



Calystegia sepium

BEST MANAGEMENT PRACTICES FOR
Hedge Bindweed
in the Metro Vancouver Region



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SERVICES AND SOLUTIONS FOR A LIVABLE REGION



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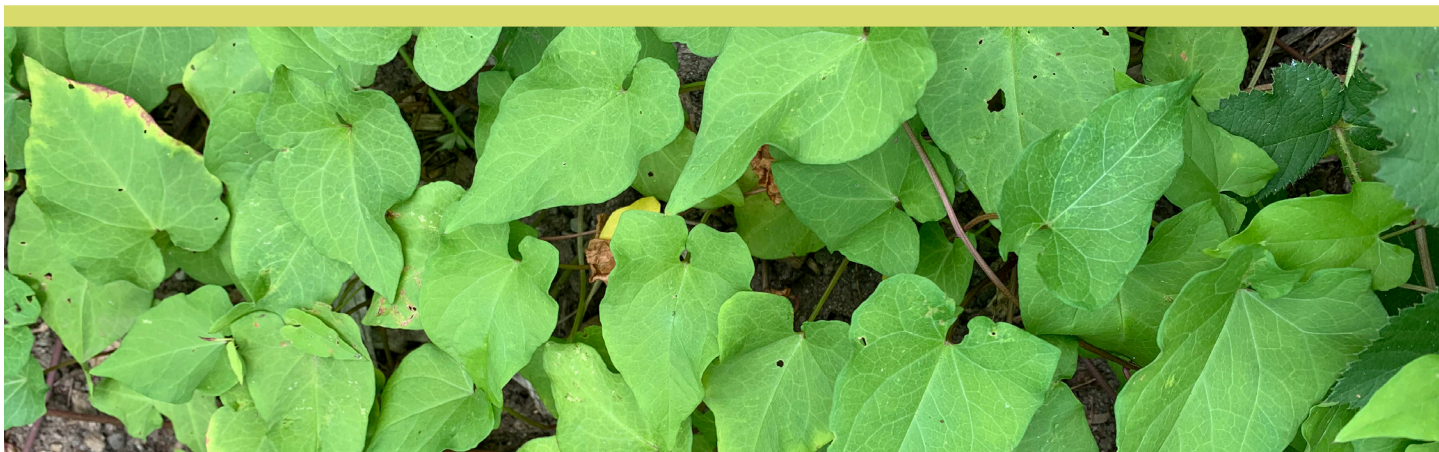
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Introduction

The impacts of invasive species on ecological, human, and economic health are of concern in the Metro Vancouver region. Successful control of invasive species requires concerted and targeted efforts by many players. This document – “**Best Management Practices for Hedge Bindweed in the Metro Vancouver Region**” – is one of a series of species-specific guides developed for use by practitioners (e.g., local government staff, crews, project managers, contractors, consultants, developers, stewardship groups, and others who have a role in invasive species management) in the region. Together, these best practices provide a compendium of guidance that has been tested locally by many researchers and operational experts.

Hedge bindweed¹ (*Calystegia sepium* subsp. *sepium*) is a familiar sight from spring until fall in urban natural areas and gardens in Metro Vancouver. It is found twining around other plants and structures, often forming a tangled mass (Melymuka & Bradtke, 2013). It is a persistent plant that spreads by underground stems and roots that can resprout from fragments of these structures left in the soil (Washington State University, 2015). Several subspecies of *Calystegia sepium* are recognized: *Calystegia sepium* subsp. *sepium*², the focus of this document, was introduced from Europe (Darbyshire, 1988).

Academic institutions, government, and non-government organizations continue to study this species in British Columbia. As researchers and practitioners learn more about the biology and control of hedge bindweed, it is anticipated that the recommended best management practices will change. This document will be updated to reflect these changes as the information becomes available. Please check metrovancover.org regularly to obtain the most recent version of these best management practices.

REGULATORY STATUS

Although hedge bindweed is an invasive plant of concern in the Metro Vancouver region, it is not currently regulated anywhere in British Columbia.

IMPACTS

Hedge bindweed can quickly overwhelm other vegetation, growing between, around and over other plants. This growth pattern physically damages other plants and prevents them from accessing light and nutrients (Crampton, 2020). Dense infestations can cause branches or stems of other plants to collapse. It often grows at restoration sites and can threaten newly installed plants or structures. Hedge bindweed also produces allelopathic chemicals that inhibit the growth of surrounding plants (North Carolina State University Extension, 2020).

1 Hedge bindweed is known by many common names; some of the most common are morning glory, great bindweed, hedge false bindweed, wild morning glory, bellbind, and hedgebell. It is referred to as hedge bindweed in this document.

2 *Calystegia sepium* was previously known as *Convolvulus sepium* (North Carolina State University Extension, 2020).

Hedge bindweed, and other bindweeds, are considered serious agricultural weeds worldwide (Boldt, Rosenthal, & Srinivasan, 1998). They reduce crop yields through competition and by interfering with harvesting practices (Pfirter, Ammon, Guntli, Graves, & Defago, 1997). Regular ploughing helps prevent their establishment in annual crops but they are very damaging to perennial crops and orchards (Rask & Andreasen, 2007).

The seeds of hedge bindweed and other bindweeds are poisonous when consumed in large quantities (The Ohio State University, 2020). The roots are poisonous to swine (The Ohio State University, 2020).

REPRODUCTION AND SPREAD

Hedge bindweed has a rapid growth rate (North Carolina State University Extension, 2020), spreading horizontally and climbing vertically. It can spread from clonal off-shoots from the rhizomes or underground stems (North Carolina State University Extension, 2020). If broken, the long creeping roots of hedge bindweed are able to regenerate. Even small sections of root can re-grow, although the shorter the fragment and the deeper it is buried, the lower the regeneration capacity (Bond, Davies, & Turner, 2007). This form of vegetative growth is the main source of spread of hedge bindweed.

Seed production in *Calystegia* species is limited and seedlings are rarely produced (Ushimara & Kikuzawa, 1999). Seeds can be spread in water (Bond, Davies, & Turner, 2007).



Hedge bindweed growing around a fence

CREDIT: ISCMV

HABITAT AND DISTRIBUTION

Hedge bindweed can be found in a variety of natural and disturbed habitats such as streamsides, marshes, fields, thickets, orchards, roadsides and railroads (The Ohio State University, 2020). It is a nuisance for gardeners in garden beds and borders. As the common name suggests, it grows as a hedgerow plant, scrambling over and smothering shrubs, hedges and trees. It is common in developed areas such as urban parks and vacant lots and often grows after disturbance, such as at restoration sites.

This plant tolerates most growing conditions (North Carolina State University Extension, 2020). It prefers moist sites along

streams and shores (George, Gerald, & Del, 1989).

Hedge bindweed is common in southwestern BC and rarely found on Haida Gwaii and in BC's northeast and southeast regions (George, Gerald, & Del, 1989). It is found in all provinces in Canada and the Yukon Territory (North Carolina State University Extension, 2020).

CLIMATE ADAPTATION

Climate modellers predict that the Metro Vancouver region will experience warmer temperatures; a decrease in snowpack; longer dry spells in summer months; more precipitation in autumn, winter and spring; more intense extreme events; and an extended growing season. In the past, our region had an average of 252 days in the growing season. In lower elevations 45 days will be added to the growing season by the 2050s, and 56 days by the 2080s, resulting in nearly a year-round growing season of 357 days on average. In higher elevation ecosystems the growing season length will increase by 50% to 325 days by the 2080s (Metro Vancouver, 2016). These changes will stress many sensitive ecosystems, increasing their vulnerability to invasive species.

Hedge bindweed's ability to survive in a variety of conditions and habitats, and its widespread distribution around the world (Boldt, Rosenthal, & Srinivasan, 1998) will likely influence its ability to adapt to future climate changes. No specific information on how hedge bindweed will adapt to climate change was found in the literature, but it is speculated that this plant may benefit from our future climate in several ways:

- **Extended growing season:** It emerges in early spring in Metro Vancouver (April) and is one of the last remaining deciduous plants to retain leaves in the fall (Gasior, 2020). With a wide seasonal window of survival, hedge bindweed may be able to capitalize on an extended growing season.

- **Increased precipitation and flooding:** Hedge bindweed seeds can be spread in water (Bond, Davies, & Turner, 2007) so dispersal by seeds in stormwater runoff may be enhanced. Increased flooding events may encourage the spread of hedge bindweed fragments, which can propagate new plants.
- **Drought tolerance:** Hedge bindweed's root system is more extensive than many other plants (The Ohio State University, 2020), contributing to its drought tolerance (North Carolina State University Extension, 2020).

With these kinds of competitive advantages, this species is more adaptable than native species in a variety of ecosystems. Its ability to reproduce in multiple ways and ability to spread quickly suggest that it will be able to withstand, and possibly thrive, with changing climate conditions.

Identification

Unless otherwise noted, the following identification information was collected from the Province of BC (2020) and Bond, Davies and Turner (2007).

Lifecycle: Perennial, leaves die off in the fall but the rhizomes and roots overwinter, producing new shoots the following growing season.

Stem: Round, branching, young stems are dull red, becoming light green with maturity (The Ohio State University, 2020). Up to 4 metres in height, twines around other plants or structures in a counterclockwise direction (Melymuka & Bradtke, 2013).

Leaves: Alternate, on long stalks, 5-12 centimetres long, arrow- to heart-shaped with rounded or square-shaped lobes at the base of each leaf and pointed tips. Leaves are delicate and thin, green on the top and grey-green on the bottom (Crampton, 2020), with a deep groove on the upper side (The Ohio State University, 2020).

Flowers: Petals are fused into a funnel-shaped flower, 5-7 centimetres across, usually white, but colour variations include pink with spreading white stripes (North Carolina State University Extension, 2020). Two large bracts enclose the base of each flower (The Ohio State University, 2020).

Flowers are solitary growing on square stalks from the stem, typically bloom during May to September, and require pollination from bees or flies (Ushimara & Kikuzawa, 1999). Flowers open in morning and twist closed later in the day; they stay closed during dull, unsunny weather. Individual flowers only last one day (North Carolina State University Extension, 2020).

Fruits: Egg-shaped capsule with 2-4 oval seeds that are smooth, light to dark brown and 3.5-5 millimetres long (Canadian Food Inspection Agency, 2014). Capsules split when mature. Seeds are sparse or rarely produced (Province of BC & ISCBC, 2021) but viable up to 30 years (Invasive Species Council of BC, 2020).

Roots: White, round, fleshy, 3-4 metres long or more in length. Roots run underground in all directions but rarely more than 30 centimetres deep (Bond, Davies, & Turner, 2007). Roots exhibit rapid growth within the first few weeks after germination (Bond, Davies, & Turner, 2007).

The following photos show hedge bindweed plant parts.



Leaves
CREDIT: ISCMV



Stems twining around oregon grape
CREDIT: ISCMV



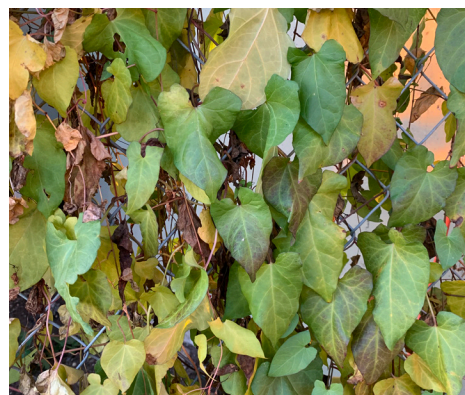
Dead stems growing around an apple tree in early spring
CREDIT: ISCMV



Roots
CREDIT: ISCMV



Stems growing off a root
CREDIT: ISCMV



Leaves dying in the fall
CREDIT: ISCMV



Open flower
CREDIT: ISCMV



Closed flower with two bracts visible at the base
CREDIT: ISCMV



Seed capsules with seeds
CREDIT: ISCMV

SIMILAR SPECIES

Many vines and plants that climb are incorrectly identified as hedge bindweed. The species most commonly mistaken for hedge bindweed are listed below.

NATIVE SPECIES

- **Beach bindweed** (*Calystegia soldanella*/*Convolvulus soldanella*) has a similar shaped flower to hedge bindweed, but the petals are pink to purple. Thick, fleshy alternate leaves up to 4 centimetres wide grow from creeping (but not twining) stems (Klinkenberg, 2021). It grows in sand dunes at low elevations along the Pacific Coast. Beach bindweed is a blue-listed plant species in BC, which means it is of special conservation concern (Klinkenberg, 2021).



Beach bindweed

CREDIT: STROBILOMYCES VIA WIKIMEDIA COMMONS

NON NATIVE SPECIES

All of the similar non-native species below are also called 'morning glory' (other widely used common names for these plants are listed).

- **Field bindweed³** (*Convolvulus arvensis*) is easily mistaken for hedge bindweed; in fact, many people are not aware that they are two distinct bindweed species. Field bindweed is present throughout most regions in BC, including Metro Vancouver (Province of BC, 2002) but is more common in agricultural settings (Weaver & Riley, 1982) and rarely seen in the urban areas. Although field bindweed is not currently classified as a noxious weed in British Columbia, it is designated as an "invasive plant of concern" in the Province's [Field Guide to Noxious Weeds and Other Selected Invasive Plants of British Columbia](#). It is considered one of the world's worst invasive plants due to its wide distribution, abundance and economic impact (Lyons, 1998). Its impact on agricultural lands is well documented but its affect on natural areas is less known (Lyons, 1998).

Field bindweed is a perennial plant that trails on the ground but it also grows vertically around structures. The flowers, leaves and stems are generally smaller than hedge bindweed. The leaves are distinctly arrow-shaped (Lyons, 1998) with sharp-pointed lobes at the base of the leaves and a more rounded tip. Flowers are white to pink (Weaver & Riley, 1982). Instead of two large bracts at the base of each flower like hedge bindweed, the two field bindweed bracts are located 2-5 centimetres below the flower (The Ohio State University, 2020).

³ Field bindweed is also known as small-flowered morning glory, wild morning glory, creeping Jenny and creeping Charlie (Weaver & Riley, 1982) (Lyons, 1998).

- Field bindweed is closely related to hedge bindweed (Kolmanic, Leskovšek, & Lešnik, 2020) and many experts suggest that control methods for hedge bindweed and field bindweed are the same. Most of the research available on both species is limited to agricultural settings, and there is far more literature on field bindweed, which has been extensively studied for over a century (Lyons, 1998). Field bindweed has a more extensive root system and may be more difficult to manage (Garry Oak Ecosystems Recovery Team, 2003). Both hedge bindweed and field bindweed should be managed.



Field bindweed bract

CREDIT: STEVE DEWEY, UTAH STATE UNIVERSITY, BUGWOOD.ORG

- **Wild buckwheat⁴** (*Polygonum convolvulus*/*Fallopia convolvulus*) has similar arrow-shaped leaves but the flowers of this plant are small, green and inconspicuous, and found in clusters along stems that emerge from the main stem where the leaves grow (Melymuka & Bradtke, 2013). When it's not flowering, it can be distinguished from hedge and field bindweeds by a papery sheath that wraps around the stem where the leaf stalks join the stem. Wild buckwheat is an annual plant infrequent in southern BC and rare in northern BC (Province of BC, 2002).

⁴ Wild buckwheat is also known as black bindweed (Weaver & Riley, 1982). This plant is known by the scientific names *Polygonum convolvulus* and *Fallopia convolvulus*.

- *Ipomoea* is a genus of annual and perennial ornamental morning glories (also commonly called sweet potato vine) that vary greatly in appearance but have distinct blue or purple flowers, and leaves of various colours and often with lobes (Melymuka & Bradtke, 2013). *Ipomoea* species are readily available as plants and in seed packages in Metro Vancouver garden centres (Gasior, 2020). They are not considered invasive.



Ipomoea species

CREDIT: JOHN RUTER, UNIVERSITY OF GEORGIA, BUGWOOD.ORG



Wild buckwheat

CREDIT: BRUCE ACKLEY, THE OHIO STATE UNIVERSITY, BUGWOOD.ORG

Tracking

The Provincial government maintains the [Invasive Alien Plant Program \(IAPP\) application](#) (British Columbia Ministry of Forests, Lands and Natural Resource Operations and Rural Development 2017), which houses information pertaining to invasive plant surveys, treatments, and monitoring. Hedge bindweed is listed as 'hedge false bindweed' in IAPP. Many agencies, including local governments, have their own internal invasive species inventory and mapping protocols that are used by staff, contractors, and, in some cases, the public. For example, the City of North Vancouver has its own system called AlienMap. Agencies in British Columbia that do not enter data into IAPP are encouraged to check it regularly because it contains public reports and data from other agencies and it is important to consider as much data as possible when making management decisions. The Map Display module of IAPP is publicly accessible.

When carrying out a hedge bindweed inventory it is useful to record the following information as it will later inform treatment plans:

- Size and density of infestation;
- Location in relation to the 10 metre Pesticide Free Zone adjacent to water courses;
- Location in relation to other water sources, such as wells;
- Whether it is growing around desired vegetation or structures.

Reporting

Since hedge bindweed is widespread throughout the Metro Vancouver region and does not pose an imminent health or safety risk, there is generally little value in reporting individual occurrences.



CREDIT: ISCMV

Prevention and Control Strategies

Effective invasive plant management may include a variety of control techniques ranging from prevention, chemical, manual, mechanical, biological, and/or cultural methods.

Hedge bindweed is so pervasive in some habitats that, although it may be possible to eliminate from a particular site (e.g., a discrete garden), the plant may simply encroach again from adjacent sites that are not managed (Cornell University, 2020).

As the root system can be quite extensive, it is difficult to remove once established (North Carolina State University Extension, 2020). Successful management of this species involves a multi-faceted approach including “the prevention of seeds, competition from more desirable vegetation, and vigilance in removing new growth” (King County Noxious Weed Control Program, 2007). Any control methods will likely require management over several years (King County Noxious Weed Control Program, 2007).

STRATEGY COLOUR LEGEND

GREEN: RECOMMENDED

ORANGE: CAUTION

RED: NOT RECOMMENDED OR NOT AVAILABLE

PREVENTION: IMPERATIVE

Prevention is the most economical and effective way to reduce the spread of hedge bindweed over the long term.

It is important to minimize the establishment and spread of hedge bindweed by maintaining native vegetation in natural settings and preventing soil disturbance and compaction (Garry Oak Ecosystems Recovery Team, 2003). When hedge bindweed is first discovered, undertake control activities swiftly and frequently to prevent spread (Garry Oak Ecosystems Recovery Team, 2003).

When working in or adjacent to hedge bindweed, it is best to inspect and remove plants, plant parts, and seeds from personal gear, clothing, pets, vehicles, and equipment and ensure soil, gravel, and other fill materials are not contaminated with hedge bindweed before leaving an infested area. Plants, plant parts, and seeds should be tarped or bagged before transport to an appropriate disposal site (see Disposal section).

Note that many plants are commonly named ‘bindweed’ or ‘morning glory’. It is best to avoid purchasing seeds or plants with these common names, unless the true identity is known. Review seed mixes carefully as seeds labeled as ‘bindweed’ may be found in some seed mixes (Province of BC, 2002). The Invasive Species Council of BC’s [‘Grow Me Instead’](#) Program or [Metro Vancouver’s Grow Green website](#) provide recommendations for non-invasive, drought-tolerant plants, and garden design ideas. All materials (e.g., topsoil, gravel, mulch, compost, wood chips, plant stock) should be weed-free. Hedge bindweed can be introduced via these materials, and sites where they are used should be monitored carefully for any growth (Crosby, 2018).

Healthy green spaces are more resistant to invasion by invasive plants, so it is also important to maintain or establish healthy plant communities.

MANUAL/MECHANICAL: RECOMMENDED

- **Pulling new seedlings** by hand will eventually exhaust the root system. Younger plants have a greater regenerative capacity so it is recommended to wait until 5-6 leaves have fully developed prior to pulling the seedlings (Rask & Andreasen, 2007). Once seedlings have reached this developmental stage, pull 6-8 times during the first growing season, and 3-5 in the second season for maximum control (Cornell University, 2020). This method must be done consistently as new shoots arise from the rhizome or seeds (Crampton, 2020). Repeated removal of the top growth in this way can kill the plants in two years (Cornell University, 2020).

It is not recommended to pull mature hedge bindweed that has become entwined around desirable plants, where pulling may defoliate or damage the plant stems or branches. It is possible to pull hedge bindweed from sturdy structures that will not be damaged, but this will not eradicate the plant; other methods listed below are more appropriate at these sites.

- **Digging and removing roots** is very time-consuming but can be effective at small sites, especially sites that are being prepared for planting. Dig one shovelful at a time, picking out the chunks of rhizomes as you go (Cornell University, 2020). Collect the rhizomes in a bucket for disposal later. Dig systematically so that you keep track of where you have already dug (e.g., scooping the soil to one side to form a trench). If the soil is loose, root fragments will be easy to see. If the soil is hard, use the back of the shovel to break up the soil – the soil will tend to break apart along the roots, exposing them (Cornell University, 2020). Although digging out the entire root system may be impractical, remove as much of the root material as possible. The smaller the root fragments and the deeper they are buried (at least 25 centimetres deep), the less likely they are to regrow (Bond, Davies, & Turner, 2007).

After digging, pull and remove any seedlings that arise from any remaining roots fragments in the soil.

- **Cutting** stems alone will not control hedge bindweed (King County Noxious Weed Control Program, 2007), however this can be used to save desired vegetation that hedge bindweed is growing on if you are unable to manage it using other methods. This method is particularly useful at restoration sites that have been recently planted (Crosby, 2018). With hand clippers, cut the stem close to the ground and everything above will die off (Crampton, 2020). Removing the dead stems from desired vegetation may increase survivability of young plants (Crosby, 2018). If possible, remove the underground rhizomes and roots as described above.

Line trimming, also called weed whacking, weed eating, or string trimming (using an electric or gas-powered handheld machine) can control hedge bindweed along fences. This method must be repeated frequently and will not eradicate the plants. Do not use this method around plants or delicate structures that will be damaged from the machine's rotating line.

- **Tilling**, the use of machinery to turn over and break up soil, fragments hedge bindweed rhizomes and roots, altering their position in the soil and exposing them to the soil surface where they will decompose or freeze (Rask & Andreasen, 2007). While this will reduce regrowth, it will not eradicate the plants, and there is great potential for re-growth of fragments left in the soil. Use of this method is restricted to large accessible sites where other desired vegetation is not present, such as in agriculture settings. Tilling will be most successful in the spring when the ground is wet and plants are smaller (King County Noxious Weed Control Program, 2007).
- **Flower removal** by hand will not likely impact hedge bindweed growth since seeds are not the main source of spread. If seed production is a concern, pull open or closed flower heads off the stems as soon as they form.
- **Covering** is ineffective as a control method for hedge bindweed, which can grow through and around thick piles of mulch and other synthetic covers (Cornell

University, 2020). It has been observed growing through a 46-centimetre pile of bark mulch (Cornell University, 2020). Hedge bindweed can also survive without light, sending roots underground beyond the edge of coverings (King County Noxious Weed Control Program, 2007). Covering in a crop setting can encourage hedge bindweed vines to follow light holes in the cover material where crop plants emerge, causing the bindweed to twine up the crop plants making control very difficult.

- **Burning** is not a suitable control method because of the plant's potential for vegetative growth, and its long-lived seeds (Province of BC, 2002).

REMOVAL TIMING

Pulling, digging and tilling methods can be done anytime during the growing season, but are easiest in the spring when the ground is moist (King County Noxious Weed Control Program, 2007).

APPLYING MANUAL/MECHANICAL CONTROL METHODS IN RIPARIAN AREAS

Hedge bindweed often grows in large contiguous patches right up to the edge of water courses. Consider the impact of control techniques and the resulting bare soil on the adjacent aquatic environment. Schedule removal works during a period of least risk to fish species, outside of the [fish window](#). Adhere to Provincial and Federal riparian regulations. It is recommended to consult with a qualified environmental professional when working around water bodies.

CHEMICAL: CAUTION

When alternative methods to prevent or control invasive plants are unsuccessful, professionals often turn to herbicides. Although hedge bindweed is difficult to control chemically (Pfirter, Ammon, Guntli, Graves, & Defago, 1997) requiring high application rates (large amounts of herbicide) and repeated applications (Province of BC, 2002), it can be effective for short-term suppression and is the most common management option for this plant in agricultural settings around the world where the plants grow as a carpet (Kolmanic, Leskovšek, & Lešnik, 2020). This method should not be used at planted sites due to likely impact on non-target plants (Crosby, 2018). Seedlings and new growth of hedge bindweed may respond well to herbicide, but long-term control of older plants will be less successful because the rhizomes and roots grow deep into the ground (Weaver & Riley, 1982).

This method should be used with caution for the following reasons (Crosby, 2018):

1. Weather conditions greatly influence treatment efficacy;
2. Hedge bindweed often grows in riparian areas where pesticide use is restricted; and
3. Since hedge bindweed growth is closely associated with other plants, chemical control can easily damage non-target species (Province of BC, 2002).

With the exception of substances listed on Schedule 2 of the [BC Integrated Pest Management Regulation](#), the use of herbicides is highly regulated in British Columbia. Site characteristics must be considered with herbicide prescribed, based on site goals and objectives and in accordance with legal requirements. [This summary of BC's Integrated Pest Management Act](#) provides an overview of the provincial legislation.

PESTICIDE LICENCE AND CERTIFICATION

A valid pesticide licence is required to:

- offer a service to apply most pesticides;
- apply most pesticides on public land including local government lands⁵; and
- apply pesticides to landscaped areas on private land, including outside office buildings and other facilities.

Pesticides (e.g., herbicides, insecticides, fungicides) are regulated by the Federal and Provincial government, and municipal governments often have pesticide bylaws.

- Health Canada evaluates and approves chemical pest control products as per the [Pest Control Products Act](#).
- The [Integrated Pest Management Act](#) sets out the requirements for the use and sale of pesticides in British Columbia. This Act is administered by the Ministry of Environment and Climate Change Strategy.
- Several municipalities have adopted bylaws that prohibit the use of certain pesticides.

Everyone who uses pesticides must be familiar with all relevant laws.

ONLY companies or practitioners with a valid Pesticide Licence and staff who are certified applicators (or working under a certified applicator) may apply herbicide on invasive plants located on public lands in British Columbia. Applicators must be either the land manager/owner or have permission from the land manager/owner prior to herbicide application.

On private property the owner may obtain a Residential Applicators Certificate (for Domestic class products only) or use a qualified company. Residents do not require a Residential Applicator Certificate for certain uses of domestic class glyphosate including treatment of plants that are poisonous for people to touch, invasive plants and noxious weeds listed in legislation, and weeds growing through cracks in hard surfaces such as asphalt or concrete. Refer to the 'Pesticides & Pest Management' and 'Home Pesticide Use' webpages listed in the Additional Resources Section for more information.

Questions? Contact the Integrated Pest Management Program: Telephone: (250) 387-9537
Email: bc.ipm@gov.bc.ca

⁵ on up to 50 ha/year by a single organization. Organizations looking to treat over 50 hectares of land per year are also required to submit a Pest Management Plan and obtain a Pesticide Use Notice confirmation.

Pesticide applicator certificates can be obtained under the category 'Industrial Vegetation Management' to manage weeds on industrial land, roads, power lines, railways, and pipeline rights-of-way for control of noxious weeds on private or public land. However, since hedge bindweed is not a regulated noxious weed in the Metro Vancouver region, the 'Landscape' certification category is needed for herbicide use on public and private lands. Assistant applicator training is also available and the [online course and exam](#) are free.

It is best practice for personnel supervising or monitoring pesticide contracts to also maintain a pesticide applicator licence so they are familiar with certification requirements.

For more information on how to obtain a licence and the requirements when working under the Provincial [Integrated Pest Management Act and Regulation](#), please review the Noxious Weed & Vegetation Management section on this webpage: gov.bc.ca/PestManagement.

HERBICIDE LABELS

Individual herbicide labels must always be reviewed thoroughly prior to use to ensure precautions, application rates, and all use directions, specific site and application directions are strictly followed. Under the federal *Pest Control Products Act* and the BC Integrated Pest Management Regulation, **persons are legally required to use pesticides (including herbicides) only for the use described on the label and in accordance with the instructions on that label.** Failure to follow label directions could cause damage to the environment, create poor control results, or pose a danger to health. Contravention of laws and regulations may lead to cancellation or suspension of a licence or certification, requirement to obtain a qualified monitor to assess work, additional reporting requirements, a

stop work order, or prohibition from acquiring authorization in the future. A conviction of an offence under legislation may also carry a fine or imprisonment.

Herbicide labels include information on both the front and back. The front typically includes trade or product name, formulation, class, purpose, registration number, and precautionary symbols. Instructions on how to use the pesticide and what to do in order to protect the health and safety of both the applicator and public are provided on the back (BC Ministry of Environment, 2011).

Labels are also available from the Pest Management Regulatory Agency's [online pesticide label search](#) or [mobile application](#) as a separate document. These label documents may include booklets or material safety data sheets (MSDS) that provide additional information about a pesticide product. Restrictions on site conditions, soil types, and proximity to water may be listed. If the herbicide label is more restrictive than Provincial legislation, the label must be followed.

HERBICIDE OPTIONS

The following herbicides can be used on hedge bindweed. Information is from Washington State University (2015); King County Noxious Weed Control Program (2007); and Kolmanic, Leskovšek, & Lešnik (2020).

ACTIVE INGREDIENT (EXAMPLE BRAND NAMES)+	APPLICATION	PERSISTENCE	GROWTH STAGE++	TYPE+++	
Glyphosate (many products)	foliar application	non-residual	actively growing	non-selective	<i>Best suited for landscaped areas and bare ground; apply as a spot treatment only; for re-treatment in the same season, wait until plants grows and form flowers before next application; least effective of all herbicides listed when used alone (Kolmanic, Leskovšek, & Lešnik, 2020)</i>
2,4-D	foliar application	short residual	actively growing	selective, no effect on most grasses	<i>Best suited for turf areas and bare ground; 2,4-D products not currently permitted on BC Ministry of Transportation and Infrastructure jurisdiction</i>
Triclopyr (e.g. Garlon™)	foliar application	residual	actively growing	selective, no effect on grasses	<i>Best suited for turf areas and bare ground</i>
Imazapyr (e.g. Arsenal™)	foliar application	residual	actively growing	non-selective	
Dicamba (e.g. Banvel™)	foliar application	short residual	actively growing	selective	

+ The mention of a specific product or brand name of pesticide in this document is not, and should not be construed as, an endorsement or recommendation for the use of that product.

++ Herbicides that control all vegetation are non-selective, while those that control certain types of vegetation (e.g., only grasses or only broadleaf plants) are termed selective.

Kolmanic, Leskovšek, & Lešnik (2020) found the greatest reduction of rhizomes (8 months after herbicide application) was achieved with sequential application of glyphosate followed by 2,4-D or dicamba 12 hours later (compared to individual treatment of these herbicides, other sequences, or tank mixtures). In their trials using each herbicide alone, dicamba and 2,4-D showed greater rhizome reduction compared to glyphosate. The researchers suggest that the sequential application of glyphosate followed by 2,4-D or dicamba 12 hours later is a viable method of control for spot treatments as well as large infestations. Repeated treatments are needed.

APPLYING PESTICIDE IN RIPARIAN AREAS

Provincial legislation prohibits the use of herbicides within 10 metres of natural water courses and 30 metres of domestic or agricultural water sources on public lands. On private lands herbicide labels need to be followed (which means for glyphosate products treatment can happen up to the water's edge) and other restrictions may apply (e.g., industrial sites, forestry sites, golf courses, etc.). On public lands, glyphosate is the only active ingredient that can be applied within the 10 metre Pesticide-Free Zone (PFZ)⁶ in British Columbia in accordance with the *Integrated Pest Management Act* and Regulation and all public land Pesticide Management Plans (PMPs). A plant must be either a listed Noxious Weed (under the [Weed Control Act](#)) or appear in the *Forest and Range Practices Act* [Invasive Plants Regulation](#) to be treated within the 10 metre PFZ. **Hedge bindweed is not listed and therefore glyphosate and other herbicides can only be applied on hedge bindweed up to 10 metres away from the high water mark (HWM)**⁷. The 30 metre no-treatment zone around a water supply intake or well used for domestic or agricultural purposes may be reduced if the licensee or PMP holder is "reasonably satisfied" that a smaller no-treatment zone is sufficient to ensure that pesticide from the use will not enter the intake or well.

When managing hedge bindweed with herbicide in riparian areas:

- Observe and mark all PFZs while on site.
- The HWM should be determined by careful evaluation by the applicator.
- Distances in PFZs should be measured as horizontal distance.
- Herbicides restricted in a PFZ must not enter these zones by leaching (lateral mobility) through soil or by drift of spray mist or droplets.
- Treatments should be conducted when water levels are low (e.g. summer months) to reduce risk.
- Note that efficacy may be dependent on site conditions, including moisture in the soil.

⁶ The Pesticide-Free Zone (PFZ) is an area of land that must not be treated with pesticide and must be protected from pesticide moving into it, under the *Integrated Pest Management Act* and Regulation.

⁷ The High Water Mark (HWM) is defined as the visible high water mark of any lake, stream, wetland or other body of water where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed of the lake, river stream, or other body of water a character distinct from that of the banks, both in vegetation and in the nature of the soil itself. Typical features may include, a natural line or "mark" impressed on the bank or shore, indicated by erosion, shelving, changes in soil characteristics, destruction of terrestrial vegetation, or other distinctive physical characteristics. The area below the high water mark includes the active floodplain (BC Ministry of Environment, 2011).

APPLICATION METHODS

Foliar application can be undertaken by hand or backpack sprayer. Herbicide can also be painted or brushed onto the leaves (King County Noxious Weed Control Program, 2007). Application may be more effective during the flowering stage but before seeds form (The Royal Horticultural Society, 2020) (Lyons, 1998). Application during the evening is also more effective than during the day (The Royal Horticultural Society, 2020).

Where stems have twined around other plants or structures, it is possible to carefully unwind the stems and lay them on the ground prior to herbicide application to reduce non-target damage (The Royal Horticultural Society, 2020).

Re-treat regrowth as needed (King County Noxious Weed Control Program, 2007). Multi-year applications will likely be needed (Lyons, 1998).

CULTURAL: CAUTION

- **Vertical barriers** installed into the ground at high-risk locations for invasion (along garden beds, fences, hedges and other boundaries) can help prevent the spread of hedge bindweed. Use any vertical, solid barrier that can be buried at least 45 centimetres into the soil (The Royal Horticultural Society, 2020). This method will not eliminate hedge bindweed.
- **Stakes** can be installed in the spring to provide alternative structures for hedge bindweed to climb, rather than nearby plants or trees. Insert vertical gardening poles close to hedge bindweed seedlings to encourage them to grow up the poles rather than nearby plants. Stems can be left on the poles or treated later (The Royal Horticultural Society, 2020). This method can help to minimize damage to other vegetation at sites where the hedge bindweed cannot or will not be managed. This method will not eliminate hedge bindweed.

- **Grazing** opportunities are limited in urban areas due to municipal bylaws regulating agriculture animals, the high probability of interface with the public, and the damage animals could cause to riparian areas and other sensitive sites with multiple land uses. Due to these constraints and the risk to animal health, grazing is not recommended as a management option for this species in Metro Vancouver.

BIOLOGICAL: NOT AVAILABLE

There are no biological control agents currently available in BC for hedge bindweed, although some are present in BC and under investigation:

- *Charidotella sexpunctata bicolor* (previously called *Metritona bicolor*), a foliar feeding beetle, is native to southeastern Canada and the eastern United States (Province of BC, 2018). It was first reported/released in BC in 1969. Establishment has not been confirmed at historic release sites although the beetles have been found in Chilliwack and other Fraser Valley sites. No follow-up activities for this species have occurred and it is not available for distribution due to recent indication that the beetles may feed on crop plants (Province of BC, 2018). Damage from this insect appears as small holes on the leaves of hedge bindweed, where adults and larva have fed (Province of BC, 2018).
- *Deloyala guttata* (previously called *Chirida guttata*), a foliar feeding beetle, is native to eastern Canada. It was first released in BC in 1969, from native populations in Ontario. The beetles dispersed and eventually the release site was developed (Province of BC, 2015). This beetle has not established in BC (Province of BC, 2015).

CONTROL SUMMARY

The following table provides a summary and comparison of control methods for hedge bindweed.

CONTROL STRATEGY	TECHNIQUES	APPLICABLE SITE TYPE	PROS	CONS
Manual	Pulling new seedlings	Sites with plants that have at least 5-6 leaves	Selective, low risk to environment.	Labour intensive, requires many repeat treatments, may damage other plants and structures the bindweed is growing around
	Digging and removing roots	Small sites, restoration sites	Selective, low risk to environment.	Creates disturbance, labour intensive, all roots must be removed
Manual & Mechanical	Cutting	Sites where bindweed is growing around other plants, environmentally sensitive areas	Selective, low risk to environment, protects impacted plants or structures.	Requires many repeat treatments, low long-term efficacy unless combined with other methods
Mechanical	Tilling	Typically only feasible in fields, medium to large infestations, flat sites where machine access is possible	Reduces growth at heavy infestations, less labour intensive	Requires trained staff and specialty equipment, costly, damaging, non-selective, high potential for re-growth, low long-term efficacy unless combined with other methods
Chemical	Foliar application	Agricultural sites, seeds and new growth	Treatment method for plants that cannot be managed other ways, less labour intensive, treat large areas.	Herbicide resistance, unintended environmental/ health impacts, great risk for non-target damage, high public concern, requires trained staff, specialty equipment and herbicide products, weather dependent, cannot treat within PFZ
Cultural	Vertical barriers & stakes	Sites where bindweed is growing around other plants	Prevents spread and minimizes damage to other plants.	Challenging to implement around existing vegetation, requires significant follow-up, will not eliminate bindweed

Manual	Flower removal	Sites where seed production is a concern and no other methods are possible	Selective, low risk to environment, easy.	Will not impact growth of the plant
	Covering	None		Bindweed can grow through covers and complicate control efforts
	Burning	None		Not effective
Cultural	Grazing	None		Not a suitable management option for this species in Metro Vancouver
Biological	No biological control agents are currently available for distribution in British Columbia			

CONTROL SUMMARY COLOUR LEGEND

GREEN: RECOMMENDED

ORANGE: CAUTION

RED: NOT RECOMMENDED OR NOT AVAILABLE



CREDIT: ISCMV

Disposal

ON SITE DISPOSAL

Do not dispose of hedge bindweed in backyard composters or piles, as it can resprout from fragments (King County Noxious Weed Control Program, 2007).

Hedge bindweed is sensitive to drying; size of fragments, temperature and humidity will impact the drying of the rhizomes (Rask & Andreasen, 2007). Rhizome fragments left exposed onsite should be untouched for at least 96 hours prior to disposal (Rask & Andreasen, 2007).

For large contiguous infestations of hedge bindweed or agricultural settings, in situ burial may be possible. Bury fragments in the ground 10 centimetres or more to reduce regrowth (Rask & Andreasen, 2007). Cutting rhizomes into smaller pieces before burial delays regrowth from the fragments (Rask & Andreasen, 2007).

OFF SITE DISPOSAL

When disposed off site, all plant parts should be tarped or placed in thick plastic bags before transporting to an appropriate disposal or compost facility. In the Metro Vancouver region, several facilities accept hedge bindweed plants and/or infested soil. Please consult [this disposal facility list](#) for current details.

PLEASE CONTACT ALL FACILITIES BEFOREHAND TO CONFIRM THEY CAN PROPERLY HANDLE THE MATERIAL.

CLEANING AND DISINFECTION⁸

Before leaving a site, all visible plant parts and soil from vehicles, equipment, and gear should be removed and rinsed if possible. When back at a works yard or wash station, vehicles should be cleaned and disinfected using the following steps:

- Wash with 180 °F water at 6 gpm, 2000 psi*, with a contact time of ≥ 10 seconds on all surfaces to remove dirt and organic matter such as vegetation parts or seeds. Pay special attention to undercarriages, chassis, wheel-wells, radiators, grills, tracks, buckets, chip-boxes, blades, and flail-mowing chains.
- Use compressed air to remove vegetation from grills and radiators.
- Sweep/vacuum interior of vehicles paying special attention to floor mats, pedals, and seats.
- Steam clean poor access areas (e.g., inside trailer tubes) – 200 psi @ 300 °F.
- Fully rinse detergent residue from equipment prior to leaving facility.

* Appropriate self-serve and mobile hot power-wash companies in the Metro Vancouver area include: Omega Power Washing, Eco Klean Truck Wash, RG Truck Wash, Ravens Mobile Pressure Washing, Hydrotech Powerwashing, Platinum Pressure Washing Inc, and Alblaster Pressure Washing. Wash stations should be monitored regularly for hedge bindweed growth.

⁸ Adapted from Metro Vancouver 2017 Water Services Equipment Cleaning Procedures and Inspection Protocols.

Follow-up Monitoring

Whatever control method is used, follow-up monitoring and maintenance treatments are components of an integrated management plan or approach. Since small pieces of hedge bindweed roots or rhizomes left in the soil can produce new shoots, frequently monitor management areas. Hedge bindweed can overwhelm native vegetation in as little as a few weeks (Gasior, 2020). Swiftly deal with any re-growth (Crampton, 2020) and expect a long-term commitment.

Restoration

Hedge bindweed is more likely to smother vegetation than to displace it. Restoration must include a plan for managing the hedge bindweed growing around or over top of desired vegetation as well as replacing the hedge bindweed with other species. Even if hedge bindweed is not present at the beginning of restoration activities, it could invade the site, especially where invasive blackberry is removed or disturbed (Crosby, 2018). Restoration is recommended to create competition which may suppress hedge bindweed regrowth. Due to the risk of introduction and spread, management of hedge bindweed must be carefully considered at any restoration site (Gasior, 2020).

Examples of common competitive native species prescribed in Metro Vancouver sites are summarized in the table below based on site moisture.

WET SITES	MOIST SITES	DRY SITES
SHRUBS		
Salmonberry	Salmonberry	Thimbleberry
Hardhack	Willow	Nootka rose
Willow	Red osier dogwood	Red flowering currant
Red osier dogwood	Red elderberry	Snowberry
Pacific ninebark	Vine maple	Tall Oregon grape
	Indian plum	Oceanspray
TREES		
Western red cedar	Western red cedar	Douglas-fir
Red alder	Red alder	Red alder

Replacement species should be chosen based on the ecology of the site by a qualified environmental professional. Local biologists, environmental professionals, agronomists, agrologists, native and domestic forage specialists, seed companies, and plant nurseries are all good sources for localized recommendations for regional native species and regionally adapted domestic species, based on site usage. Native grass seed mixes are also available. There are several science-based resources available to guide restoration efforts, such as the South Coast Conservation Program's [Diversity by Design](#) restoration planning toolkit.

Shrubs, herbs and groundcovers are at risk for infestation by hedge bindweed. After planting, a high level of maintenance is required to manage hedge bindweed and allow the new plants to establish (Crosby, 2018). Monthly monitoring during the growing season is recommended after restoration activities (Crosby, 2018).

Revegetation of the site to a domestic or cultured non-native plant species composition may be considered in some circumstances. Often domestic species establish faster and grow more prolifically, which aids in resisting hedge bindweed re-invasion.

Hedge bindweed sites are often found in areas with existing, or potential, wildlife populations (e.g., deer, beaver, muskrat, vole, etc.) that can damage restoration plantings. Therefore, any revegetation plan must consider impacts from wildlife and utilize appropriate mitigation measures to protect the restoration and existing native plantings (e.g., tree wrapping, exclusion caging/fencing, vole guards, etc.).



Hedge bindweed smothering a newly planted red-osier dogwood shrub at a restoration site
CREDIT: EVERGREEN

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Additional Resources

For more information please refer to the following resources.

- British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development, Invasive Alien Plant Program (IAPP). <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/reporting-invasive-species>
- E-Flora BC, an Electronic Atlas of the Plants of British Columbia. www.eflora.bc.ca/
- GrowGreen Guide. www.growgreenguide.ca
- Grow Me Instead. <http://bcinvasives.ca/resources/programs/plant-wise/>
- Pesticides and Pest Management. Province of British Columbia <https://www2.gov.bc.ca/gov/content/environment/pesticides-pest-management>

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