population	Removal of top growth, depletion of root reserves	Burning can encourage the growth of native species that may outcompete Wild Parsnip, use in conjunction with other control methods and caution must be taken during a controlled burn
Chemical	Large populations	Herbicide application; eradication or control to manageable levels	Multiple applications may be necessary
Biological	Large populations	Once a population is past manageable or treatable levels, often the only viable control option is biological control (introduction of a predator, disease or pathogen to reduce populations)	No biological control is currently available

Restoration

Restoration can be a critical aspect of invasive plant management. Site restoration will result in a healthier ecosystem 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. manual or chemical control of Wild Parsnip) may aid in the recovery of native species and prevent immediate re-colonization by other invaders. Mulching reduces light availability, allowing more shade-tolerant native plant species to germinate and colonize the gaps left by the Wild Parsnip removal.

Seeding:

Seeding an area with an annual cover crop or native plant species, immediately after management activities, may be useful to prevent the establishment of new invasive species. This can give desirable native species the chance to establish themselves.

After Control

Soil Rehabilitation:

Wild Parsnip changes soil chemistry by adding nitrogen to the soil. The soil may no longer support native plant species, and may be better suited to other invaders moving in. Replenishing the mycorrhizae in the soil after all Wild Parsnip control has been completed will help to reduce any effects and restore soil conditions to encourage native species to re-grow. Growth of mycorrhizal fungi can be encouraged by using leaf mulch, logs and sticks (to provide food and protective cover for the fungi) and reducing soil compaction. Commercial mycorrhizal products are also available for purchase in Ontario.

Planting:

If there are invasive plants nearby which may colonize the control area, planting larger native species stock (potted etc.) will help them outcompete invasive seedlings. Wait until all management is complete before doing a large stock re-planting, as it may be difficult to distinguish between newly planted native species and invasive seedlings. When completing planting at control sites, consider earthworm impacts (little to no leaf litter) and light availability (have any trees recently been removed which have opened up the forest canopy?). These environmental changes should be taken into account when choosing plant species for restoration, as they will affect the growing and soil conditions. Also, additional management activities may disturb the newly planted materials, so it is best to postpone planting until all invasive plant control is complete.



Wild Parsnip can be found along river banks.

Photo courtesy of Adriana Bernardo.

Preventing the Spread

Everyone can help prevent the spread of Wild Parsnip by following these tips:

Report it.

If you think you see Wild Parsnip in an area where it has not been intentionally planted, take a picture, record the location and contact the Invading Species Hotline to report it. 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 Wild Parsnip looks like. Monitor property boundaries, roadsides, fence lines and trails. Early detection of invasive plants can make it easier and cheaper to remove or control them.

Stay on trails.

Avoid traveling off-trail in areas known to have Wild Parsnip or other invasive species.

Stop the spread.

Inspect, clean and remove mud, seeds and plant parts from clothing, 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

Try to use local native species in your garden. Don't plant Wild Parsnip and if you have removed it, try to replant with native species. Don't transplant invasive species such as Wild Parsnip. 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 of Wild Parsnip

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 Wild Parsnip 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 Wild Parsnip on your property or if you see it in your community where it hasn't been intentionally planted, 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

Garlic Mustard Best Management Practices for Ontario

Giant Hogweed Best Management Practices for Ontario

Phragmites (Common Reed) Best Management Practices for Ontario

Japanese Knotweed Best Management Practices for Ontario

Wild Parsnip Best Management Practices for Ontario

Invasive Honeysuckles Best Management Practices for Ontario

White Sweet Clover Best Management Practices for Ontario

European Black Alder 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

References/Additional Resources

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