Giant Hogweed

(Heracleum mantegazzianum)

Best Management Practices in Ontario

ontario.ca/invasivespecies

Invasive Species Centre

Ontario Invasive Plant Council

Ontario

Foreword

These Best Management Practices (BMPs) are designed to provide guidance for managing invasive Giant Hogweed (Heracleum mantegazzianum) in Ontario. They were developed by the Ontario Invasive Plant Council (OIPC), its partners and the Ontario Ministry of Natural Resources (OMNR and Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). These guidelines were created to complement the invasive plant control initiatives of organizations and individuals concerned with the protection of biodiversity, agricultural lands, crops and natural lands.

These BMPs are based on the most effective and environmentally safe control practices known from research and experience. They reflect current municipal, 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) or Ontario Ministry of Natural Resources (www.ontario.ca/invasivespecies) 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 Credit Valley Conservation.

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Giant Hogweed.

Photo courtesy of Central Lake Ontario Conservation Authority.

Giant Hogweed escaped from gardens.
Photo courtesy of Ontario Ministry of Natural Resources (OMNR).

Introduction

Giant Hogweed (*Heracleum mantegazzianum*) is an invasive perennial herb from the carrot family (Apiaceae). It has spread throughout much of Europe and is a concern in many parts of southern and central Ontario. Native to the Caucasus Mountains in Southwest Asia, the plant grows to an enormous size and produces large umbels (umbrella –shaped clusters) of white flowers. It was probably introduced in North America in the early 1900s as a garden plant. Ontario's first confirmed record of this plant was in 1949. Today, Giant Hogweed has a scattered distribution across southern and central Ontario and has been found as far north as Kapuskasing. Hogweed populations in these locations range in size from individual to thousands of plants.

Giant Hogweed invasions can have a range of negative impacts on society and the environment. It poses a significant threat to human health. Giant Hogweed sap can cause a condition called phytophotodermatitis, which makes skin extremely sensitive to sunlight, and can result in severe burns and blisters. It also outcompetes native plants, reduces biodiversity and degrades the quality of riparian habitats (the zone of land along or around a body of water). Giant Hogweed can negatively impact agriculture and is listed as a noxious weed under the Weed Control Act.

Giant Hogweed grows in a wide range of habitats, spreading rapidly along roadsides, ditches, and riparian areas. Giant Hogweed seeds can be dispersed short distances by wind and long distances by moving water. These BMPs emphasize control efforts in those areas where it can spread easily via waterways or human intervention.

The Ontario Ministry of Natural Resources, the Ontario Ministry of Agriculture of Food and Rural Affairs, and the Ontario Invasive Plant Council and its partners have developed this document as a tool to help guide the effective control and management of this invasive plant across Ontario.

Ontario's Management Priorities for Giant Hogweed

Giant Hogweed is recognized as a threat to Ontario's biodiversity, agriculture, and human health. Ontario has taken several steps to prevent its introduction and spread and to manage and control it where established, consistent with the Ontario Biodiversity Strategy and Ontario Invasive Species Strategic Plan (OISSP).

In 2010, Ontario listed Giant Hogweed as a provincially noxious weed under the Weed Control Act. This has provided a regulatory tool for weed managers to control Giant Hogweed where it could affect agricultural or horticultural operations and ban its sale as a garden plant. In addition to regulation, greater public awareness of the problems caused by Giant Hogweed is necessary to stop gardeners from sharing this invasive plant.

Outreach materials and provincial tracking tools have been produced in partnership with organizations such as the Ontario Invasive Plant Council and Ontario Federation of Anglers and Hunters. These tools, such as the Invading Species Hotline (**1-800-563-7711**) and the online Invasive Tracking System (www.invasivetrackingsystem.ca), help the public report sightings of Giant Hogweed, track the scope of the invasion and allow for early detection and management.

The extensive distribution of Giant Hogweed in southern Ontario requires a coordinated and focused response to control and management. To facilitate this, the province has committed to develop and share these Best Management Practices.

Giant Hogweed is found in many locations across Ontario.
Photo courtesy of David Staples.

Description

The Giant Hogweeds

Giant Hogweed is actually the common name of 4 species of large hogweeds that are invasive outside of their native range.

Heracleum mantegazzianum is the most common invasive large hogweed (growing up to 5.5 m) found in both Europe and North America. It is generally the species that is thought of when referring to invasive hogweeds. Unless otherwise specified, this is the species referred to in these BMPs.

H. persicum is slightly smaller (growing up to 3m) and is capable of producing seeds over several growing seasons (it does not die after the first seed set is produced). It is found throughout Europe.

H. sosnowski is also smaller than *H. mantegazzianum* (growing up to 3m) and is more commonly found in northern areas of Europe. It is more resilient to harsh conditions than the other two species.

H. sphondylium (Common Hogweed) is very similar to the native *H. maximum* (Cow Parsnip). It may be that rather than being two species, the North American plant is a sub-species of the European plant. H. sphondylium is recorded as introduced to Ontario by the Database of Vascular Plants of Canada.

All species are very similar in appearance with only minor differences in size and leaf and umbel shapes.

Although all four species have been found throughout Europe, a comprehensive study of the identity of Giant Hogweeds in Canada has not been done. There are no confirmed sightings of *H. persicum* or *H. sosnowski* in Canada and reports of *H. sphondylium* are rare, but that may be simply because it's difficult to distinguish between these species. For simplicity, this document will assume that all Giant Hogweeds occurring within the province are *H. mantegazzianum*.

It is important to get to know this plant – and its "look-alikes"

Photo courtesy of Doug Thain, Lakeside Forestry.

Description of Giant Hogweed (*H. mantegazzianum*)

Height:

Giant Hogweed is a perennial herb which can grow to 5.5m under ideal conditions, though such sizes are rarely seen. Typically the plant reaches heights of 3-4.5m across Ontario although that varies based on soil and habitat type.

Stems:

Typically 10-15cm in diameter with coarse hairs, and can either be covered in purple blotches or be completely purple.

It can grow to over 5 metres tall.

Photo courtesy of Joe Ferreira, City of Brampton.

The bristles and purple blotches on the stem are distinctive.

Photo courtesy of Owen Williams.

Leaves:

Leaves are prominently spiked with a pronounced jagged appearance. On mature plants, leaves are divided into three equal or almost equal parts which are then divided into a further 3 parts (ternate). Smaller plants may just be deeply lobed. Leaves can grow up to 1m wide.

Seedling leaf.

Photo courtesy of Ontario Ministry of Natural Resources OMNR.

Mature leaf – this one a metre wide.

Photo courtesy of Ontario Ministry of Natural Resources OMNR.

Mature leaf.

Photo courtesy of Rick Bull.

Flowers:

Whitish flowers appear in mid-June and are clustered in umbel shaped heads which can measure up to 1m across. Umbels are an umbrella-shaped cluster of short-stalked flowers, typical of plants of the carrot family. Each compound umbel can have 50-150 rays which can lead to a single plant producing well over 50,000 flowers. The green fruit (seeds) produced by each flower dry out and turn brown in the late summer. They need to undergo 2-3 months of cold in order to break their dormancy and begin to sprout. Giant Hogweed is a monocarpic plant which means that it flowers once and then dies.

Tiny flowers in umbels.

Photo courtesy of Karen Rimmer.

Flower

Photo courtesy of Peter Gardiner.

Health Concern:

Giant Hogweed contains a phototoxic sap which reacts with ultra-violet (UV) light once it has come in contact with the skin. It can cause 2nd degree burns. The organic chemicals called furanocoumarins that cause the burns also deter predators from eating the plant. Other plants with similar phototoxic properties include Wild Parsnip (*Pastinaca sativa*) and Cow Parsnip (*Heracleum maximum*).

Burn to leg caused by Giant Hogweed sap - 5 days to 5 months after initial exposure

Photo courtesy of Bob Kleinberg.

Used with permission from New York State Department of Environmental Conservation.

Giant Hogweed frequently grows near water.

Photo courtesy of Peter Gardiner.

Giant Hogweed - Look-alikes

Giant Hogweed can be confused with several native and non-native plant species found in Ontario including Wild Parsnip (*Pastinaca sativa*), Cow Parsnip (*Heracleum maximum*), Purplestem Angelica (*Angelica atropurpurea*), Woodland Angelica (*Angelica sylvestris*), Valerian (*Valerian officinalis*), Lovage (*Levisticum officinale*) and Queen Anne's Lace (*Daucus carota*) (also known as Wild Carrot). None of these plants are as large as a mature Giant Hogweed which can grow up to 5.5m.

Cow Parsnip:

Giant Hogweed looks very similar to the native and widespread Cow Parsnip (*H. maximum*). **The sap of Cow Parsnip contains the same toxic properties as Giant Hogweed and contact with this plant should also be avoided.** Note: Cow Parsnip is native to Ontario and in some cases is regionally rare and is not considered invasive. Control of Cow Parsnip should only be undertaken where it poses a health and safety hazard.

Wild Parsnip:

Wild Parsnip (*Pastinaca sativa*), an introduced species native to Europe, can also be confused with Giant Hogweed. The plant grows up to approximately 1.5 metres in size, and its flowers are yellow. **The sap of Wild Parsnip has the same toxic properties as Giant Hogweed. Contact with this plant should be avoided.**

Angelica Species:

Giant Hogweed is superficially similar to Angelica species including the common, native Purplestem Angelica (*Angelica atropurpurea*) and the introduced Woodland Angelica (*A. sylvestris*). It might also be mistaken for other angelica species (*A. lucida, A. venenosa*), Valerian (*Valeriana officinalis*), and Lovage (*Levisticum officinale*), The key differences for the most similar species, the native Purplestem Angelica, are that it has more rounded flower umbels (almost like globes) and the stem is smooth and purple.

Other Species:

Queen Anne's Lace (*Daucus carota*) and a number of elderberry species including American Elderberry (*Sambucas canadensis*) can be confused with Giant Hogweed. These species are not known to present a health hazard, however Queen Anne's Lace is also listed as a noxious weed under the Weed Control Act.

Giant Hogweed and its look-alikes

	Giant Hogweed	Cow Parsnip	Wild Parsnip	Queen Anne's Lace	Angelica
Height	2.5-5m (8-14 ft)	1-2.5 m (3-8 ft)	0.5-1.5m (2-5 ft)	0.3 -1.5m (1-5 ft)	1.2-2.1m (4-7 ft)
Flowers	White flowers in large umbels (umbrella shaped clusters) 12-36 inches across Umbel composed of many smaller umbels 50-150 rays per main umbel	White umbel 4-12 inches across 15-30 rays per umbel	Yellow umbels 4-8 inches across	Pale pink before fully opening White 2-4 inch wide umbel when mature Often with single purple flower in center of umbel	Greenish-white rounded (globe-like) flower umbels 3-10 inches wide (7-25 cm)
Leaves	Prominently spiked edges. Up to 1.5 m (5 ft) long Lateral leaflets have blade touching main stem with no petioles (leaf stalk)	Palmately lobed (leaves have lobes shaped like a hand with fingers) with fuzzy underside. Up to 0.5m (20 in) long and wide Leaf blade separated from main stem by petiole.	Pinnately compound (leaves have leaflets that grow across from each other along the stem) with 2-5 pairs of opposite leaflets and one diamond-shaped terminal leaflet Leaflets toothed and often shaped like a mitten.	Alternately arranged (leaves are staggered along the stem) A mix of bi-pinnate and tri-pinnate compound leaves with lobed segments.	Alternate leaves, divided into 2-3 leaflets

Giant Hogweed and its look-alikes (continued)

	Giant Hogweed	Cow Parsnip	Wild Parsnip	Queen Anne's Lace	Angelica
Stem	Hollow 5-15cm (2-6 in) thick stems Prominent purple blotches Distinct, coarse and bristly hairs	Hollow stem, 5cm (2 in) thick at base Green, few to no purple spots Soft and fuzzy hairs	Green stem 2.5-5 cm (1-2 in) thick Smooth with few hairs	Green stem 1-2.5 cm (0.5-2 in) thick Covered with fine bristly hairs	Purple or purple blotched, stem, smooth (no hairs)
Lifecycle	Biennial (lives for 2 years) or perennial (lives longer than 2 years)	Perennial	Biennial/Perennial	Biennial	Perennial
Origin	Invasive	Native	Introduced	Introduced	Native

Comparison of Features of Ontario's Most Common Hogweed "look-alikes"

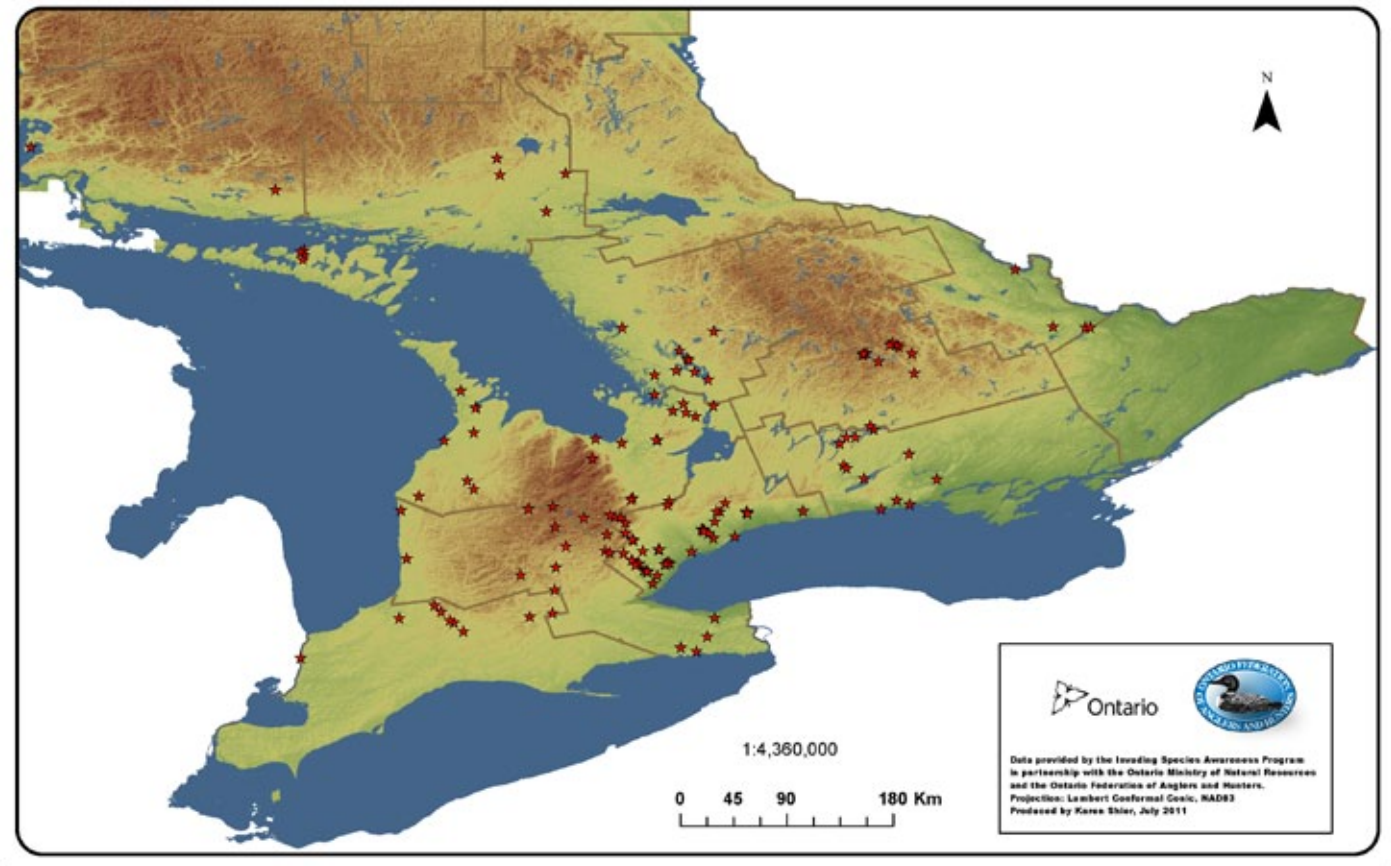
	Height	Stem	Leaf	Flower
Giant Hogweed				
Cow Parsnip				
Wild Parsnip				
Angelica				

Photos courtesy of Jeff Muzzi, Diana Shermet, Owen Williams and Karen Rimmer

Distribution

Giant Hogweed has a scattered distribution across southern and central Ontario, south of the line from Manitoulin Island to Ottawa. Confirmed reports of Giant Hogweed have been made as far north as Kapuskasing. Many counties and municipalities are taking steps to remove Giant Hogweed from their lands. Established populations with the greatest potential to spread are mostly found south of the line between Ottawa and Parry Sound.

Nationally, limited populations of Giant Hogweed occur in Quebec, New Brunswick, Nova Scotia, Newfoundland and Labrador, and British Columbia.



Giant Hogweed distribution in Ontario as of July 2011.

Photo courtesy of Invading Species Awareness Program of OMNR and OFAH.

Biology and Life Cycle of Giant Hogweed

Giant Hogweed is one of the first plants to come up in the spring. During the first year, plants form large rosettes with many large lobed leaves reaching up to 150cm in diameter. It grows rapidly, forming a large taproot which stores energy. Plants usually take from 2-5 years (sometimes as long as ten years) after they first germinate to produce a flowering stalk. The timing for flower development may depend on environmental conditions and competition with other vegetation, although this is not well understood.

For mature plants, flowering stalks begin to appear in early-mid June in southern Ontario, and they are in full flower from mid-late June to end of July. Each plant produces compound umbels with tens of thousands of flowers which are wind and insect pollinated. Female flowers typically appear on the central (terminal) umbel around one week before male flowers appear on the satellite umbels. Although capable of reproducing with itself, seed viability is much higher when fertilized by pollen from other plants (~80% compared to ~13% viability). The plants die after seeds are produced.

Each adult plant produces an average of 10,000 winged seeds, though large individuals are capable of producing over 100,000 seeds. Seeds are spread by wind and water, and most fall within 10m of their parent plant. If seeds fall into water they can float downstream and can remain viable for up to 3 days before dying. New colonies of Giant Hogweed can start from one single seed. Seeds are also blown around during the winter and can travel great distances on the snow. There is no evidence of birds carrying seeds. Other than being carried by water, the most likely cause of spread is by humans. This can be from people taking seeds to plant in a garden or by moving soil containing viable seeds.

Ninety-five percent of the seeds produced will stay within the top 5cm of the soil layer which leads to a short-term seed bank. The vast majority of viable seeds are dormant when they first reach the ground and require 2-3 months of cold weather (below 8°C) to break dormancy and germinate. Some seeds remain dormant in the soil but most (>98%) germinate the first spring. After the third year there are less than 0.1% of seeds remaining in the seed bank.

Habitat

Giant Hogweed is native to the Caucasus Mountains in Southwest Asia and was likely introduced to Ontario as an ornamental plant. In its native range Giant Hogweed occurs in meadows, ravines, and along forest edges and streams. It has been observed in northern regions and is tolerant of cold climates. Within Ontario, Giant Hogweed has been observed in riparian areas, pastures, open woodlands and wetlands, and along streams, roadsides, ditches and transportation corridors. Giant Hogweed prefers moist soils with adequate nutrient supplies, high sunlight, and limited active land use. It can be found within drier, nutrient poor shaded sites though may take several years for the plant to reach maturity and flower in those locations.

Effects of Giant Hogweed

Natural Resource Impacts

There is evidence that Giant Hogweed can harm Ontario's biodiversity by shading out native plants, although scientists have not done extensive research on this topic in Ontario or Canada. Established populations of Giant Hogweed can out-compete native vegetation through rapid growth in the early spring, producing large leaves which shade out other plants before they have an opportunity to grow. This creates stands of low species diversity typically inhabited by only the hardiest of native grasses and other invasive species such as Garlic Mustard (*Alliara petiolata*).

Giant Hogweed can form dense stands in riparian areas. When the plants die back in the fall, soil is exposed resulting in increased erosion and siltation of stream banks which can impact fish spawning areas. In Ireland dense Giant Hogweed stands have caused a significant loss of plant and animal diversity along rivers and streams.

Health Concerns

The clear watery sap of Giant Hogweed contains toxins that can cause severe dermatitis (inflammation of the skin). Ultraviolet radiation activates compounds in the sap resulting in severe burns when exposed to the sun. Symptoms occur within 48 hours and consist of painful blisters. Purplish scars may form that last for many years. Eye contact with the sap has been reported (in the media and by various web sites) to cause temporary or permanent blindness, though this has not been confirmed. Similar effects result from exposure to the other two cow parsnip species found in Ontario (*H. maximum* and *H. sphondylium*) and from the widely introduced Wild Parsnip (*Pastinaca sativa*).

Agriculture Concerns

The impact of Giant Hogweed to agriculture is rare however populations have been documented as creeping into agricultural fields requiring additional management practices for growers in order to minimize its impact on crop yield. Giant Hogweed in pasture and forage fields reduces feed quality and increases health risks to more susceptible grazing animals.

Regulatory tools

Provincial - Weed Control Act

In 2010 Giant Hogweed was added to the list of noxious weeds under the Weed Control Act. The objective of the Weed Control Act is to minimize the impact of noxious weeds and weed seeds on agricultural or horticulture land. Landowners whose property contains noxious weeds and weed seeds that negatively affect agricultural lands are responsible for weed control and associated costs.

Municipal - Community Standards Bylaw

A municipality might wish to pass a bylaw to address the presence of Giant Hogweed in areas other than agricultural or horticultural land. Municipalities such as Durham Region and the Town of Halton Hills have enacted bylaws under the Municipal Act to control plants in areas where there is a potential for negative impact to human safety. Examples of these bylaws can be viewed at www.ontarioinvasiveplants.ca.

Federal – Weed Seeds Order

The *Weed Seeds Order* is a ministerial order made under the Seeds Act. The *Weed Seeds Order* (WSO) classifies weed species for the purposes of establishing purity standards for seed in Canada. Giant Hogweed is proposed to be listed as a primary noxious species on the revised *Weed Seeds Order* (WSO). A primary noxious listing of this species would prevent the spread of Giant Hogweed by restricting its presence in seed and seed mixtures imported into or sold in Canada.

In addition, *H. sosnowski* and Wild Parsnip (*Pastinacasativa*) are proposed for addition to the WSO, as a Class 2- Primary Noxious weed and Class 3-Secondary Noxious weed respectively.

Removed plants lying on road

Photo courtesy of Doug Thain, Lakeside Forestry.

Best Management Practices

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

Once Giant Hogweed has been confirmed at a location, a control plan should be developed based on an assessment of population size, accessibility, potential for spread, and risk of it causing environmental, agricultural or direct human health impacts. The following Best Management Practices can be used in the development of a control plan. It is important to note that there are a number of natural resource considerations that should be applied prior to implementing control plans including species at risk and habitat disruption. All persons employed in controlling Giant Hogweed should exercise the health and safety precautions as outlined below.

Given the health concerns associated with Giant Hogweed and similar plants with phototoxic properties, it is highly recommended that private landowners hire a licensed professional to remove the plant to ensure safe procedures are followed. A list of Giant Hogweed abatement professionals prepared by the Ontario Invasive Plant Council can be viewed at www.ontarioinvasiveplants.ca for information purposes only.

Health and Safety Considerations

Protective clothing:

- All persons employed in the removal or management of Giant Hogweed MUST wear protective clothing. The clear watery sap of Giant Hogweed and similar plants with phototoxic properties contains toxins that can cause severe dermatitis (inflammation of the skin). Severe burns can occur if the sap contacts the skin and is then exposed to sunlight. Symptoms occur within 48 hours and consist of painful blisters.
- Protective clothing includes waterproof gloves, long sleeve shirts, pants, and eye protection (face shield). It is ideal to wear disposable "spray suit" coveralls over your normal clothing (spray suits are commercial grade waterproof coveralls). Tape coveralls at the wrists to minimize potential exposure of skin to sap.
- Remove protective clothing carefully to reduce the risk of skin coming into contact with any sap that may be on your clothing. Wash rubber gloves first with soap and water prior to removing the protective disposable spray suit. Wash rubber gloves again before taking them off and then lastly remove the protective eye wear. Put non-disposable clothing in the laundry and wash yourself immediately with soap and water.
- Keep pets and animals clear of Giant Hogweed, as the sap can also be transferred on their fur.

If you are exposed to Giant Hogweed sap:

- If skin comes into contact with the sap, wash it thoroughly with soap and water.
- Avoid further exposure of the affected skin to UV/Sunlight.
- If photodermatitis occurs, seek medical consultation.
- If there has been direct exposure to the eye (cornea), immediately flush the eye with water and seek medical evaluation and treatment on an urgent basis.

Natural Resource Considerations

You are responsible for ensuring that your project follows all relevant laws, including the Endangered Species Act (ESA).

Before starting control actions, a site assessment for species or habitat protected under the ESA is required. Your local MNR office can provide existing knowledge of protected species and their habitat at or near your site and existing species at risk survey protocols. Details on additional sources to consult for this information are available in the ESA Submission Standards for Activity Review.

If protected species or habitats are present, an assessment of the potential effects of the control project is required. Consult with your local MNR district office as early in your control plans as possible for advice on alternatives that may avoid or minimize adverse effects, and to determine if your control activities require authorization under the ESA.

Control Measures

The most appropriate time to remove Giant Hogweed is in late April or early May as plants are typically less than 30 cm in height, are easier to dig up, and more susceptible to herbicide applications. As the growing season progresses, Giant Hogweed becomes more difficult to control due to its large size, and increased health and safety concerns for workers.

Mechanical control

Mechanical control is most effective if done in early spring (ie. late April to early May). The overall success of mechanical control options depends on the size of the Giant Hogweed population. Mechanical control works best when dealing with a limited number of plants in relatively accessible locations. Due to the close contact with the plant required for these options, extreme care must be taken to ensure workers' health and safety. Note: Motorized tools such as "whipper snippers" should never be used for control of Giant Hogweed or other plants with phototoxic properties as the sap can be splashed on to the operator.

Giant Hogweed should be controlled before seeds are produced.

Photo courtesy of Owen Williams.

Digging:

Digging works best for Giant Hogweed plants in their first or second year of growth, as the taproot can exceed 1 m in depth in older plants. Digging is most effective in the spring (early May).

Use a spade to remove as much of the taproot as possible. Unless the entire root is removed, it is possible that the plant will re-grow and repeated digging or covering the dug area with black plastic to smother new growth will be necessary.

Digging to remove hogweed.
Photo courtesy of Doug Thain, Lakeside Forestry.

Mowing:

NOT RECOMMENDED. Mowing or above ground cutting takes a great deal of effort and care as it is an ongoing process throughout the year. Mowing may be useful if the sole objective is to prevent seed production. Extreme caution should be exercised by operators of mowing equipment due to the potential for sap to splash.

If the terrain allows the use of machinery, mow top growth every two weeks throughout the growing season to exhaust the plant's root reserves. Take precautions to prevent people from coming in contact with the cut stem bases. Even a single spring cutting can reduce the number and size of seeds. When mowing, care must be taken to void the spread of seeds in tire treads and sap on the machinery.

Tilling:

Tilling is problematic in many landscapes because Giant Hogweed tends to grow in unsuitable areas. This control method is most effective on agricultural land and near residential areas where conditions may be more favourable.

Flower removal:

NOT RECOMMENDED. Removing flowering umbels in summer before seed production will stop the plant from reproducing and the seed bank from increasing, however, this control tactic is extremely challenging. The sheer size of the plant at this time of year prevents easy access to the flower head, and in dense populations workers are at increased risk of coming in contact with the sap. While the removal of umbels during early flowering stages can result in a reduction in seed production, new umbels can form on lower branches. Control work must be repeated over the summer to regularly remove new flower heads. Timing is crucial because if the treatment is applied too early in the season (before full inflorescence), regeneration is very vigorous and an even larger number of seeds can be produced. If treatment is carried out too late (at the beginning of seed-setting), there is a risk that seeds will ripen even on cut umbels.

The cut umbels must be collected and destroyed. Carefully remove flower heads from stems and place them in black plastic bags. Make sure not to drop any seeds (see information on disposal techniques below). The removal of umbels is most effective if done when terminal umbels just start to flower. Even then, there is some regeneration and treated stands must be checked at the time of seed ripening to stop release of seeds produced by regeneration.

This method should only be considered as an improvised solution for control of stands where no other attempts of control have taken place earlier in the season.

Umbels turn green as seed develops.
Photo courtesy of Ken Towle.

Note: *If the flower heads have changed from white to green, seeds are being produced and there is less opportunity for successful management as it is challenging to remove the seed heads and/or cut the plant without dispersing the seeds.*

Disposal:

DO NOT BURN. DO NOT COMPOST. Dispose of plant material in black plastic bags. Seal the bags tightly and leave them in direct sunlight for about a week. Allow stems and roots to dry out thoroughly before disposing of them. Contact your municipality to determine if the bagged plants can be sent to your local landfill site.

Chemical Control

Herbicide treatments may be the best way to control Giant Hogweed. There are many regulations surrounding the use of chemicals for the control of invasive species and specific precautions must be taken prior to application. In Ontario, herbicide storage, disposal, use, transport and sale is regulated under the Pesticides Act and Regulation 63/09, which can be viewed at: www.e-laws.gov.on.ca/html/source/regs/english/2009/elaws_src_regs_r09063_e.htm.

Section 22 under Regulation 63/09 contains an exception which allows the use of pesticides to control plants such as Giant Hogweed that are poisonous to the touch. Under this exception, only the use of certain herbicides listed in Class 10 (i.e. glyphosate) is allowed. Read the product label before using to ensure it can be legally used on Giant Hogweed.

As glyphosate is translocated throughout an actively growing plant, herbicide applications to leaves are most effective in spring, followed with a subsequent summer application for missed plants or those that may have re-grown. Since glyphosate is non-selective and only works on the green vegetation that it comes into contact with, new seedlings will often germinate from seed and emerge after 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 as per the instructions under 'Flower Removal' (above).

Giant Hogweed after chemical control.

Photo courtesy of Greg Bales.

Summary of Control Techniques

General:

Take appropriate health and safety precautions to protect workers and others from the toxic sap. Avoid use of mechanical equipment that might spray or splash sap. **Eradication is most efficient in spring** (April and May) when the plants are less than 30 cm tall. Mechanical control is most effective when dealing with small numbers of plants. Disposal: Do not burn. Do not compost.

Method	Population Type	Purpose of Control	Notes
Digging	Small number of plants Most effective on 1st or 2nd year plants	Eradication	Entire root must be removed to prevent regrowth
Mowing	Small to medium populations in accessible location	Reduce seed production	Start early in the growing season, while plants are still small Repeat every two weeks
Tilling	Medium populations, located in accessible locations (agricultural)	Reduce growth and seed production	
Flower removal (Not recommended)	Individual to small populations	Reduce seed production	Requires extreme caution to avoid contact with sap Cutting must be repeated to remove new flower heads
Chemical	Small to large populations	Eradication or to control population size	

This table is a summary. See the text of this section for more detail.

Preventing the Spread

Everyone can help prevent the spread of Giant Hogweed by following these tips:

☑ Report it.

If you think you see Giant Hogweed, take a picture, record the location and contact the Invading Species Hotline to report it (for safety reasons do not take a sample of the plant). For more information and guidance call the Invading Species Hotline at 1-800-563-7711 or visit www.ontarioinvasiveplants.ca. Because it is included in the Weed Control Act you can also contact county and regional weed inspectors regarding Giant Hogweed infestations.

☑ Watch for it.

Learn what Giant Hogweed looks like and then monitor hedges, property boundaries, 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 and in areas known to have Giant Hogweed or other invasive species. If Giant Hogweed is found close to trails, signs should be posted to alert people to the potential health hazards.

☑ 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. It's very important to carefully wash sap from clothing, equipment, and pets.

☑ 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 Giant Hogweed in your garden and if you have removed it, try to replant with native species. Don't transplant invasive species such as Giant Hogweed. Encourage your local garden centre to sell non-invasive or native plants.

Tracking the Spread of Giant Hogweed

Over 90 locations of Giant Hogweed have been documented in Ontario however there are still 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) The Invasive Tracking System, an on-line reporting tool where users can view existing sightings of Giant Hogweed and other invasive species in Ontario and document their sightings utilizing satellite imagery. This tool, at www.invasivetrackingsystem.ca, is free to use.

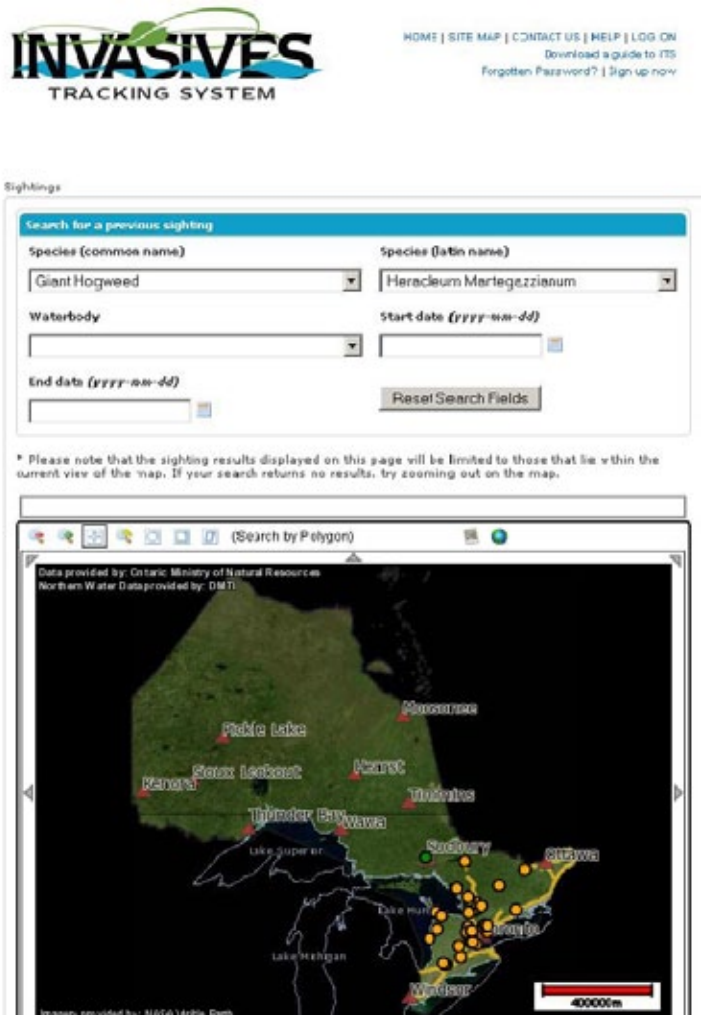


Photo courtesy of OFAH.

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 Giant Hogweed on your property or if you see it in your community DO NOT touch it. You will be asked to send in photos of the leaf, stem and flower for identification. Do not collect parts of the plant for identification.

Literature and Other Resources

The Ministry of Natural Resources, Ministry of Agriculture, Food and Rural Affairs, the Ontario Invasive Plant Council and its partners have produced outreach materials to share with the public. They provide information on the identification, control and management of Giant Hogweed. These materials can be found on-line at www.ontario.ca/invasivespecies, www.invadingspecies.com and www.ontarioinvasiveplants.ca or by contacting the Invading Species Hotline at **1-800-563-7711.**

Several regional working groups have also been established by a coalition of conservation authorities and municipalities to provide a coordinated response to Giant Hogweed management. Contact the Ontario Invasive Plant Council for more information about how to become involved in these initiatives.

Additional materials and resources can be found at:

Ontario Weeds: Giant Hogweed
http://www.omafra.gov.on.ca/english/crops/facts/ontweeds/giant_hogweed.htm

Giant Hogweed, Heracleum mantegazzianum
http://www.ontarioweeds.com/weed.php?w=HERMZ

The Biology of Invasive Alien Plants in Canada. 4. *Heracleum mantegazzianum* Sommier & Levier
http://www.weedinfo.ca/media/pdf/page_biology_canada_weeds.pdf

Please report Giant Hogweed in Ontario.
Photo courtesy of David Staples.

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