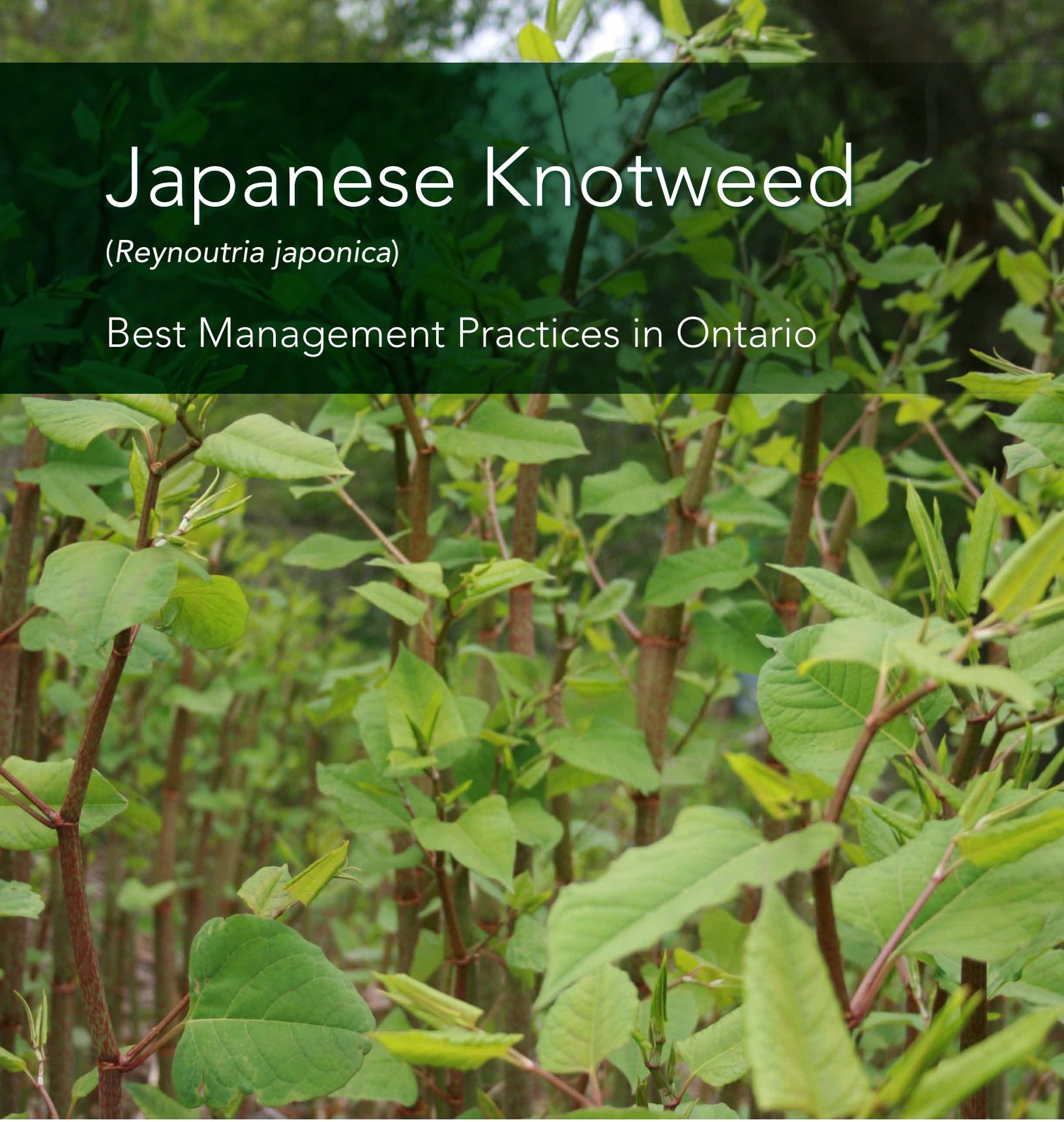
Japanese Knotweed

(*Reynoutria japonica*)

Best Management Practices in Ontario



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Foreword

This Best Management Practices (BMP) document provides guidance for managing invasive Japanese knotweed or renouée du Japon (*Reynoutria japonica*) in Ontario. Funding and leadership to produce this document was provided by the Ministry of Natural Resources (MNR). BMPs are developed by the Ontario Invasive Plant Council (OIPC) and its partners to facilitate invasive plant control initiatives by individuals and organizations concerned with the protection of biodiversity, agricultural lands, infrastructure, crops, and species at risk in Ontario.

The intent of this document is to relay information specifically related to invasive plant control practices that have been recommended by leading professionals across Ontario and Canada. This document contains the most up-to-date, effective, and environmentally-safe control practices known at the date of publication. Information provided within this document was curated based on the most recent research, experience, and literature Available: at this time. It complies with current provincial and federal legislation regarding pesticide usage, habitat disturbance, and species at risk protection. It is subject to change as legislation is updated or new research findings emerge. The information provided in this BMP is not to be considered legal advice. Interested parties are advised to refer to the applicable legislation to address specific circumstances.

Check the website of the OIPC (www.ontarioinvasiveplants.ca) for updates.

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Inquiries regarding this document can be directed to the:
Ontario Invasive Plant Council
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For more information on invasive plants in Ontario, please visit the following websites: www.ontarioinvasiveplants.ca, www.ontario.ca/page/invasive-species-ontario, www.invadingspecies.com, or www.invasivespeciescentre.ca.

Front and back cover Photo courtesy of: Francine MacDonald.

Japanese knotweed.
Photo courtesy of: Francine MacDonald.

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Japanese knotweed is listed as one of the world's worst 100 invasive species.
Photo courtesy of: Wasyl Bakowsky.

Introduction

Japanese knotweed is part of a complex (also called "Japanese knotweed sensu lato") of closely related invasive knotweeds that are all highly invasive and can interbreed with one another: Japanese knotweed (*Reynoutria japonica* (var. *japonica*, var. *compacta*), giant knotweed (*R. sachalinensis*), and their hybrid Bohemian knotweed (*F.* × *bohemica*). All three are perennial herbaceous, rhizomatous plants introduced to Ontario. As of January 2022, all three species, in addition to the unrelated Himalayan knotweed (*Koenigia polystachya*), have been regulated as restricted invasive species under *Ontario's Invasive Species Act*, 2015 (ISA). For the purpose of this document, the focus is primarily on Japanese knotweed (*R. japonica*), however, much of the information and recommended control measures will apply to all four species.

Japanese knotweed (*R. japonica*) is also known as Mexican bamboo, fleeceflower, Japanese polygonum or Hu zhang (Brouillet *et al.* 2010). It is native to eastern Asia (Japan, Korea, China and Taiwan), where it is relatively uncommon and one of the first species to grow after eruptions or disturbance on volcanic slopes (Barney *et al.* 2006; Del Tredici 2017). It was introduced to North America in the late 1800s as an ornamental plant, for erosion control, and as forage for livestock (Weston *et al.* 2005; Barney *et al.* 2006; Grevstad *et al.* 2018; Kato-Noguchi 2022). It escaped cultivation and became an aggressive invader in North America as well as Europe, Australia, and New Zealand. Herbarium records indicate its presence in North America as a garden plant between 1862 and 1875 (Del Tredici 2017). It was introduced to Canada around 1900, with the first Ontario record from Niagara Falls in 1901 (Barney *et al.* 2006). It is now reported in many locations throughout Ontario (EDDMaps 2026a; iNaturalist 2026a).

Japanese knotweed is regarded as one of the world's worst 100 invasive species (Global Invasive Species Database 2024) with negative impacts to the environment, economy and society. It forms dense, bamboo-like stands that can be up to 3 m tall, with heavy canopy cover that shades and outcompetes native plants (Wilson *et al.* 2017; Drazan *et al.* 2021). Japanese knotweed produces allelopathic chemicals which inhibit the germination and growth of other plants (Murrell *et al.* 2011; Dommanget *et al.* 2014; Kato-Noguchi 2022). Its extensive rhizome (root) system can damage public and private infrastructure (Wilde 2019). Once established, it is costly and difficult to control (Reinhardt *et al.* 2003; Hocking *et al.* 2023; Drazan *et al.* 2021).

Japanese knotweed grows in a wide range of habitats including riparian areas, wetlands, roadsides, ditches, utility rights-of-way and fence lines (Barney *et al.* 2006; Kato-Noguchi 2022). It is often found around old homesteads where it may have been originally planted as an ornamental. It spreads primarily along riparian areas or ditches where plant and rhizome fragments can be dispersed in moving water (i.e., along canals, beaches, streams and rivers) (Colleran and Goodall 2015; Rouleau *et al.* 2023). It can also be spread by moving machinery or equipment with soil containing plant parts (rhizomes). Seeds (if produced) are spread mainly by wind.

This document has been developed to help guide the effective and consistent management of Japanese knotweed and other knotweed species across Ontario.

Japanese knotweed spreads primarily along riparian areas where it can be dispersed by moving water.
Photo courtesy of: Ken Towle.

Giant knotweed (*Reynoutria sachalinensis*)

Giant knotweed, native to northern Japan, was introduced to North America as an ornamental plant and has become invasive, much like Japanese knotweed. In Ontario, scattered, isolated sightings have been reported in northern Ontario (Cockburn and Manitoulin Island, Sudbury, and as far north as Thunder Bay), southern Ontario (London, Niagara, Hamilton, Peel, York) and central Ontario (Parry Sound, Kawartha Lakes). Sightings have also been reported in British Columbia, Quebec, and the Atlantic Provinces (EDDMapS 2026a; iNaturalist 2026a). It is the biggest of the four knotweed species, reaching heights up to 5 m. It can be distinguished from Japanese knotweed by its leaves, which are much larger and deeply heart-shaped with long, wavy hairs on the underside. Giant knotweed's panicles (flower clusters) are shorter than the closest leaves.

Leaves are large and deeply heart-shaped.

Photo courtesy of: Mhairi McFarlane, iNaturalist, Available: https://www.inaturalist.org/observations/30608138.

Flower clusters are shorter than the closest leaves.

Photo courtesy of: Christof Moning, iNaturalist, Available: https://www.inaturalist.org/observations/225576995.

Stalks are thick.

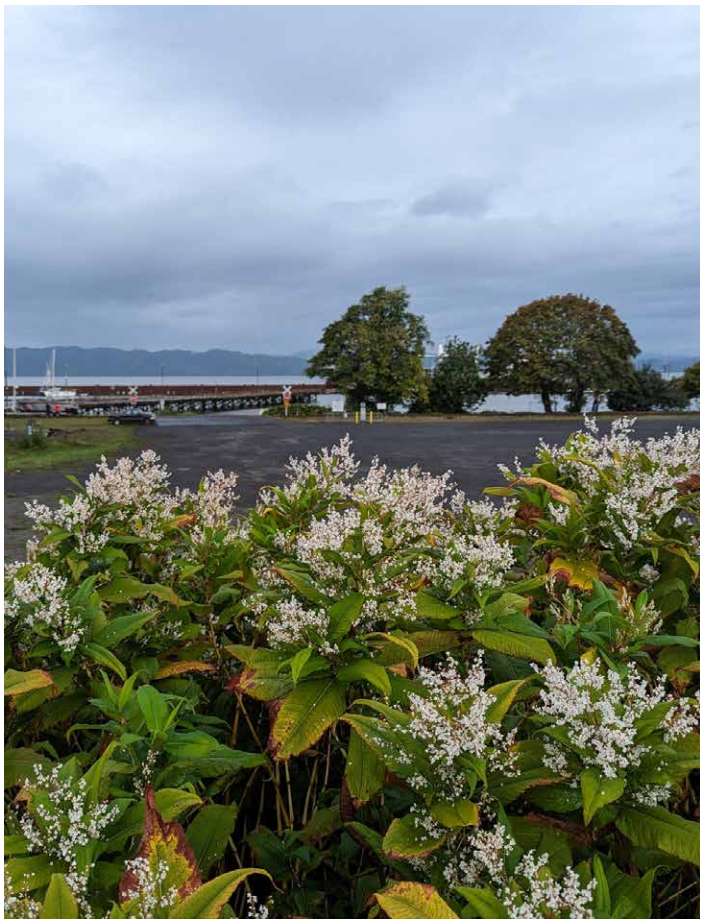
Photo courtesy of: Mhairi McFarlane, iNaturalist, Available: https://www.inaturalist.org/observations/30608138.

Himalayan knotweed (*Koenigia polystachya*)

Himalayan knotweed, native to the Himalayas in southern Asia, is occasionally found in isolated locations in Ontario (i.e., it has been reported in a few residential gardens in Toronto) (Stephen Smith, personal communication). Within Canada, it has been reported in British Columbia, Nova Scotia and Newfoundland (iNaturalist 2026d). It is also present in some US states that border Ontario (New York, Vermont, Michigan). It can grow up to 2 m tall and differs from Japanese knotweed by its longer, slender leaves and flowers, which are cream-white to pinkish-white with a loosely spreading arrangement.

Leaves are long and slender with cream-white to pinkish-white flowers.

Photo courtesy of: Rajendra Koranga, iNaturalist,
Available: https://www.inaturalist.org/observations/92488266.



Himalayan knotweed near the Columbia River in Astoria, Oregon.

Photo courtesy of: Jess Beauchemin, iNaturalist,
Available: https://www.inaturalist.org/observations/335356363.

	Japanese Knotweed *(Reynoutria japonica)*	Giant Knotweed *(Reynoutria sachalinensis)*	Bohemian Knotweed *(Reynoutria x bohemica)*	Himalayan Knotweed *(Koenigia polystachya)*
	 **Photo courtesy of: Jan Samanek, Phytosanitary Administration, bugwood.org** **INVASIVE**	 **Photo courtesy of: Christoph Moning, iNaturalist. Available: https://www.inaturalist.org/observations/184949475, Licensed under CC-BY-NC** **INVASIVE**	 **Photo courtesy of: Andras Schmotzer, iNaturalist, Available: https://www.inaturalist.org/observations/338765385, Licensed under CC-BY-NC** **INVASIVE**	 **Photo courtesy of: David Earl, iNaturalist, Available: https://www.inaturalist.org/observations/36315948, Licensed under CC-BY-NC** **INVASIVE**
Leaves	• 10 - 17 cm long, 2/3 as wide • Oval to triangle-shaped • Flat base • Abruptly pointed tip • Long petiole • Hairless; underside veins have visible bumps	• **Relatively large: 15 - 40 cm long, 2/3 as wide** • **Heart-shaped** • Tapering tip • Long petiole • Underside veins have **long, fine, wavy hairs (visible along leaf veins)**	• 12 - 25 cm long, 2/3 as wide (size and shape intermediate between Japanese and giant knotweed) • Oval to triangular or heart-shaped • Flat base or more heart-shaped • **Long tapered leaf tips** • Underside veins have short and stiff hairs	• 10 - 20 cm long, 1/2 as wide • **Long, narrow, lance-shaped** • **Tapered base** • Long tapered leaf tips • Underside veins have many stiff hairs
Flowers	• Flowers are white-green to cream-white • Branching panicles (or sprays) in loose, drooping arrangement • **Flower clusters are longer than the closest leaves**	• Flowers are white-green to cream-white • Branching panicles (or sprays) in **compact**, drooping arrangement • **Flower clusters are shorter than nearest leaves**	• Flowers are white-green to cream-white • Branching panicles (or sprays) in loose or erect, drooping arrangement • Flower clusters are mid-size, **approximately the same length as nearest leaves**	• Flowers are cream-white to pink-white • Branching panicles (or sprays) in loose, **spreading** arrangement
Fruits	• Dry seed pods are light-colored, papery, 3-angled (triangular), winged • Seeds are triangular, black, smooth, shiny, small	• Dry seed pods are light-colored, papery, 3-angled (triangular), winged • Seeds are triangular, black, smooth, shiny, small	• Dry seed pods are light-colored, papery, 3-angled (triangular), winged • Seeds are triangular, black, smooth, shiny, small	• Dry seed pods are light-colored, papery, **wingless** • Seeds are triangular, black, smooth, shiny, small

Leaf comparisons of knotweed species

Giant Knotweed

Photo courtesy of: Mhairi McFarlane, iNaturalist, Available: https://www.inaturalist.org/observations/30608138

Bohemian Knotweed

Photo courtesy of: Ivan Jarolímek, iNaturalist, Available: https://www.inaturalist.org/observations/330204040

Japanese Knotweed

Photo courtesy of: Karro Frost, iNaturalist, Available: https://www.inaturalist.org/observations/243054594

Himalayan Knotweed

Photo courtesy of: Ian Cruickshank, iNaturalist, Available: https://www.inaturalist.org/observations/323665069

Hairs vs no hairs:

Giant knotweed - underside veins have long, fine, wavy hairs.

Photo courtesy of: Marc-Aurèle Vallée, iNaturalist, Available: https://www.inaturalist.org/observations/218533188

Japanese knotweed - underside veins short and stiff hairs.

Photo courtesy of: Patrick Hacker, iNaturalist, Available: https://www.inaturalist.org/observations/313906185

Biology and Life Cycle

Japanese knotweed can be dioecious (male and female flowers occur on separate plants) or gynodioecious (hermaphrodite flowers and female flowers occur on separate plants) (Bailey 2013). Most North American populations are female clones that reproduce primarily vegetatively via rhizomes and adventitious rooting of stem fragments rather than by seed (Bailey *et al.* 2008).

In early spring, new aerial shoots arise from underground wintering buds (Bailey *et al.* 2008; Dauer and Jongejans 2013). These shoots grow rapidly (up to 4.3 cm per day), typically reaching full height by late July (Beerling *et al.* 1994). Flowering occurs in late summer, and seeds (if produced) ripen in the fall. The leaves and stalks start to die back in late fall, as it begins to go dormant and store energy reserves in its root system. The rhizomes extend more than 2 m in depth and 15 - 18 m in length, and they are able to spread outwards at a rate of about 50 cm/year in optimal conditions (Weston *et al.* 2005). Rhizome fragments as small as 1 cm in length can regenerate new plants, and longer fragments have higher regeneration rates and greater leaf production than shorter fragments (Sasik and Jnr 2006; Kato-Noguchi 2022). Rhizome fragments also have a higher probability of establishment compared to seeds or stem fragments (Gowton *et al.* 2016). Buried rhizomes can regenerate from depths of 1 m or more and can remain dormant in the soil for many years before regenerating.

While the initial invasion of Japanese knotweed into North America was likely a female clone with primarily vegetative reproduction, it is now known that sexual reproduction occurs more frequently in North America than previously thought. A study from the northeastern United States indicated that female Japanese knotweed can produce viable seed not only through hybridization with related species, but also through backcrossing (introgression) and, in some cases, without hybridization (Grimsby *et al.* 2007). Hybridization between Japanese knotweed and giant knotweed produces Bohemian knotweed, which is now widespread across Canada and the United States and was likely previously misidentified as Japanese knotweed.

Bohemian knotweed, can produce viable seed. Recent studies indicate that Bohemian knotweed is widespread across Canada and the USA, having likely been previously misidentified as Japanese knotweed. Bohemian knotweed can produce high quantities of viable seeds, with high seed germination rates of up to 93% (Bram and McNair 2004; Groeneveld *et al.* 2014; Gillies *et al.* 2016). Seeds are wind-dispersed and are also buoyant, allowing them to spread long distances via waterways. The combination of vegetative reproduction and seed spread make Bohemian knotweed a formidable invasive and more challenging to control. The increased genetic variation caused by sexual reproduction allows it to further adapt to environmental conditions (Gillies *et al.* 2016). With climate change, it is predicted that the northern spread of Bohemian knotweed will continue to increase, as seed production is thought to be currently limited by late flowering and earlier frost dates in the northern limits of its range (Groeneveld *et al.* 2014).

Seasonality for Japanese knotweed (based on iNaturalist sightings in southern Ontario):

Leaves:

- Late March – early May (leaves start to emerge with stalks)
- Mid-October (leaf color change to yellow-orange-brown)
- Mid-November – end of November (leaves drop or turn brown and remain on canes through winter)

Flowering:

- End of August – mid October (flowers emerge, bloom in sprays)
- Mid to end of October (flowers drop off)

Seeds:

- Mid-September (seeds might start to form; can remain on cane through winter)

Stalks/canes:

- Late March – early May (new purplish-red and green stems emerge, resemble asparagus spears)
- Mid November – April (stalks die back, remain dead standing, leaves, seeds, and remnants of flower sprays may still be present)

Spring

Photo courtesy of: iNaturalist, Available: https://www.inaturalist.org/observations/267736926

Summer

Photo courtesy of: iNaturalist, Available: https://www.inaturalist.org/observations/184949475

Fall

Photo courtesy of: Julie Mercier, iNaturalist, Available: https://www.inaturalist.org/observations/190219407

Winter

Photo courtesy of: Jason Miller, iNaturalist, Available: https://www.inaturalist.org/observations/260458861

Habitat

Japanese knotweed is native to eastern Asia (Japan, Korea, Taiwan and southwest China). In its native range it grows in a wide range of habitats including riparian areas, swamp forests, disturbed forest edges and mountain slopes. It has even been found on Mount Fuji on volcanic slopes between elevations of 1500 – 2500 m (Del Tredici 2017). In these environments, it is considered an early successional species found growing on volcanic ash and recent lava flows (Barney *et al.* 2006; Bailey *et al.* 2008).

It was introduced to the USA between 1862 - 1875 and was brought to Canada in the 1900s as an ornamental plant, but has since escaped cultivation (Bourchier and Van Herzewijk 2010; Del Tredici 2017). In its introduced range, it is found growing in disturbed edges along roadsides, rail-beds, old homesteads, along woodland/forest edges, abandoned agricultural fields and infrastructure edges (Del Tredici 2017). It demonstrates remarkable adaptability to different habitat types, and can survive on a variety of terrains, including sandy soils, rocky banks, and floodplains (Barney *et al.* 2006). In its introduced range, it often co-occurs with other plants that thrive in disturbed environments, such as including stinging nettle (*Urtica dioica*), lesser celandine (*Ficaria bulbifera*), herb Robert (*Geranium robertianum*) and goutweed (*Aegopodium podagraria*) (Bimova *et al.* 2004). In Toronto it is often found growing on historical piles of ashes in ravines and edges of streams where extensive filling with concrete and rubble has occurred in the past (Stephen Smith, personal communication).

Japanese knotweed grows most vigorously in full sunlight, preferring open exposed sites. It can also grow in deep shade in riparian zones. It prefers moist soils, like those in riparian or wetland areas. It can grow in a variety of site conditions including in nutrient poor soils (Kato-Noguchi 2022). It is salt tolerant (Richards *et al.* 2008; Rouifed *et al.* 2012) and able to survive in extreme climates (i.e., volcanic plains) (Del Tredici 2017). Additionally, Japanese knotweed has been observed growing in heavily polluted areas of Japan and in soils contaminated with heavy metals, where it can accumulate these toxic substances (Soltysiak *et al.* 2011; Rahmonov *et al.* 2019).

Japanese knotweed can grow in disturbed areas.

Photo courtesy of: BC Ministry of Forests, Lands and Natural Resource.

Japanese knotweed can grow in a variety of site conditions, including full sun.

Photo courtesy of: Doug Thain.

Roads are an important pathway of spread in Ontario.

Photo courtesy of: Brett Dixon.

Pathways of Spread in Ontario

As previously described, Japanese knotweed typically spreads vegetatively via its extensive rhizome network (Bailey *et al.* 2008; Bailey 2013). It can also spread via seed, although seed establishment is typically low (Dauer and Jongejans 2013). It was introduced to North America in the 1860s as an ornamental plant (Del Tredici 2017) and has since escaped cultivation. Waterways and flooding are significant dispersal pathways as rhizomes and seeds are highly buoyant, allowing them to establish new populations (Lamberti-Raverot 2017). It can also spread along transportation corridors such as railroads and roadways. Road maintenance, forestry operations and construction activities may spread these plants further.

Outside its native range, Japanese knotweed is also found in the UK, Europe and Africa (Shaw 2013). It is widespread across the USA, occurring in 42 of 50 states (nyis.info 2026). It is listed as a Noxious Weed or under state quarantine lists in many US states including Washington, Idaho, Montana, Nebraska, Minnesota, Alabama, and Pennsylvania.

In Canada, the primary distribution of Japanese knotweed is in Ontario, Quebec, the Atlantic Provinces and southern British Columbia, with isolated populations in Winnipeg, Manitoba, Edmonton, Alberta and northern British Columbia (EDDMaps 2026a; iNaturalist 2026a). In Ontario, there are established populations across southern, central and eastern Ontario (in over 20 different municipalities), with populations confirmed as far north as Thunder Bay, Ignace (Kenora District), and Sault Ste. Marie. Japanese knotweed, Himalayan knotweed, Bohemian knotweed and giant knotweed are regulated as restricted species under *Ontario's Invasive Species Act, 2015* (ISA). It is illegal to import, deposit, release, breed/grow, buy, sell, lease or trade these invasive plants (MNR 2024).

While invasive knotweeds survive Canadian winters, they tend to prefer areas less prone to persistent, severe freezing conditions. However, as the climate warms and extreme weather events become more frequent, it is expected that these invasive plants will continue to spread, particularly into northern regions that were previously too cold for them to dominate (Groeneveld *et al.* 2014).

For up-to-date distribution information, visit:
EDDMapS (https://www.eddmaps.org/) or iNaturalist (https://www.inaturalist.ca).

Waterways are significant dispersal pathways.

Photo courtesy of: Stew Stryker, iNaturalist,
Available: https://www.inaturalist.org/observations/22086017.

Impacts

Ecological:

Note that ecological impacts are similar for all species in the knotweed complex. Bohemian knotweed has been shown to grow and regenerate more quickly than its parent species and release more allelopathic substances that inhibit the growth of nearby plants.

Japanese knotweed can significantly degrade the quality of wetland and riparian habitats where it becomes established. It can spread rapidly along riparian corridors, where it contributes to streambank erosion, since the rhizomes lack root hairs necessary to hold stream bank soil in place (Matte *et al.* 2022). Due to its large leaves that form a dense canopy, it can reduce sunlight penetration and shade out other plants, making it difficult for species that are not shade tolerant to grow (Siemens and Blossey 2007; Drazan *et al.* 2021). Invaded stands are associated with reduced native plant biomass, cover, and species richness, with up to 10 times fewer native plant species than non-invaded areas (Murrel *et al.* 2011; Lavoie 2017). These impacts may be partly driven by allelopathy, which appears to play an important role in invasion success (Vrchotova and Sera 2008; Moravcova *et al.* 2011; Kato-Noguchi 2021). For example, Dommanget *et al.* (2014) found that leachate from Japanese knotweed inhibited the growth of three willow species, and root exudates have been shown to significantly reduce arbuscular mycorrhizal fungi, which support native plant growth (Kato-Noguchi 2022). In addition to plants, dense knotweed stands can lower biomass of riparian macroinvertebrates by up to 60%. In one study, species most impacted included ground-dwelling beetles, snails, and springtails, while detrivorous species increased, likely due to knotweed's abundant litter production (Lavoie 2017).

As a result of the reduced native plant biodiversity and lowered invertebrate densities, established knotweed stands do not support the same level of diversity, species composition, or abundance of wildlife (i.e., amphibians, reptiles, birds). For example, a Pennsylvania study found that bird species associated with disturbed habitats (generalists) were more common in Japanese knotweed stands, while more sensitive riparian species preferred native vegetation (Serniak *et al.* 2017). In another study, generalist species such as red-winged blackbird (*Agalaius phoeniceus*) and gray catbird (*Dumetella carolinensis*) were the most frequently found birds nesting in or under knotweed stands in the northern USA and southern Canada (Kiviat *et al.* 2025). In another study, two old fields invaded by Japanese knotweed were found to significantly reduce foraging success of the native green frog (*Rana clamitans*), likely due to reduced arthropod abundance (Maerz *et al.* 2005).

Japanese knotweed invasions may also alter soil chemistry and microbial activity, with potential long-term ecosystem implications. Knotweed is able to impact soil properties less than one year after establishing, in turn making the soil conditions more favorable for its own expansion. The soil on invaded sites has been shown to have higher concentrations of organic carbon, total nitrogen, and phosphorus compared to non-invaded sites. This may be due to the substantially greater biomass and leaf litter production compared to native vegetation

(between 1.8 – 13x higher). In addition, knotweed's deep roots are able to uplift nutrients from deeper soil horizons, which may result in greater nitrogen content in the topsoil after invasion (Dommanget *et al.* 2024). Once established, knotweed stands are highly persistent and do not decline naturally, as demonstrated in Ontario by its continued presence in neighbourhoods built before the 1940s and ongoing spread from these locations.

A weed risk assessment conducted in 2010 in Nebraska, indicated that Japanese knotweed had a high risk for ecological impact potential because it forms dense monocultures which reduce biodiversity and alter habitat for wildlife (Nebraska Weed Control Association 2010). Another risk assessment conducted in 2018 in Minnesota also found that Japanese knotweed had a high risk for ecological impact, resulting in it being listed as a prohibited species (Calkins and Chandler 2018).

Japanese knotweed negatively affects the diversity of vegetation.

Photo courtesy of: Randy Westbrooks, U.S. Geological Survey, Bugwood.org.

Economic:

The rhizomes of Japanese knotweed can contribute to infrastructure damage by exploiting existing defects (i.e., small cracks, expansion joints) in concrete, asphalt, cavity walls, and brickwork. As rhizomes expand, they can widen these weaknesses, affecting structures like drains, sewers, retaining walls, pavement, bridges and flood control structures. If left unmanaged, damage may worsen over time and lead to substantial repair costs (Property Care Association 2022). Development on knotweed affected land can also be expensive, as contaminated soil often requires removal and disposal by licensed contractors (Royal Institution of Chartered Surveyors 2022). Infestations may impact property sales and purchases, although they rarely cause significant structural damage to residential buildings (Fennell *et al.* 2018). To date, there have been no studies conducted in North America that assess the impact of this plant on infrastructure.

Japanese knotweed is extremely costly to remove once established. In Germany, it costs an estimated €32.3 million (38 million USD) to control all knotweed populations (Reinhardt *et al.* 2003). In the UK, Japanese knotweed was estimated to cost £246.5 million per year to control (Eschen *et al.* 2023).

Knotweed is able to grow through decks and building foundations as this photo showing Himalayan knotweed demonstrates.

Photo courtesy of: BC Ministry of Forests, Lands and Natural Resource Operations.

Societal:

Knotweed can form dense stands along road corridors, which can pose safety hazards to pedestrian, motorists, and cyclists by blocking sightlines along roadways and trails (Metro Vancouver and the Invasive Species Council of Metro Vancouver 2024). Infestations along riparian corridors can also block or interfere with access to water for activities such as canoeing, boating, angling and swimming.

Despite its negative impacts, several societal uses for Japanese knotweed have been explored in Europe, including its potential capacity to remove heavy metals (Rahmonov *et al.* 2019), provide renewable and alternative energy sources (Brunerova *et al.* 2017; Hennequin *et al.* 2021), or be a potential source of pulp for paper production or natural dye (Lavric *et al.* 2018; Klancnik 2020). However, these uses have yet to be explored in North America. Japanese knotweed has a long history of use as traditional medicine in Asian countries, particularly China and Japan. In Traditional Chinese Medicine, where it is known as Hu zhang, it has been used to treat various inflammatory, respiratory and circulatory conditions, as well as skin disorders. The rhizome is rich in resveratrol and other biologically active compounds that have demonstrated antioxidant, anti-inflammatory, and antimicrobial properties (Cucu *et al.* 2021). Research in Prince Edward Island suggests that local populations may be a viable source of resveratrol for commercial extraction (Chen *et al.* 2013). Knotweed extracts have also shown antiviral activity against SARS-CoV-2 in vitro, and the plant may provide a valuable nectar source for nutraceutical honey production, though risks of its spread still outweigh most benefits (Bobis *et al.* 2019; Jug *et al.* 2022).

Note that use of Japanese knotweed for these purposes may not be permitted in Ontario given prohibitions on growing/propagating, buying, selling, trading or offering to buy, sell, or trade this species.

Social and Equity Considerations:

Japanese knotweed can impact both rural and urban landowners differently. In rural areas, large infestations may restrict access to agricultural land, increase management costs, and reduce property values. For urban landowners, the presence of knotweed can complicate property transactions, discourage development, and increase maintenance needs for public spaces such as parks, trails, and riverbanks.

Japanese knotweed can also affect community infrastructure, including culverts and stormwater systems, by causing blockages or structural damage, leading to increased repair and maintenance costs for municipalities.

Japanese knotweed management also raises important equity and accessibility considerations. The burden of controlling infestations can fall disproportionately on those with fewer resources, such as renters, small landowners, or marginalized communities, who may lack access to disposal services or guidance tailored to their needs. Disposal guidelines currently focus on homeowners, so developing accessible information and resources for renters, contractors, landscapers, and community groups can help broaden participation in management efforts.

Applicable Legislation

(Last Updated – March 2026)

Regulatory Tools – Knotweed species:

Japanese knotweed, giant knotweed, Bohemian knotweed, and Himalayan knotweed are listed as restricted species under the *Invasive Species Act* (ISA), 2015.

See Table 2 for details.

Depending on the location, timing of work, and the type of management activities (e.g., mechanical/manual or chemical), permits, approvals or authorizations may be required from municipal, provincial or federal agencies before knotweed control can be initiated. Individuals undertaking control activities for knotweed are responsible for ensuring that these are obtained and complying with any applicable legislation. Please note that this is only for general guidance and is not intended as legal advice.

Additionally, if protected species or habitats are present, an assessment of the potential effects of the control project and authorization could be required. Depending on the species and its location, applications should be directed to the appropriate authorities.

While not an exhaustive list of permits or rules that may apply to knotweed management, the following examples are provided for consideration.

Table 2: Legislation pertaining to knotweed management.

Legislation & Regulating Body	Purpose	Application to Knotweed Species Management
PROVINCIAL		
***Invasive Species Act*, Ontario Regulation 354/16** Ministry of Natural Resources (MNR) Applicable to Terrestrial and Aquatic Environments	Prevent the Introduction and Spread of Invasive Species	Japanese knotweed, Bohemian knotweed, giant knotweed, and Himalayan knotweed are listed as restricted species under the *Invasive Species Act* (ISA), 2015. It is illegal to import, deposit, release, breed/grow, buy, sell, lease or trade the four knotweed species in Ontario. It is also illegal to bring these species into a provincial park or conservation reserve and to possess, transport, deposit or release them in these protected areas. There are exceptions under the regulation for the deposit or release of a restricted invasive species for the purpose of control if reasonable precautions are taken to prevent its spread outside the immediate area where control is occurring. For more information, visit: https://www.ontario.ca/page/managing-invasive-species-ontario
***Species Conservation Act* (SCA)** Ministry of Environment Conservation and Parks (MECP) Applicable to Terrestrial and Aquatic Environments	Protection of Endangered and Threatened Species and their Habitat	In 2025, Schedule 10 of Bill 5 introduced a new legislation called the *Species Conservation* Act, 2025 (SCA). For up-to-date information on changes to authorizations or permitting under the new Act, visit: https://www.ontario.ca/page/species-risk or contact MECP.

Legislation & Regulating Body	Purpose	Application to Knotweed Species Management
***Pesticides Act & Regulation* 63/09** Ministry of Environment Conservation and Parks (MECP) Applicable to Terrestrial and Aquatic Environments	Regulation of Pesticide Use in Ontario	The *Pesticides Act* and *Ontario Regulation* 63/09 govern the sale, use, transportation, storage and disposal of pesticides in Ontario including license and permit requirements. Most invasive species control projects will require a licensed exterminator. Only pesticides registered under the federal *Pest Control Products Act* by the Pesticide Management Regulatory Agency (PMRA) can be used in Ontario. **The pesticide label is a legal document that must be followed exactly.** Exterminations on land are subject to the cosmetic pesticide ban. Other than certain biopesticides and low-risk pesticides on Ontario's "Allowable List", pesticides can only be used in accordance with an exception (e.g., agriculture, forestry, public health and safety, natural resources and other legislation) to the cosmetic pesticide ban. The licensed exterminator in charge can provide guidance regarding how the exceptions to the cosmetic pesticide ban apply to the specific extermination and any requirements that must be met to perform work under the exception. For more information on these exceptions and the rules with respect to pesticide use visit: https://www.ontario.ca/laws/regulation/090063
FEDERAL		
Fisheries Act and Species at Risk Act Fisheries and Oceans Canada (DFO) Applicable to Aquatic Environments	Protection of Fish and Fish Habitat *Fisheries Act*: Protection of Fish and Fish Habitat *Species At Risk Act*: Protection of aquatic species at risk	The *Fisheries Act* (and in some cases the *Species at Risk Act* [SARA]) applies when a proposed work, undertaking or activity in fish-bearing water results or is likely to result in: • The death of fish (by means other than fishing); • The harmful alteration, disruption or destruction of fish habitat; • The deposit of a deleterious substance (e.g., herbicides) in water frequented by fish; • Impacts to species listed as aquatic species at risk under *Species at Risk Act* (SARA) or any part of their critical habitat. If there is risk of harm to fish or their habitat, authorization from DFO is required prior to undertaking any projects to avoid and mitigate impacts. The use of herbicides may be authorized to prevent the introduction or spread of, or to control aquatic invasive plants that may cause harm to fish, fish habitat or use of fish. To remain in compliance with the *Fisheries Act* and the SARA consult the guidance found at the following websites: **Projects near water** - https://www.dfo-mpo.gc.ca/species-especes/sara-lep/permits-permis/index-eng.html.

Legislation & Regulating Body	Purpose	Application to Knotweed Species Management
Species at Risk Act (SARA) Environment and Climate Change Canada (ECCC) Applicable to Terrestrial Environments	Protection and Recovery of Species at Risk and their Habitats	For most extirpated, endangered and threatened species, the *Species at Risk Act* (SARA) applies automatically only on federal lands. This includes National Parks and National Wildlife Areas administered by ECCC, as well as areas administered by Parks Canada (i.e., protected heritage areas). For control activities on federal lands that may affect non-aquatic species listed on Schedule 1 of SARA, or which contravene SARA's general or critical habitat prohibitions, permits may be required. For more information, consult: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/permits-agreements-exceptions/permits-agreements-information.html
***Migratory Birds Convention Act* & Regulations** Environment and Climate Change Canada (ECCC) – Canadian Wildlife Service (CWS) Applicable to Terrestrial and Aquatic Environments	Protection of Migratory Birds, and their Nests and Eggs	When undertaking your project, you should take precautions to avoid harming migratory birds, nests and eggs. This includes: • Understanding how migratory birds and their nests are legally protected. • Consider species activity timelines (i.e. active nesting season) • Planning your activity ahead of time, evaluate if the activity may cause harm to migratory birds, and determine what measures can be taken to avoid causing this harm • Develop and implement preventative and mitigation measures, such as beneficial management practices. For more information please visit: https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/convention-act-regulations.html
Pest Control Products Act Pest Management Regulatory Agency (PMRA), Health Canada Applicable to Terrestrial and Aquatic Environments	Regulation of Pest Control Products in Canada	Before a pesticide can be sold or used in Ontario, it must be registered under the federal *Pest Control Products Act* (PCPA) by the Pest Management Regulatory Agency (PMRA) of Canada. **The pesticide label is a legal document. Follow all label directions – and ensure you have the most current label and are aware of any re-evaluation decisions.** Visit the PMRA's product label search site at https://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php

Japanese knotweed infestation on public land in Lake Scugog.

Photo courtesy of: Alan Westerterp.

Invasive Management Planning

Management Considerations

It is important to control knotweed species before they become locally established. Preventing the spread of these invasive plants will reduce their impact on biodiversity, the economy, and society.

It is important to use a control plan that incorporates Integrated Pest Management (IPM) principles. This entails using existing knowledge about the invasive plant (i.e., its biology and life cycle), and its surrounding environment. This often requires more than one type of control measure to be successful.

Once knotweed has been confirmed at a location, a control plan should be developed based on infestation size, site accessibility, potential for spread and risk to the environment, economy or society. Also consider site-specific conditions such as native plant richness and diversity, and wildlife usage, including bird migration routes and species at risk. Note that some bird species are known to nest in knotweed stands. Therefore, consider surveying for nests in the fall after the leaves have fallen, and timing treatments to avoid unintended harm (Kiviat *et al.* 2025). It is strongly recommended to conduct a detailed inventory of each site prior to starting control efforts to ensure that proper methods and timings are used to mitigate potential negative impacts on native plant species and wildlife.

Mapping

If you are planning a restoration project on your property, conducting an ecological survey is a beneficial way to document current and future distributions of invasive plants that might be present, such as Japanese knotweed. Conservation authorities or municipalities, which manage large land areas, will likely hire contractors or qualified volunteers to conduct ecological surveys. However, private landowners with smaller properties may be able to conduct their own surveys or hire a contractor. If you know you have knotweed in one area, survey the rest of the property to identify other infestations. Map the extent of the invasion, as well as any small satellite populations.

For detailed information on mapping techniques consult the Landowners Guide for Managing and Controlling Invasive Plants in Ontario.

To determine potential infestations in your areas, consult EDDMapS: https://www.eddmaps.org/

Social and Equity Considerations

Building partnerships with Indigenous communities and local organizations is essential for inclusive and effective management. Indigenous knowledge can contribute valuable perspectives on knotweed impacts and restoration, while community groups can help with monitoring, reporting, and hands-on removal projects. Engaging stakeholders from diverse backgrounds ensure management approaches are more equitable and culturally sensitive.

Education and outreach are important societal tools. Raising awareness about identification, impacts, and disposal options empowers the public to report new infestations and participate in control efforts, reducing the spread and impact of Japanese knotweed over time.

Landscape Level Management

A more detailed management strategy is likely to be needed if knotweed has become widely established. A strategic, landscape-level approach to management should be undertaken that aids in bringing together partners, landowners, and land managers. This approach is designed to work towards common and shared goals that consider both site-level needs in conjunction with wider landscape considerations. It makes it easier to use resources efficiently, coordinate management activities and accomplish strategic goals. Failure to consider a broader landscape context, by only focusing on individual or local challenges, may increase management costs, be more labour-intensive, and may not produce desired results across larger areas. Effective management of Japanese knotweed requires repeat treatments and the combination of control methods (i.e., hand pulling or digging and herbicide use). It is important to determine the land use objective and desired plant community because it is not always realistic, especially for larger populations, to eliminate the entire infestation at once. From here, develop an appropriate IPM strategy which takes into consideration the biology and life cycle of the plant in addition to using a combination of management techniques.

Setting Priorities

Establishing your highest priority locations for control prior to management will help to determine the best course of action. Therefore, when developing a management strategy, it is important to consider the following considerations to help inform control decisions:

1. **Protect:** Federally, provincially, and regionally rare species and communities can be protected by removing invasive plants and ensuring rare species are not negatively impacted by control efforts. You are responsible for ensuring that your project follows provincial, federal, and municipal laws, including the provincial *Species Conservation Act,* 2025 (SCA) and federal *Species at Risk Act*. For species-specific information, consult: https://www.ontario.ca/page/species-risk-ontario

2. **Consult:** Ensure all landowners have been identified and consulted before control takes place.

3. **Contain:** If you have limited resources, try to remove the outlying populations of knotweed first (isolated plants or satellite populations), to prevent further spread. Protect areas where knotweed is absent or just appearing. In these areas, the native habitat is likely also most intact, and will be fastest to recover from the infestation. When action is taken early it can significantly reduce the cost of control.

4. **Work inward:** If you have more resources, work from the outlying or satellite populations inward into larger, "core" populations of knotweed. In many cases, resource limitations may prohibit the

immediate removal of entire core populations. Under these circumstances, the periphery of the invasion should be prioritized and addressed strategically.

5. **Consider sensitive ecological areas:** Concentrate on preventive strategies in high-priority ecological areas or areas where the plant is going to cause the most problems in terms of spread, such as the most productive or sensitive part of an ecosystem, along a creek, near species at risk, or a favourite natural area. Pay special attention to disturbed sites which can be quickly colonized by knotweed. Reduce the spread of knotweed and other invasive plants by following the Clean Equipment Protocol and proper disposal practices. Monitor contractors doing work to ensure they take all necessary precautions to prevent the spread of knotweed.

6. **Logistics and costs:** Review the different control options and costs with consideration to surrounding water, habitat, time of year, and type of land use (i.e., high-traffic recreational areas, agriculture, etc.).

7. **Timing:** Consider dedicating a certain time each year to control efforts and make it a joint effort with neighbouring landowners and/or land managers.

8. **Regeneration or restoration:** Begin to assess whether regeneration or restoration is appropriate, and if seeding or planting of native plants is needed to help jump-start natural succession and increase biodiversity in the area.

9. **Monitor:** Follow-up monitoring and control is crucial to address resprouts that may emerge after initial control efforts.

Japanese knotweed creates thick mats of dead and decaying vegetation.

Photo courtesy of: Francine MacDonald.

Prioritizing within a Control Area

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

1. Focus on large blocks of uninvaded areas and keep them free of invaders.
2. Control small, younger, outlier (satellite) populations first.
3. Reverse the invasion, expand the cleared area outward and ensure that un-invaded areas are kept free of invasive plants (with regular monitoring).

This flow chart can help land managers choose where to first focus control efforts if controlling satellite populations due to limited resources:

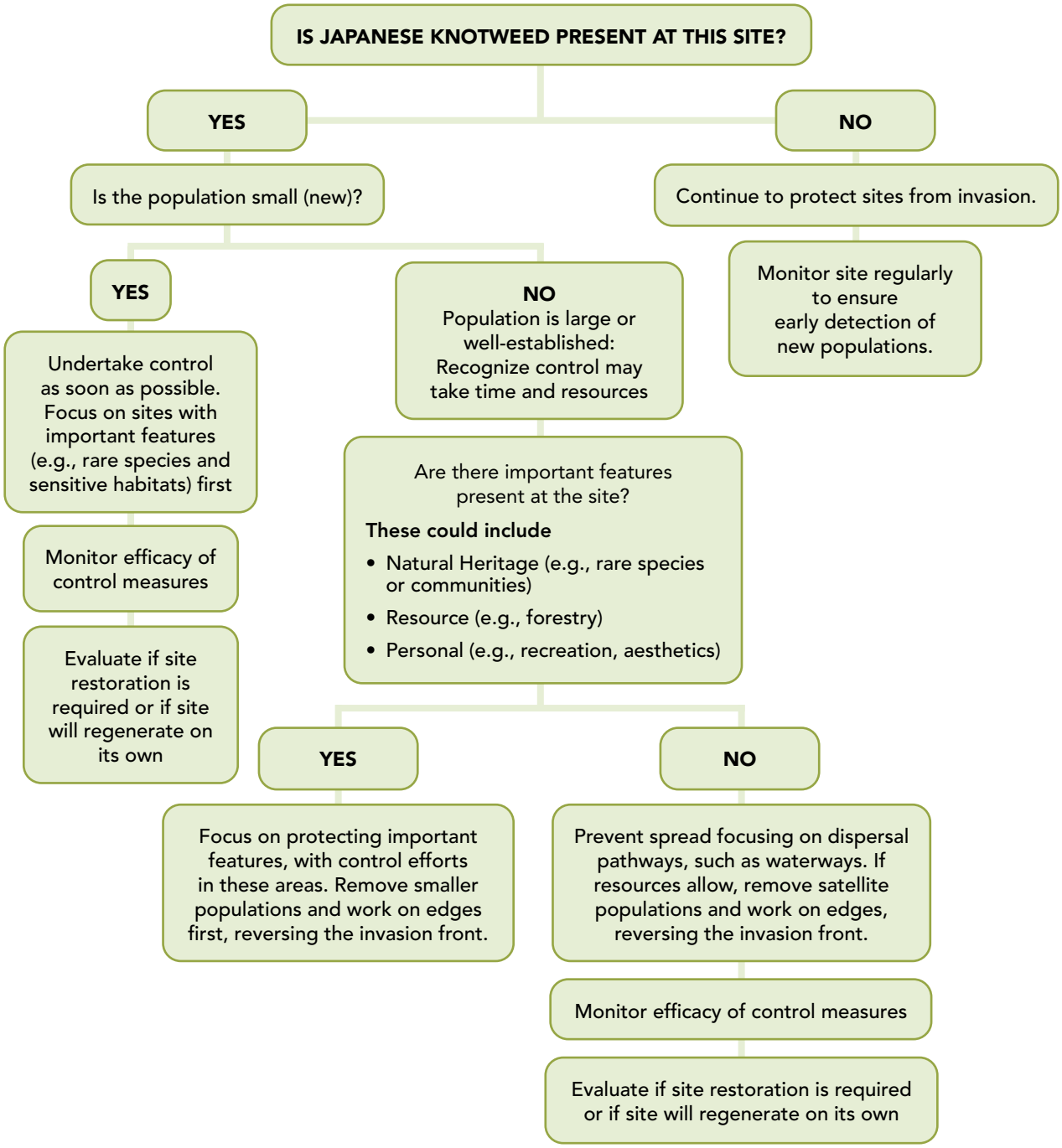


Figure 1: How to prioritize knotweed sites for effective control.

Long-term Management and Monitoring

A long-term management and monitoring plan should be developed prior to control efforts to help prevent the re-establishment of knotweed. Established stands of Japanese knotweed will likely need annual management. Monitoring after the initial control measures will enable the assessment of effectiveness and determine if follow-up treatments are needed. Ongoing management is essential to the success of a control project because, after removal, a site is at risk of reinvasion from nearby populations or other invasive plants.

Monitoring can be simple or complex, ranging from taking photos or performing visual assessments to conducting extensive vegetation surveys. In general, annual control of Japanese knotweed is needed and should focus on removing individual plants or small, isolated populations as they appear. This will help ensure that the invasive plant population remains under control while allowing for the regeneration of desirable native plant species.

For detailed monitoring information consult the Landowners Guide for Managing and Controlling Invasive Plants in Ontario.

After Management: Assessing Regeneration vs. Restoration

Consider the following factors:

1. **Level of disturbance at the site:**
   - Was this a heavily invaded site (e.g., was much disturbance caused during control measures)?
   - Will it continue to be disturbed (e.g., through urban management activities or recreational use)?
2. **Biology of the invasive species removed:**
   - Is there a seed bank to consider?
   - Are there seed banks from other invasive plants in the area?
3. **Re-invasion risk:**
   - Are there invasive species nearby that could re-invade the site from nearby trails, watercourses or other pathways of introduction?
4. **Existing native vegetation:**
   - Will any native vegetation that still exists on the site regenerate quickly?
   - Does the existing native vegetation need help? Species with specific habitat requirements or reproductive strategies resulting in low fecundity, including species at risk, may require re-introduction. The majority of plant species should be able to recover naturally, especially if healthy populations exist adjacent to the controlled area.

If you answered **Yes** to most of the questions under 1 to 3, it is most likely that (a) the site will be re-invaded before it has a chance to regenerate on its own or (b) that knotweed will continue to invade and be present among the native species so that annual control of knotweed may be required. Restoration will be needed to reduce the risk of re-invasion. If you answered **Yes** to the questions under 4, your site may have a lower risk of invasion but could still require some restoration measures to help re-establish native vegetation.

Control Measures

The prevention and early detection of new knotweed infestations is the most important first step to a successful invasive plant management strategy. Once established, Japanese knotweed and others in the knotweed complex are notoriously difficult to control. The goal of knotweed management should be eradication where feasible, given the significant impacts these species have on biodiversity. However, this will not be possible on all sites, particularly for large, well-established stands. Managing Japanese knotweed requires eliminating the below-ground rhizome network, which accounts for approximately two-thirds of the plant's total biomass and can be more than 2 m deep and grows laterally by 14 - 18 m. This makes management challenging, as the plant has enough reserve in its below-ground network to withstand most manual and chemical control methods. Therefore, an Integrated Pest Management approach that uses a combination of control techniques is strongly encouraged. The management approach will depend on various factors, such as the size and age of the infestation (small, isolated plants vs large, mature stands), potential impact on health and safety or infrastructure, site conditions (i.e., aquatic habitats, soil type, overhead shade), labour and cost. Eliminating mature knotweed stands is a multi-year process, requiring at least 5 - 10 years of ongoing monitoring and follow-up to achieve successful eradication.

Manual control methods (i.e., pulling, digging, cutting, mowing, excavation, tarping) are not effective control techniques in isolation, particularly for mature well-established stands, as they only remove the above-ground portion and do not target the rhizome system. While frequent cutting, mowing or tarping might eventually exhaust the rhizome system, studies have indicated that even after frequent cutting throughout the growing season or years of starving the rhizome network through tarping, knotweed will still grow back, and can even make infestations larger and denser as cutting stimulates growth. Digging can also encourage re-sprouting if roots are not completely removed. Tarping can encourage knotweed to spread many meters laterally, sprouting at the tarp edges and extending the infestation by several meters. For this reason, manual methods like cutting or mowing are only considered under specific circumstances, such as cutting back for sightline or safety issues, to prepare for follow-up herbicide treatment, or for sensitive habitats where herbicide use is prohibited. In these cases, manual control serves mainly as a maintenance strategy (i.e., to reduce overall expansion) rather than eradication and must be done frequently throughout the season over multiple years, making this method very labour-intensive with limited chance for eradication. Manual methods also risk further spread by rhizome fragments, as even a 1 cm root fragment can reproduce. If using manual control, it is critical that contaminated soil is properly disposed of, equipment is properly cleaned, and disturbance is limited to avoid further spread (see Disposal section). Never use a strimmer or mower, as this scatters fragments that can grow into new plants.

Chemical control with a systemic herbicide remains the most effective and recommended option for managing knotweed, particularly large, mature stands. In a study by Jones *et al.* 2018, applying a glyphosate-based herbicide appropriately timed with the plant's life cycle led to effective control of knotweed over multiple years. Systemic herbicides

can be applied biannually via foliar spray, or annually by stem injection (see Chemical Control section). Following removal, re-planting the infested area with native trees and shrubs can help to suppress the further growth of knotweed (see Restoration section).

Note that the control techniques described in this document can apply to all species in the knotweed complex.

Manual

Digging:

Digging is only effective for very young plants and new or early infestations, where the rhizomes are still small enough to be dug out. Once established, Japanese knotweed has a large and dense root system and will quickly re-sprout when pulled or dug if the roots are not completely removed.

The use of a garden fork, shovel, or similar digging tool may aid in the removal of smaller plants, but it is essential to remove the entire plant, including all roots. This means digging and sifting through the soil after the main stem is removed. Any portion of the root system not removed can re-sprout. Dig as much as you can at the site throughout the spring when the plant is at the beginning of its growing season and after it rains when the soil is most pliable. Revisit the site 2 - 3 times during the growing season to remove or chemically treat re-sprouts. Consider restoring the site with competitive native plants to prevent knotweed or other invasive species from being established in areas disturbed by digging/pulling efforts.

Cautions: plant fragments must be removed off-site and carefully disposed of to prevent further spread. Be cautious of soil disturbance and erosion, especially in sensitive wet sites. Even small rhizome fragments can form new plants, and discarded canes can form new plants if they have not been thoroughly dried.

Mechanical

Cutting or Mowing:

NOT RECOMMENDED. Cutting or mowing is generally not advised as repeat mowing can stimulate growth of new shoots and encourage lateral spread. Cutting/mowing can also spread plant fragments into new areas and make the situation worse if done improperly (Cygan 2018; Jones *et al.* 2020a; Metro Vancouver and the Invasive Species Council of Metro Vancouver 2024.).

Mowing or cutting can be appropriate in limited situations (Martin *et al.* 2020), depending on the management goals for the site, such as:

- In areas where knotweed must be removed immediately (i.e., when posing a health and safety risk, such as visibility along roads);
- In sensitive areas where herbicide cannot be sprayed (i.e., close to a waterbody, organic certified farm field).

In sensitive areas, a case study along DeBoville Slough in Coquitlam, BC found that repeat cutting several times during the season by volunteers (3 - 4x or more) over multiple years was able reduce the total area of knotweed by 50 - 95% depending on the site (Metro Vancouver 2024). In another study at an organic farm site, plots with frequent knotweed cuttings (3 - 12x/season) showed decreased capacity for resprouting the following year. Planting competitive native species as a follow-up at the site was also found to help reduce knotweed spread (Distler and Huss 2021).

However, cutting is more of a maintenance strategy (i.e., reduce overall cover/regrowth, prevent further

spread) and will not eradicate knotweed, due to its extensive rhizome system. Cutting is very labour-intensive, must be done continuously each year, and will not eradicate mature knotweed stands. It is also very important to dispose of plant fragments properly and to thoroughly clean equipment when moving off-site to prevent further spread (Metro Vancouver 2024).

For brush cutting equipment, it is advised to use a hedge trimmer or hedge trimmer attachment instead of a standard nylon string attachment, as hedge trimmers throw fewer and smaller fragments and for shorter distances than standard nylon string. This is especially the case near open water or wet soil where fragments may root and establish (Distler and Huss 2021). Knotweed stems can also be cut by hand using tools such as a machete, loppers, or pruning shears. Cut the stems as close to the soil surface as possible, continuously (at least twice/month) from early spring and throughout the growing season (April through July), and then less frequently in August (once a month) when growth slows down. Frequent hand cutting has only been reported to be successful for small infestations, and is not recommended for large, well-established stands (Soil 2004).

Excavation:

USE WITH CAUTION: For large or well-established stands, full-scale excavation with heavy machinery has proven to be a method of quick eradication in the United Kingdom. This usually involves excavating deep pits to remove the entire rhizome system, often to depths of at least 3 m and widths of up to 20 m (Metro Vancouver and the Invasive Species Council of Metro Vancouver 2024). Excavated root material may be buried on-site within lined pits fitted with root barriers. As a last resort, if knotweed cannot be buried on-site, it can be removed and brought to a designated soil treatment area at a landfill. One of the advantages of excavation is the potential for complete removal, including the rhizome system. However, excavation carries a high risk of spreading knotweed through fragmented plant material. This makes strict containment, proper disposal, and thorough cleaning of all equipment essential. This method also causes substantial site disturbance and is costly due to specialized equipment, labor, and soil handling requirements, limiting its suitability to specific circumstances such as construction projects or property redevelopment. For construction projects, grading or soil movement should not occur within or adjacent to knotweed stands unless containment measures are in place, as disturbance can spread rhizome fragments. Continue to monitor the site for re-sprouts after excavation and treat any re-sprouts with herbicide.

Cultural

Grazing:

NOT RECOMMENDED. Grazing is the use of goats, cattle or other livestock to suppress the above-ground growth of knotweed. While grazing animals will feed on early spring shoots of Japanese knotweed, grazing only removes the above-ground portion and does not damage the rhizome system. Grazing may also promote vigorous re-sprouting and increase the risk of spread through soil disturbance and the dispersal of plant fragments or seeds. Further, this method requires specially trained herds, special permits, and is non-selective. It is therefore considered impractical for most management sites and unsuitable for sensitive habitat or where other plant species are to be maintained.

Tarping:

USE WITH CAUTION: Tarping involves covering an infested area with a thick, heavy, dark material to block sunlight and "cook" the rhizome system. Reported methods and effectiveness of tarping for knotweed vary widely, and outcomes are often inconsistent (Dusz *et al.* 2021). As a result, tarping is generally considered only in specific situations, such as sensitive areas where herbicide is prohibited, as a follow-up on regrowth after herbicide application, or to prevent its growth in areas where knotweed impedes visibility or access. This method is most suitable for small to medium-sized infestations in open areas ('small' is considered fewer than 50 stems, or less than 230 m^2), due to the high cost of the fabrics, labour-intensive installation and ongoing monitoring/tarp repair, and is not effective in low light areas. Dusz *et al.* (2021) reported that tarping for knotweed was most commonly used along riverbanks and roadsides, at sites that were easy to access, sunny, sparsely wooded, flat, and rarely flooded.

Recommended steps for tarping include first clearing the treatment area by manually removing knotweed stems, cutting canes close to the base, or digging the rhizomes. This works best on a flat surface free of sticks, stones or debris that could puncture the tarp, and care must be taken to cover the entire infestation. A layer of mulch can be spread over the area to prevent the cut stems from puncturing the tarp. The area should then be covered with a heavy-duty, dark-coloured plastic tarp or large sheets of thick black plastic, installed loosely enough to allow some growth under the tarps as the knotweed stems may break through the tarp if it is too tight. Extend the smothering material about 5 m beyond the knotweed area in all directions. Tarps should be securely weighted with heavy materials (i.e., rocks, logs, mulch), being careful not to puncture the fabric as re-sprouts can grow through holes in the fabric. Tarps should remain in place for as long as possible (at least 6 years). Continue to monitor the site to manage any re-growth around the edges or through the fabric and repair any damage to the tarp (Dusz *et al.* 2021, Cygan 2026).

This method has many disadvantages. The rhizome system can extend up to 3 m deep and spread laterally several metres beyond the visible stand, allowing plants to escape beneath tarps and re-emerge at the edges. It can also survive multiple years of tarping. In British Columbia, sites tarped for over 10 years have not resulted in successful control (Metro Vancouver 2024). Tarping is labour-intensive, and can have non-target impacts. Since tarping essentially "cooks" the soil, mycorrhizae (beneficial soil fungi) may need to be replenished when replanting.

For the reasons above, tarping is best used in conjunction with other control methods rather than a stand-alone treatment. Replanting the area with native vegetation once control measures are complete will help to suppress re-sprouting and reduce the risk of re-invasion.

Tarping Case Study:

The City of Toronto has trialed PVC-coated wire mesh (1.27 cm x 1.27 cm) over Japanese knotweed patches in High Park and Etobicoke where herbicide cannot be used (e.g., riparian areas). As stems grow through the mesh, they become girdled, restricting growth and reducing plant vigor. Repeated stress is expected to deplete rhizome energy reserves over time. While study is ongoing, early results show visible plant stress, with greater effectiveness observed in full sun than in shade.

Wire mesh girdling a Japanese knotweed stem.

Photo courtesy of: iNaturalist, https://www.inaturalist.org/observations/77829288.

Tarping done by Credit Valley Conservation.

Photo courtesy of: Credit Valley Conservation.

Chemical

The management of pesticides is a joint responsibility of the federal and provincial governments. The federal government, through the Pest Management Regulatory Agency (PMRA), is responsible for approving the registration of pesticides across Canada under the *Pest Control Products Act*. Ontario regulates the sale, use, storage, transportation, and disposal of pesticides, including issuing licenses and permits under the *Pesticides Act* and Ontario Regulation 63/09. Federally registered pesticide products are assigned one of four product class designations (i.e., Manufacturing, Restricted, Commercial or Domestic). The class of pesticide determines who can sell or use the pesticides products as well as what restrictions are placed on their use (e.g., requires a license and/or permit).

Most invasive species control programs using a pesticide will require an appropriately licensed exterminator. The use of pesticides on land is subject to the cosmetic pesticide ban. Other than certain biopesticides and low-risk pesticides on Ontario's "Allowable List", pesticides can only be used if the use is permitted under an exception to the ban. Depending on the specifics of the extermination, invasive plant control may be permitted in accordance with exceptions for forestry, agriculture, public health and safety (e.g., plants poisonous to humans by touch and plants that affect public works and other buildings and structures) and compliance with other legislation (e.g., control of noxious weeds where required by the *Weed Control Act*). There is also an exception for the management, protection, establishment or restoration of a natural resource that may be considered if other exceptions do not apply. The requirements that must be met for pesticide

use under each exception are set out in Ontario Regulation 63/09 and may include conditions such as certification in integrated pest management, a letter from the relevant Ministry (MNR or MECP) and/or others. The appropriately licensed exterminator in charge can provide guidance on requirements that apply to the specific extermination under consideration.

Herbicide Selection and Application

Pesticide applications can be an effective method for knotweed species management when used as part of an integrated pest management program and in consideration of knotweed species biology and site-specific information. Pesticides must be applied in accordance with the federal *Pest Control Products Act*, the Ontario *Pesticides Act*, Ontario Regulation 63/09 and all label directions. Most invasive species control programs using a pesticide will require an appropriately licensed exterminator. The availability of pesticides to control knotweed may change over time, as may the label directions on how to use the pesticide so that it does not endanger human health or the environment. Before using any pesticide, ensure you have the most current label. Pesticide labels can be accessed using the PMRA's label search tool, which can be found by searching "PMRA label search" in any major search engine (or see link on next page). Always read and follow all directions on the label. The label is a legal document that must be followed exactly, including any applicable buffer zones. Using a pesticide to treat a species not listed on the label, or in a manner other than specified on the label violates the *Pest Control Products Act* and may incur penalties.

Chemical Control and Japanese knotweed

Chemical control is the most effective approach for managing large or well-established knotweed stands, using systemic herbicides applied by foliar spray or stem injection. Stem injections work best on larger stems, as thin stems can split and cause cause herbicide leakage. Injections are valuable adjacent to sensitive habitats because of its targeted application. Glyphosate-based herbicides are the only approved ingredient for stem injection of knotweed species.

For foliar spray, it is recommended to use a glyphosate-based herbicide, however because follow-up treatments are almost always required, alternating herbicide modes of action may help reduce the risk of herbicide resistance, particularly when treating the same infestation multiple times within a year. In addition to glyphosate, products containing aminopyralid, imazapyr, or triclopyr may also be used where appropriate. Some herbicide products can kill aboveground foliage too quickly, preventing the active ingredient from being transported to the rhizomes and resulting in incomplete control. Some practitioners recommend mixing an MSO spray adjuvant (methylated seed oil) to the spray solution. This additive works by helping to break down the waxy leaf surface, increases penetration into the leaf, reduces evaporation, and improves overall wetting and spreading of the herbicide. This additive can be mixed with any herbicide but is especially recommended if using glyphosate.

In addition, there is one imazapyr-based herbicide registered for the control of knotweed that is suitable for sites in or around water. All applicable federal or provincial pesticide legislation must be followed. Herbicide application adjacent to water must be authorized and used in accordance

with the Aquatic Invasive Species Regulations under the *Fisheries Act*. Applicators must observe the specified buffer zones for protection of sensitive aquatic habitats and be aware of the drift potential of the selected herbicide.

Note: Ensure that the use of these herbicides is approved by the pest control product label and always refer to the specific directions listed for the product you will be using. Visit the Pest Management Regulatory Agency's product label search site at http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php

Foliar spray of knotweed by Hamilton Conservation along a Don Valley Rail Trail.

Photo courtesy of: Hamilton Conservation.

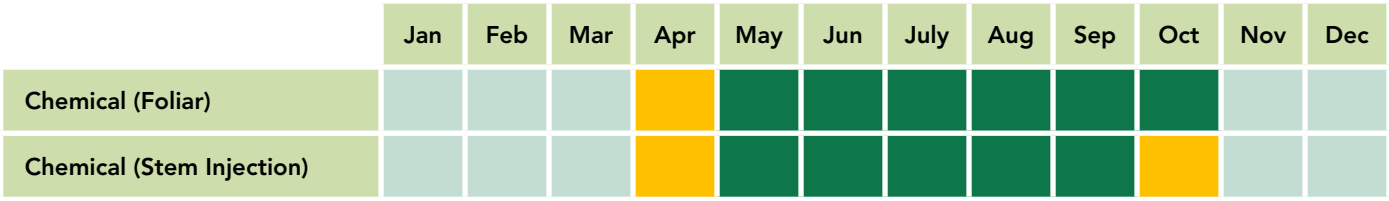
Table 3: Herbicides effective at controlling knotweed species

Herbicide	Application/ Timing	Herbicide Class	Benefits	Cautions
Glyphosate	• Apply as a foliar spray to actively growing plants with a backpack or canister sprayer. • Apply with a handheld injection device (i.e., JK1000 Injection Tool).	• Commercial. • *Only licensed professionals may apply this herbicide.*	• Low rate of persistence in the environment, low toxicity. • Does not travel through soil (stays in rhizome)	• Observe required buffer zones. Non-selective herbicide, avoid contact with non-target plants. Avoid application if heavy rain is forecasted. Visual effects may take longer (7 to 10 days).
Aminopyralid	• Apply as a foliar spray to actively growing plants with a backpack or canister sprayer.	• Commercial. • *Only licensed professionals may apply this herbicide.*	• Use if glyphosate is ineffective or to avoid herbicide resistance. • Residual herbicides remain effective over an extended time period.	• Persists in the soil (residual). Selective; no effect on grasses.
Imazapyr	• Apply as a foliar spray to actively growing plants with a backpack or canister sprayer.	• Commercial. • *Only licensed professionals may apply this herbicide.*	• Use if glyphosate is ineffective or to avoid herbicide resistance.	• Observe required buffer zones. Non-selective herbicide, avoid contact with non-target plants. • Will kill non-target species in proximity to targeted plant such as desirable trees and shrubs, particularly if the root system touches/ grafts to the roots of a treated knotweed. • Consider site conditions. Only suitable in non-crop areas, or open areas without trees/shrubs. • May take several months to see results.
Triclopyr	• Apply as a foliar spray to actively growing plants with a backpack or canister sprayer.	• Commercial. • *Only licensed professionals may apply this herbicide.*	• Use if glyphosate is ineffective or to avoid herbicide resistance.	• Observe required buffer zones. Non-selective herbicide, avoid contact with non-target broadleaf weeds and woody plants.

Timing of Herbicide Application:

As a species with an extensive underground rhizome network, timing herbicide application with the plant's seasonal life cycle of rhizome source-sink is an important consideration. Jones *et al.* (2018) found that applying glyphosate at the appropriate stage of the plant's life cycle was more important than herbicide dose, with properly timed applications resulting in the greatest reductions in stem density and basal cover. Applying herbicide during or just after flowering and 4 - 6 weeks before the first fall frost takes advantage of seasonal changes in rhizome source-sink relationships: during the active growing season, nutrients and carbohydrates travel upwards from the rhizome to the plant stems. Once flowering occurs, the process reverses and nutrients and carbohydrates travel downwards towards the rhizome system, in preparation for fall and overwintering. This makes it an optimal time to apply herbicide as it will also be translocated to the rhizome system.

Japanese Knotweed Treatment Times



- No Treatment
- Optimal Treatment Times
- Suboptimal Treatment Times

Note: The above treatment times for herbicide application must consider weather conditions.

Foliar spray done by Credit Valley Conservation.

Photo courtesy of: Credit Valley Conservation.

Foliar Spray:

Foliar application involves coating the leaves and stems of target plants with herbicide. The leaves absorb the herbicide; it then translocates to other parts of the plant.

Practitioners consulted for this document recommended biannual foliar application for knotweed. The first treatment in **late spring or early summer (May – June)** once leaves are fully extended, and once the majority of knotweed canes have emerged in order to ensure adequate coverage. The second treatment is applied later in the summer, just after flowering and **4 – 6 weeks before the first fall frost (August – October)**. Repeat applications over multiple growing seasons. Alternatively, apply the first application in **early fall** (until first frost), follow up **next spring** just after the plant emerges.

Infestation Size:	Any infestation size.
Goal:	Eradication.
Timing (season):	*Biannual*: • First application late spring or early summer (May – June), second application late summer or early fall (until first frost). • First application in early fall (until first frost), follow up next spring just after the plant emerges.
Treatment Frequency:	Biannual: two seasonal applications for at least 3-4 growing seasons.
Best Practices:	• Foliar spray works best with a glyphosate-based herbicide. Include a vegetable (or tracker) dye in the herbicide mix so treated areas are more visible, allowing applicators to apply more precisely and minimize spray drift. • Weather may impact treatment effectiveness therefore is an important consideration for foliar spray. Avoid spraying during drought, hot, dry weather, and shortly before rainfall. Higher wind speeds may also increase the risk for drift. • Consider alternating herbicide ingredients to reduce the risk of resistance (i.e., aminopyralid, imazapyr, triclopyr-based herbicides). • To reduce impacts on pollinating insects, consider foliar spray in the early morning before pollinators become active. • Monitor for effectiveness and treat any resprouts in subsequent years. Check the pesticide label for restrictions regarding treatment frequency. ***Spray-on application method:*** • Use a backpack or canister sprayer to completely cover the upper side of leaves. Ensure leaves are covered without herbicide dripping off of the leaves. • Consider using a wand extension to access tall foliage and minimize herbicide contact. ***Knock-down and spray method:**** • This technique is used when plants at a treatment site are > 2 m tall. It aims to avoid spraying overhead and reduce applicator exposure. • It is easiest with two people. One person pulls down individual stems of knotweed by hand or using a tool such as the blunt end of a machete or strong stick, making sure not to break the stem. The higher up stems are bent, the less woody the stem is, and the connective tissue can remain intact. The second person (applicator) sprays the leaves of the bent over stems, at waist height. • This technique is more effective if done earlier in the season. Once stems become woody and brittle, they will more likely break rather than bend.
Advantages:	• Offers a wider surface area of coverage for large, well-established stands. • More effective on small stems which cannot be stem injected.
Disadvantages:	Potential for spray drift and harm to non-target plants. Spray drift may prohibit pesticide use near water. Consider minimizing spray drift in sensitive areas by: • Shrouding or shielding the spray nozzle on the spray wand • Suspend/drape tarps or garbage bags to act as a barrier to adjacent sensitive areas (desirable vegetation, waterbodies).*
Ideal for:	• Any infestation size (especially medium or large, well-established stands) where herbicide application is permitted.

**Applicator methods as described in the document "Best Management Practices for Knotweed Species in the Metro Vancouver Region."*

Cutting with herbicide application

Some practitioners have combined manual and chemical approaches to knotweed management. A few examples of approaches include:

- Pre-treatment cutting (1-2x) in late spring or early summer followed by herbicide application in late summer or fall.
- Excavation or digging of large rhizome clumps followed by treatment of regrowth.
- Early-season foliar application followed by cutting and a subsequent fall stem-fill or foliar treatment.

The primary advantage for pre-treatment cutting is to reduce stand height. Regrowth following cutting is typically shorter and more manageable, so that foliar spray can be applied at waist height or lower, which reduces applicator exposure to herbicide and can improve site access. Some practitioners also suggest that cutting may help deplete stored energy reserves or promote the development of fresh foliage that may improve herbicide uptake. However, cutting requires careful containment and disposal of plant material, which can be costly and time-consuming, and may increase the risk of spreading fragments if not properly managed (Jones *et al.* 2018).

Stem injection of Japanese knotweed.

Photo courtesy of: Credit Valley Conservation.

Stem Injection:

Stem injection involves using a hand-held injection device to deliver a concentrated dose of systemic herbicide (glyphosate-based) into the hollow stem of a knotweed plant. Herbicide is then translocated throughout the plant, including into the rhizome system.

Infestation Size:	Best for patches with few knotweed stems, single stems interspersed with desirable vegetation, or medium-sized stands with mature plants.
Goal:	Eradication.
Timing (season):	*Annual:* Late spring to early fall (until first frost)
Treatment Frequency:	*Annual:* Single annual application for at least two growing seasons. Followed by foliar treatment of sporadic plants annually for at least 2 - 3 years once regrowing plants are not achieving sufficient size to inject.
Best Practices:	*Stem injection with glyphosate:* • Treatment should occur when the cane is 1.3 cm (½ inch) or more in width. In smaller stems, the hollow space in the stem will not yet be formed. New or small shoots may split when the needle is pushed in, or the needle may go straight through. Thus, it is important to only inject wider stems. • Inject into an internode near the base of the cane to ensure effective translocation to the roots. Injecting too close to the base can be difficult due to limited access or water-filled tissue, while injections made higher on the cane may reduce root translocation. • Ensure all stems are injected, and mark injected stems with a marker to keep track (some injection tools come with attachments for marking pens). • Follow-up stem injection with foliar application to treat re-growth within the same season and/or annually once regrowing plants are not achieving sufficient size to inject.
Advantages:	No pesticide spray drift; can apply in rain or wind conditions. Since application is more targeted, can be applied adjacent to sensitive habitats, with no buffer restrictions.
Disadvantages:	More labour-intensive and time consuming than foliar spray as each stem must be injected and marked. Not practical for very large, dense infestations. Smaller canes (< 1.3 cm) cannot be injected. Uses more herbicide than foliar spray.
Ideal for:	Best on larger stems, as thin stems can split and cause herbicide leakage. More ideal than foliar spray for sensitive habitats, as there is no risk of spray drift. Also ideal around residential gardens, close to ponds, water features, riparian areas, or drainage channels.

Biological

Biological control is the use of an 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*).

At present, there are no biological control agents Available: for release against invasive knotweeds in Canada, although several predators and pathogens from the plant's native range have been considered. One of the most extensively studied is a sap sucker psyllid, *Aphalara itadori*, first collected in 2004 in Kyushu, Japan with a second line collected in Hokkaida, Japan in 2007. These lines have shown high host specificity with slightly different preferences for different knotweed species (Jones 2023). They damage knotweed by feeding on phloem cell sap of the leaves and stems, resulting in twisted and deformed leaves, damage to the meristems and reduced biomass (Metro Vancouver and ISC Metro Vancouver 2024). In Canada, initial releases of this insect were permitted in 2014 in several provinces, including Ontario, British Columbia, and Alberta. While adult psyllids have successfully overwintered and completed at least one generation in the field, sustained populations have not yet been established, likely due to high mortality of early instar nymphs (Jones *et al.*, 2020b). Further research on establishment success, insect biology, and field impact studies is ongoing in several locations, including British Columbia, Alberta, Ontario, and by CABI and the United Kingdom (MFOR 2022). In 2019, CABI collected additional psyllid populations in Japan to restore genetic diversity potentially lost during long-term laboratory rearing of initial 2004 lines. The new lines from 2019 have demonstrated similar host specificity and increased feeding damage on Japanese knotweed foliage (Jones 2023).

The leaf-spot fungus (*Mycosparella polygoni-cuspidati*) was also considered as a biocontrol agent, however it has since been deemed unsuitable for release, as it was found to cause damage to non-target plant species under controlled greenhouse conditions. However, it may have some potential as a mycoherbicide (Kurose *et al.*, 2024).

For more information on the status of biological control agents in Canada, visit: https://inspection.canada.ca/en/plant-health/invasive-pests-and-plants/biological-control-agents.

Biological control agents are being researched.
Photo courtesy of: John P Bailey, University of Leicester.

Disposal

On-site Disposal

If possible, it is better to leave knotweed plant material on-site. On-site disposal reduces the risk of spread during transport, is more time and cost effective. The cut canes can be piled and left on-site to dry, until they are completely brown and dead, and then allowed to compost on site, or piled and burned on site (check with your local municipality for burn permits). Canes left to dry will not be viable to regrow but make sure that the stems and roots cannot reach moist ground or they could root.

Do not backyard compost

Backyard composters do not reach the temperatures necessary to effectively kill all knotweed biomass. Do not compost any viable plant material (i.e., rhizomes, stem fragments, or seeds).

Solarize

Ensure that all viable plant material (i.e., rhizomes, stem fragments, or seeds) are properly disposed of by placing all plant material in thick, garbage bags and leaving them in the sun for 2 – 3 weeks (solarization) during the summer season. The rotten material can then be composted or disposed of in a landfill. This method will not work in the dormant season.

Off-site Disposal

If transporting knotweed material off-site, take precautions to avoid the risk of plant parts, rhizomes, or seeds escaping during transport. All material should be bagged, tarped, strapped securely, or placed in a sealed container before transport.

Municipal compost

Large-scale municipal composting facilities where the compost pile reaches temperatures high enough to kill living plant material can be used to dispose of viable plant material. Ontario composting facilities are required to routinely monitor the composting process and meet strict, provincially regulated time-temperature parameters for pathogen kill. Consult your local municipality to determine if this is an appropriate course of action.

Pieces of the stem or rhizome can produce new plants, as seen in this photo of improperly disposed soil with knotweed fragments.

Photo courtesy of: BC Ministry of Forests, Lands and Natural Resource Operations.

Restoration

Following control measures, consider restoring the site to encourage the re-establishment of native plant species. Consider the following restoration practices:

During Control:

Mulching:

Mulching will not prevent knotweed regrowth. However, it can be used to cover an area immediately after management (e.g., manual or chemical control), which may help to prevent re-colonization by other invaders and to reduce soil compaction by people and pets. Avoid heavy mulching in natural areas. Covering a forest floor with a thick layer of mulch (> 5 cm) in a natural area can do more harm by changing nutrient composition of the soil and smothering desirable ground vegetation, such as spring ephemerals and native tree or shrub seedlings. Urban sites (i.e., urban parks) or residential gardens may be more appropriate.

Seeding:

Reseeding the site with native herbaceous species following plant control will not prevent knotweed regrowth. Seeding should only be done after management activities are completed to prevent new native plants from being killed. It is best to spread seeds from local native plants into the area.

After Control:

Soil Rehabilitation:

Some invasive species alter soil chemistry (especially those that are potentially allelopathic, such as Japanese knotweed). The soil may no longer support native plant species, and may in fact be better suited to other invaders moving in. Replenishing the mycorrhizae in the soil after all Japanese knotweed control has been completed will help to reduce any potential allelopathic 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:

Once knotweed has been removed, consider restoring the site by re-planting with site-appropriate native species that can help outcompete invasive seedlings. Knotweed will have the least regrowth if the site is restored to dense, high tree canopy so that as much light as possible is blocked from reaching the ground. If sunlight can reach the ground, this method is likely to be less effective at suppressing regrowth, and

knotweed will still persist. Herbaceous plantings will not successfully block enough sunlight to out-compete knotweed.

If knotweed is removed successfully from a site, other invasive species may establish. These may also require control or be a temporary stage as new native vegetation is becoming established. Invasion by a different invasive species is not a symptom of failure, merely a step toward full site restoration. The new invasive species could be easier to control than knotweed or may be short-lived and die out as site conditions change. For example, Canada thistle invades a site that is cleared of other invasive species, but declines naturally as the site becomes more shaded by new vegetation. Be sure to time restoration planting after knotweed control is completed. If planting occurs before knotweed is completely eradicated it will be harder to manage the remaining knotweed without impacting the restored vegetation.

See the Long-term Management and Monitoring Section.

Photo courtesy of: Evonne Potts, iNaturalist,
Available: https://www.inaturalist.org/observations/315809622.

Preventing the Spread

Prevention and early detection are the most effective tools for controlling the spread of knotweed species (Japanese, giant, Bohemian, Himalayan) and everyone can help. Follow these tips:

☑ Report it

If you think you see a species of knotweed, take a picture, record the location, and report it using the following tools: contact the Invading Species Hotline at **1-800-563-7711** or report online at https://www.eddmaps.org/ or https://www.inaturalist.org/. For more information, call the Invading Species Hotline at **1-800-563-7711**, visit www.invadingspecies.com or contact the Ontario Invasive Plant Council at info@oninvasives.ca.

☑ Watch for it

Learn to recognize invasive plants like knotweed (Japanese, Bohemian, giant, Himalayan) and then monitor property boundaries, forested areas, fence lines, and trails. Early detection can make it easier and less expensive to remove or control them.

☑ Stop the spread

Inspect, clean, and remove mud, seeds and plant parts from clothing, pets (including horses), vehicles (including bicycles, trucks, ATVs, etc.) and equipment such as mowers and tools. Clean vehicles and equipment in an area away from natural areas where plant seeds or parts are not likely to spread (e.g., wash vehicles in a driveway or at a car wash) before travelling to a new area. See the Clean Equipment Protocol for more details.

☑ 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

Never plant knotweed species in your garden or on your property. In Ontario it is illegal to grow, buy, sell, lease or trade Japanese, Bohemian, giant, or Himalayan knotweed. Try to use local native species in your garden. Encourage local garden centers and nurseries to sell non-invasive or native plants. The Grow Me Instead guide lists alternative species to plant instead of invasive species. For more information on alternative species to plant instead of invasive species, consult the *Grow Me Instead guide* at https://www.ontarioinvasiveplants.ca/resources/grow-me-instead/.

Tracking the Spread (Outreach, Monitoring, Mapping)

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

1. **Early Detection and Distribution Mapping System (EDDMapS):** An online reporting tool and **FREE** mobile application (iPhone and Android) where users can report sightings, review distribution maps, and explore educational resources of invasive plants and other invasive species. This tool is free to use at https://www.eddmaps.org/, and can be downloaded from your app store.

2. **The Invading Species Hotline:** a toll-free telephone number (**1-800-563-7711**) operated by the Invading Species Awareness Program where individuals can report sightings verbally.

3. **iNaturalist:** An online citizen science reporting tool where users can report sightings and review distribution maps. This tool is free to use at http://www.iNaturalist.org and can be downloaded from your app store.

If you suspect you have encountered an invasive species, please take detailed photographs (e.g., entire plant, leaves, stem, flowers, or other identifying features), mark your location, and report it using one of the above methods.

Additional Resources

Invasive Plant Focus: Japanese Knotweed. Toronto Master Gardeners [Video]
https://www.youtube.com/watch?v=kUk37KT-RTw

9 Common Mistakes To Avoid in Trying to Control Invasive Knotweed: Green Shoots [Video]
https://www.youtube.com/watch?v=IVK4_Ol3ZOY

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Goutweed
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White Mulberry
White Sweet Clover
Wild Parsnip

Additional Publications from the OIPC

A Landowner's Guide to Managing and Controlling Invasive Plants in Ontario

A Quick Reference Guide to Invasive Plant Species

Clean Equipment Protocol for Industry

Creating an Invasive Plant Management Strategy: A Framework for Ontario Municipalities

Grow Me Instead! Beautiful Non-Invasive Plants for Your Garden, a Guide for Southern Ontario, Edition 3, 2020 (EN)

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

Invasive Aquatic Plant Species: A Quick Reference Guide

Invasive Terrestrial Plant Species: A Quick Reference Guide

The Landowners Guide to Controlling Invasive Woodland Plants

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