

Best management practices and target plant profiles Excerpt from Invasive Plants Strategy

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westvancouver

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Introduction to Schedule A

This document contains general Best Management Practices (BMPs) for the removal of invasive plant species and restoration planting. It also includes detailed BMPs for treatment of the nineteen target invasive plants for West Vancouver, as outlined in the Invasive Plants Strategy adopted in 2014. You'll find photos, how to identify the invasive plant, any related impacts, how to remove/control, and information about appropriate plants for restoration planting.

This document forms part of the District's Invasive Plants Strategy. This excerpt of that document provides the necessary information to assist residents with proper identification and treatment of invasive plants. The BMPs noted in this document are approaches based on known science that result in the most effective outcome.

The Best Management Practices are based on local sources and include the latest information with regards to treatment and control of invasive plants. Note that the BMPs may be updated in the future based on monitoring local results, changes in management practices and new information learned from other agencies.

For more information, visit westvancouver.ca/invasiveplants, or contact the Parks Department at 604-925-7275/parks@westvancouver.ca.

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1.0 General Practices for Invasive Plant Removal

- Seek the assistance of a person experienced in invasive plant removal if you are uncertain about any aspect of control.
- Always wear gloves.
- Check whether any safety precautions are required unique to the plant being removed.
- Remove plants, plant parts and seeds from personal gear, clothing, pets, vehicles, and equipment.
- Avoid unloading, parking, or storing equipment and vehicles in infested areas.
- Bag or tarp plants, plant parts and seeds before transporting to recommended disposal type.
- Avoid unnecessary soil disturbance. When soil is disturbed restoration planting is often beneficial to help prevent the re-establishment of invasive plants.
- When removing invasive plants in a garden setting consider native plant replacement options as well as recommended non-native plants.
- Recommended treatment timing is approximate and will vary year to year depending on weather. It is best to avoid treatment once fruit or seeds appear.
- Avoid the removal of any invasive plant species that may be used for bird nesting during the nesting season, March 15 to August 15 (e.g. blackberry species, English ivy, etc.).

2.0 General Practices for Restoration Planting

- Seek the assistance of a person experienced in ecosystem restoration if you are uncertain about any aspect of restoration.
- Follow the same precautions outlined above in section 1.0 to avoid spreading invasive plants.
- Growing conditions vary within the District. It is critical to select ecologically appropriate plant species for the site. Sun exposure and moisture preference are particularly important.
- Native plants should never be taken from a park or natural area (i.e. disturbing one area to restore another).
- Plant material should conform to the B.C. Landscape Standards for container grown stock.
- To increase survival rates, planting is best carried out during cool, moist seasons: late fall to early spring.
- If possible avoid bringing in soil. There is a very high likelihood that imported soil will be contaminated with invasive plants.
- Avoid soil disturbance. If there is a risk of soil erosion, apply a fiber mat (such as co-co matting), straw or mulch (non-cedar chipped woody material). Within a riparian area, erosion prevention measures such as silt fencing may be necessary to prevent sediment from entering the watercourse.
- Carry out follow-up monitoring and maintenance multiple times per year until the native plant community has successfully established and invasive plants no longer pose a threat.
- Besides planting native plants such as those recommended in the next section, consider planting native tree species (e.g. red alder, black cottonwood, Douglas-fir, western redcedar, and Sitka spruce).

3.0 Target Plant Profiles and Species Specific Best Management Practices

Plants are in alphabetical order by common name. The moisture preference of native plants recommended for restoration sites is denoted by: D – Dry; M – Moist; W – Wet.

All information has been compiled from the sources listed below unless otherwise cited. For further information, visit the West Vancouver Invasive Plants website.

- BC Parks & Invasive Species Council of BC (ISCBC) “Best Practices for Invasive Plants in Parks and Protected Areas of British Columbia” 2011 (bcinvasives.ca/resources/publications)
- ISCBC “Grow Me Instead” Booklet 2011 Version 2 (bcinvasives.ca/resources/publications)
- ISCBC T.I.P.S. sheets (www.bcinvasives.ca/resources/outreach-materials/invasive-plants-tips)
- Invasive Species Council of Metro Vancouver (ISCMV) website (www.iscmv.ca)
- BC Ministry of Agriculture - Weeds BC website (www.weedsbc.ca)

Staying current

It is important to update these Best Management Practices based on monitoring results at local sites, changes in management practices and new information learned from other agencies.

Blackberry species

Himalayan blackberry

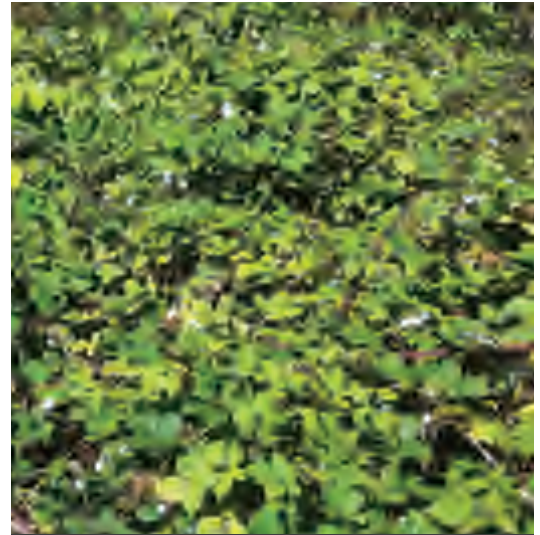
Rubus armeniacus
(syn. *Rubus discolor*)

Evergreen/cutleaf blackberry

Rubus laciniatus



Invasive Species Council of Metro Vancouver



F. Steele, DHC

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Evergreen, trailing shrub growing to 3 m tall and 12 m long</p> <p>Flowers: Small, white to pinkish, 5-petalled, in clusters of 5-20</p> <p>Fruit: Black, shiny, hairless to 2 cm in diameter, ripen from mid-summer to fall</p> <p>Leaves: Large, rounded or oblong, toothed leaflets</p> <p>Stem: Robust, stiff canes with large, flattened prickles. First year canes can root from the tips to produce daughter plants.</p> <p>Location: Roadsides, riparian areas, forest edges, agricultural areas, disturbed areas. Prefers full sun.</p>	<p>Forms dense, impenetrable thickets which displace native vegetation. Can prevent establishment of native shrub and trees species.</p> <p>Limits movement of large animals and reduces access for recreation. Reduces sight lines along roadways and trails.</p> <p>Thickets along stream banks can increase flood and erosion potential.</p>	<p>Cut or mow above-ground stems; use a Pulaski, mattock or backhoe to remove as much root as possible. Remaining root fragments will re-sprout. Mulching can reduce regrowth.</p> <p>Timing: Avoid treatment once fruit appears to prevent further spread.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least twice annually for re-growth and new seedlings.</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites:</p> <ul style="list-style-type: none"> Red-flowering currant (D) <i>Ribes sanguineum</i> Nookta rose (D-M) <i>Rosa nutkana</i> Thimbleberry (D-M) <i>Rubus parviflorus</i> Snowberry (D-M) <i>Symphoricarpos albus</i> Salmonberry (M-W) <i>Rubus spectabilis</i> Vine maple (M) <i>Acer circinatum</i> <p>Additional Alternatives for Gardens:</p> <ul style="list-style-type: none"> Marionberry or Boysenberry <i>Rubus</i> 'Marion' or 'Boysen' Red raspberry <i>Rubus idaeus</i> hybrids Huckleberry <i>Vaccinium parvifolium</i>, <i>V. membranaceum</i> or <i>V. ovatum</i>

Butterfly bush
Buddleja davidii



F. Steele, DHC



F. Steele, DHC

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Lanky shrub growing up to 5 m tall</p> <p>Flowers: Lilac, purple, white or pink with a yellow to orange centre, growing in long, cone-shaped, drooping clusters; blooming in summer</p> <p>Leaves: Opposite, lance shaped; green above, grey and wooly below</p> <p>Stem: Woody</p> <p>Location: Riparian areas, forest edges, roadsides, disturbed areas, gardens</p>	<p>Forms dense, shrubby thickets which displace native vegetation. This includes sensitive and rare ecosystems such as stream banks and rock/lichen plant communities.</p> <p>Can supplant other plants as a nectar source, reducing the pollination of native plant species.¹²</p> <p><small>¹² Washington Invasive Species Council www.invasivespecies.wa.gov/priorities/butterfly_bush.shtml</small></p>	<p>Cut back branches and dig out entire root. Use saw to cut larger plants as close to ground as possible. If roots aren't removed, stump may sprout and require repeat cutting treatment to exhaust the plant. Bag seed and flower heads to avoid spread.</p> <p>Timing: November to May is best to avoid spreading seed.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least once annually for re-growth and new seedlings.</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites:</p> <ul style="list-style-type: none"> Red-flowering currant (D) <i>Ribes sanguineum</i> Saskatoon berry (D) <i>Amelanchier alnifolia</i> Lewis's mock orange (D) <i>Philadelphus lewisii</i> <p>Additional Alternatives for Gardens:</p> <ul style="list-style-type: none"> Meyer lilac <i>Syringa meyeri</i> California lilac <i>Ceanothus spp.</i> and hybrids <p>There are dozens of alternative non-invasive plants that will attract butterflies.¹³</p> <p><small>¹³ Butterflies and How to Attract Them. Washington Department of Fish and Wildlife wdfw. wa.gov/living/butterflies/butterflies.pdf</small></p>

Cherry laurel
(English laurel,
common laurel)
*Prunus
lauracerasus*



F. Steele, DHC



R. Vidéki, Doronicum Kft, Bugwood.org

How to Identify

Size: Evergreen shrub to medium sized tree, growing 5-15 m tall

Flowers: 1 cm across with five creamy-white petals; part of a narrow cluster of a 30-40 flowers; blooming in early spring to in early summer

Fruit: Small cherry 1-2 cm across, turning black when ripe in early autumn

Leaves: Dark green, leathery, shiny, with a finely toothed serrated margin. May have almond scent when crushed.

Stem: Woody

Location: Forested areas, gardens; shade tolerant

Danger/Impact

Its rapid growth, evergreen habit and tolerance of drought and shade allow it to out-complete native vegetation on the forest floor.

Seeds are spread by bird droppings.

How to Remove/Control

Cut back branches and dig out entire root. Use saw to cut larger plants as close to ground as possible. If roots aren't removed, stump will sprout and require repeat cutting treatment to exhaust the plant.

Caution: The berries, leaves and bark are all poisonous if consumed.

Timing: December to June is best to avoid spreading fruit/seed.

Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.

Follow-up: Monitor at least once annually for re-growth and new seedlings.

Restoration and Planting Alternatives

If soil disturbance occurs, plant shade tolerant native plants including:

Native Plants for Restoration Sites:

Red elderberry (M-W)
Sambucus racemosa

Salmonberry (M-W)
Rubus spectabilis

Vine maple (M)
Acer circinatum

Dull Oregon grape (D-M)
Mahonia nervosa

Additional Alternatives for Gardens:

Hick's Yew
Taxus x media 'Hicksii'

Cedar species
Thuja plicata or occidentalis

Mexican mock orange
Choisya species

Evergreen huckleberry
Vaccinium ovatum

**Clematis – old man’s beard
(traveller’s joy)
*Clematis vitalba***



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District of West Vancouver

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Perennial, climbing vine to 30 m long.</p> <p>Flowers: Small, greeny-white, scented flowers</p> <p>Fruit/Seed: Tiny fruits have long, silky appendages. Together they form a white, fluffy ball.</p> <p>Leaves: Opposite, lance-shaped, pale green</p> <p>Stem: Woody</p> <p>Location: Forested areas, gardens</p>	<p>Can girdle trees and can cause branch or tree failure by forming heavy mats in the canopy.</p>	<p>Cut stems at ground leaving vines and foliage to die. Roots are shallow and can be pulled.</p> <p>Timing: No restriction on timing, however dormant clematis can be easier to spot from November to March when other trees and shrubs have dropped their leaves.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least once annually for re-growth and new seedlings.</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites: Typically restoration is not needed after removal of a clematis vine.</p> <p>If significant tree damage has occurred, replace with a native tree species (e.g. red alder, black cottonwood, Douglas-fir, western redcedar, Sitka spruce).</p> <p>Alternatives for Gardens: Other clematis species <i>Clematis spp.</i></p> <p>Honeysuckle <i>Lonicera ciliosa</i></p>

English holly
Ilex aquifolium



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How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Large, evergreen shrub, growing up to 25 m tall</p> <p>Flowers: Small, white, 4-lobed</p> <p>Fruit: Reddish orange berries on female plants</p> <p>Leaves: Evergreen, oval, shiny with 3-5 sharp spines on each side</p> <p>Stem: Woody</p> <p>Location: Forested areas, gardens; shade tolerant</p>	<p>Forms dense, shrubby thickets which displace native vegetation on the forest floor. Suppresses native plant germination by dominating water and nutrient consumption.</p> <p>Seeds are spread by bird droppings.</p>	<p>Cut back branches and dig out entire root. Use saw to cut larger plants as close to ground as possible. Stump may sprout and require repeat cutting treatment to exhaust the plant. Bag seed and flower heads to avoid spread.</p> <p>Timing: Avoid treatment once fruit appears.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least once annually for re-growth and new seedlings.</p>	<p>If soil disturbance occurs, plant shade tolerant native plants including:</p> <p>Native Plants for Restoration Sites:</p> <ul style="list-style-type: none"> Salmonberry (M-W) <i>Rubus spectabilis</i> Red elderberry (M-W) <i>Sambucus racemosa</i> Vine maple (M) <i>Acer circinatum</i> Dull Oregon grape (D-M) <i>Mahonia nervosa</i> <p>Additional Alternatives for Gardens:</p> <ul style="list-style-type: none"> Meserve hollies <i>Ilex x meserve</i> San Jose holly <i>Ilex x aquipernyi</i> Evergreen huckleberry <i>Vaccinium ovatum</i>

English ivy
Hedera helix



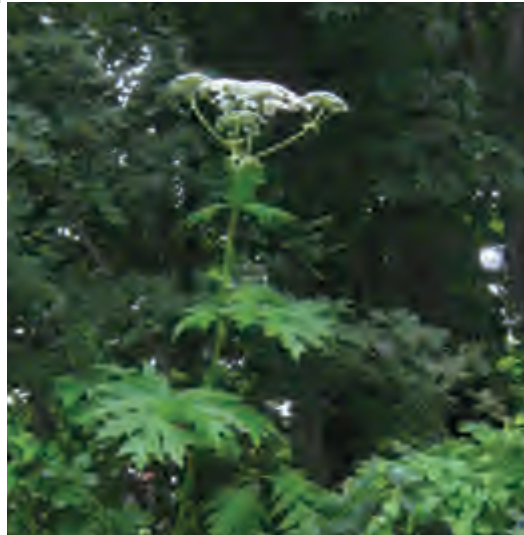
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How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Evergreen, creeping vine, up to 30 m long</p> <p>Flowers: Small, greenish-yellow, 3-5 cm diameter</p> <p>Leaves: Waxy, 5-10 cm in length; juvenile leaves 5 lobed, adult leaves unlobed</p> <p>Stem: Woody, often covered in root hairs</p> <p>Location: Forested areas, gardens; shade tolerant</p>	<p>Rapidly displaces native vegetation, forming dense carpets on forest floor.</p> <p>Can girdle trees and can cause tree failure by forming heavy mats in the canopy.</p> <p>Can accelerate deterioration of manmade structures.</p>	<p>Hand pull. Ivy climbing a tree should be a priority for removal. Cut stems around tree trunk at breast height and pull back from tree base.</p> <p>Caution: Do not pull ivy from high sections on trees as this may pull down large tree branches.</p> <p>Timing: No restriction on timing, however ivy is easiest to spot from November to March when other trees and shrubs have dropped their leaves.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: If removing an entire patch, monitor at least once annually for re-growth and new seedlings.</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites:</p> <ul style="list-style-type: none"> Salal (D) <i>Gaultheria shallon</i> Kinnikinnick (D) <i>Arctostaphylos uva-ursi</i> Sword fern (M-W) <i>Polystichum munitum</i> Salmonberry (M-W) <i>Rubus spectabilis</i> Piggy-back plant (M-W) <i>Tolmiea menziesii</i> <p>Additional Alternatives for Gardens:</p> <ul style="list-style-type: none"> Purple wintercreeper euonymus <i>Euonymus fortunei</i> 'Coloratus' Taiwan creeping raspberry <i>Rubus pentalobus</i> Privet honeysuckle <i>Lonicera pileata</i> Bunchberry <i>Cornus canadensis</i>

Giant hogweed
Heracleum mantegazzianum



F. Steele, DHC



F. Steele, DHC

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Very large, up to 5 m tall</p> <p>Flowers: White flowers in umbrella-shaped heads up to 1.5 m in diameter; may start blooming in June</p> <p>Leaves: Shiny, large with coarse, jagged edges, cut into 3 large segments</p> <p>Stem: Hollow, reddish-purple blotches, streaks, or spots, and stiff bristly hairs</p> <p>Mistaken Identity: Often confused with native cow parsnip which is smaller to 2.5 m tall¹⁴</p> <p>Location: Riparian areas, roadsides, agricultural land, disturbed areas</p> <p>¹⁴ Giant hogweed or cow parsnip? www.strathcona.ca/departments/transportation-and-agriculture-services/agriculture-services/weeds/giant-hogweed-or-cow-parsnip/</p>	<p>Very dangerous to human health. Sap causes extreme skin dermatitis in the presence of sunlight. Contact can lead to welts, rashes, blistering and scarring. If sap gets into the eyes, it can lead to temporary or permanent blindness.¹⁵</p> <p>Displaces native vegetation and reduces suitable habitat for wildlife.</p> <p>Produces copious seeds (100,000 seeds per plant). Dense taproot will keep producing leaves.</p> <p>¹⁵ Work Safe BC Toxic Plant Warning for giant hogweed: www.worksafebc.com/publications/health_and_safety/bulletins/toxic_plants/assets/pdf/tp0602.pdf</p>	<p>Due to health risk, best removed by a professional. If attempting removal yourself, cut the root crown 8-10 cm below soil with a sharp blade. Pesticides may be used in certain situations where BMPs indicate that either a) the invasive plant is more harmful to the environment than the use of pesticides or b) other control methods are not effective, feasible or are considered to be more harmful to the environment than the use of pesticides.</p> <p>Caution: Wear protective water proof clothing, gloves and safety goggles. Bag plant and seed heads in garbage bag to avoid spread and contact during handling/transport.</p> <p>Timing: April to September (before plant goes dormant).</p> <p>Disposal: Do not compost. Do not put in green waste container. Dispose in landfill. Cut material can be left on site to decompose if there is no risk of contact for three weeks AND there are no seeds.</p> <p>Follow-up: Monitor every six weeks until no re-growth or new seedlings appear (seed bank lasts several years).</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites: Red elderberry (M-W) <i>Sambucus racemosa</i></p> <p>Vine maple (M) <i>Acer circinatum</i></p> <p>Salmonberry (M-W) <i>Rubus spectabilis</i></p> <p>Additional Alternatives for Gardens: Blue elderberry <i>Sambucus cerulean</i></p> <p>Ligularia <i>Ligularia dentate</i></p> <p>Rodgersia <i>Rodgersia spp.</i></p> <p>Shieldleaf Rodgersia <i>Astilboides tabularis</i></p>

Gorse
Ulex europaeus



District of West Vancouver



District of West Vancouver

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Evergreen shrub 1-3 m tall</p> <p>Flowers: Small, bright yellow, pea-like</p> <p>Fruit/Seeds: Flattened, dark, hairy pods, 10-20 mm long</p> <p>Leaves: Evergreen, alternate; leaflets arranged in threes on young plants but reduced to stiff scales or spines when mature</p> <p>Stem: Single, densely branched, upright</p> <p>Mistaken Identity: Resembles Scotch broom but Scotch broom has no spines</p> <p>Location: Dry, open clearings, roadsides, coastal bluffs, agricultural areas, disturbed areas</p>	<p>Forms dense, shrubby thickets which displace native vegetation. Serious threat to sensitive and rare ecosystems such as rock/lichen plant communities. Impedes native shrub and tree regeneration on logged or disturbed sites.</p> <p>Reduces access for recreation, and increases fire hazard.</p> <p>Spreads rapidly by exploding seed pods. Seed can be carried by sea water.</p> <p>This plant is rare in Metro Vancouver therefore early detection and eradication is critical to prevent establishment. One patch has been observed in the median at the Horseshoe Bay Ferry Terminal.</p>	<p>Dig young plants in loose soil removing entire root. Cut back large plants as close to ground as possible. Incomplete pulling or cutting can stimulate root fragments to re-sprout. Stump may sprout and require repeat cutting treatment to exhaust the plant.</p> <p>Caution: Sharp spines can puncture tires and skin.</p> <p>Timing: Avoid treatment once seed pods appear to prevent further spread.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least twice annually until no re-growth or new seedlings appear (seed bank lasts 25-40 years).</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites: Red-flowering currant (D) <i>Ribes sanguineum</i></p> <p>Nootka rose (D-M) <i>Rosa nutkana</i></p> <p>Snowberry (D-M) <i>Symphoricarpos albus</i></p> <p>Thimbleberry (D-M) <i>Rubus parviflorus</i></p> <p>Additional Alternatives for Gardens: Shrubby cinquefoil <i>Dasiphora (Potentilla) fruticosa</i></p> <p>Forsythia <i>Forsythia</i> hybrids</p> <p>Deciduous yellow azalea <i>Rhododendron luteum</i></p> <p>Japanese kerria <i>Kerria japonica</i> 'Pleniflora</p>

Goutweed
Aegopodium podgaria



F. Steele, DHC



F. Steele, DHC

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Perennial, growing to 70 cm tall</p> <p>Flowers: White flowers in umbrella-shaped heads up to 10 cm in diameter, blooming in late spring, throughout summer</p> <p>Leaves: Broad, toothed; solid green or variegated (white and green)</p> <p>Stem: Erect, hollow, grooved</p> <p>Location: Forested areas, riparian areas, roadsides, disturbed areas adjacent to residential gardens; shade tolerant</p>	<p>Displaces native vegetation, forming dense colonies in understory.</p> <p>Commonly dumped illegally. Grown as a garden ground cover which spreads into adjacent natural areas.</p>	<p>Dig plant removing as much root as possible. Take care to remove all plant parts as fragments will re-sprout. Cover treatments of black plastic (for two growing seasons) or thick cardboard and mulch are effective.</p> <p>Timing: Any time during growing season as spread is primarily through vegetative means not by seed. Targeting the plant in early spring and again in late spring is optimal to exhaust the plant.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least twice annually for re-growth and new seedlings.</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites:</p> <ul style="list-style-type: none"> Sword fern (M-W) <i>Polystichum munitum</i> Piggy-back plant (M-W) <i>Tolmiea menziesii</i> Salmonberry (M-W) <i>Rubus spectabilis</i> Wild ginger (M) <i>Asarum caudatum</i> <p>Additional Alternatives for Gardens:</p> <ul style="list-style-type: none"> Hostas <i>Hosta spp.</i> and hybrids Barrenwort <i>Epirhedium spp.</i> and hybrids Yerba Buena <i>Clinopodium douglasii</i> Alumroot <i>Heuchera</i> hybrids Woodland strawberry <i>Fragaria vesca</i>

Hawkweed – orange
Hieracium aurantiacum



Invasive Species Council of Metro Vancouver



M. Shephard, USDA Forest Service, Bugwood.org

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Small perennial herb, up to 30 cm tall</p> <p>Flowers: Bright orange clusters atop slender branch stems</p> <p>Leaves: Hairy on both sides, arranged in rosette at base of stem</p> <p>Stem: Single, unbranched, leafless, covered with bristly black hairs</p> <p>Location: Meadows, open areas, disturbed sites (roadsides, ski runs, clearings)</p>	<p>Displaces native vegetation, forming dense carpets. This may include sensitive and rare ecosystems such rock/lichen plant communities and alpine meadows.</p> <p>Reduces grazing habitat as it has no food value to wildlife.</p> <p>New to Metro Vancouver, found primarily along Highway 1 and ski runs in West Vancouver.</p> <p>Spreads by seed, roots and above ground runners. Can be spread by contaminated soil and hay.</p>	<p>This plant is new to Metro Vancouver. Contact the ISCMV for further information as they have prioritized treatment and have been treating the plant at Cypress Provincial Park. If growing in a garden setting, dig plant, removing as much root as possible. Take care to remove all plant parts as fragments will re-sprout.</p> <p>Timing: Avoid treatment once seed appears to prevent further spread.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least once annually for re-growth and new seedlings.</p>	<p>Plant native or non-invasive species including:</p> <p>Native and Non-Native Alternatives for Gardens:</p> <p>Arkwright’s campion <i>Lychnis x awkwrightii</i></p> <p>Pinks andampions <i>Dianthus spp.</i> and hybrids</p> <p>Alpine aster <i>Aster alpinus subsp. vierhapperi</i></p> <p>Heart-leaved arnica <i>Arnica cordifolia</i></p> <p>Blanket flower <i>Gaillardia aristata</i></p>

Knotweed species

Bohemian, Giant, Japanese and Himalayan knotweed

Fallopia x bohemica
Fallopia sachalinensis
Fallopia japonica
Polygonum polystachyum



F. Steele, DHC



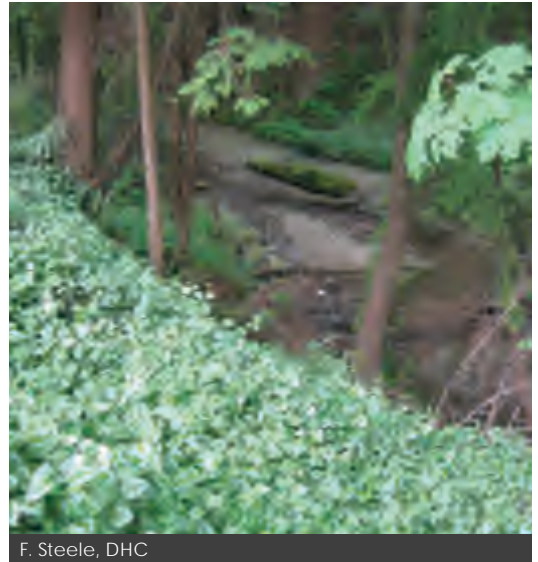
District of West Vancouver

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Large, woody bamboo-like shrubs, 1-5 m tall</p> <p>Flowers: Small, white/green in plume-like clusters</p> <p>Leaves: Variable. Japanese: spade-shaped; Giant: larger, heart-shaped; Bohemian: hybrid of Japanese and Giant; Himalayan: lance-shaped, pointy. Leaves appear in zigzag pattern along stems.</p> <p>Stem: reddish-brown, hollow</p> <p>Location: Riparian areas, roadsides, disturbed sites, landscapes. Will grow almost anywhere.</p>	<p>Forms dense, impenetrable thickets which displace native vegetation.</p> <p>Dominates stream banks, increasing erosion potential.</p> <p>Degrades wildlife and fish habitat.</p> <p>Reduces access for recreation. Reduces sight lines along roadways and trails.</p> <p>Able to grow through cement, house foundations and walls.</p> <p>Spreads prolifically by root and stem segments. Fragments float downstream to form new infestations.</p> <p>Extensive root system capable of re-sprouting even after many years of control.</p>	<p>Do not treat manually. Manual treatment is ineffective and may cause further spread. Should be removed by a professional using pesticide application. Live knotweed should not be cut as this method is ineffective and disposal results in a high likelihood of spread during transport.</p> <p>Timing: Pesticide treatment occurs during the growing season and is most effective in late summer. Plant is dormant during the winter.</p> <p>Disposal: Pesticide killed material can be left on site to decompose. Cut material can be placed in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least twice annually. Continue monitoring for several years even after no re-growth appears.</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites: Salmonberry (M-W) <i>Rubus spectabilis</i></p> <p>Red-osier dogwood (W) <i>Cornus stolonifera</i></p> <p>Willow species (W) <i>Salix spp.</i></p> <p>Snowberry (D-M) <i>Symphoricarpos albus</i></p> <p>Native tree species (e.g. red alder, black cottonwood, Douglas-fir, western redcedar, Sitka spruce)</p> <p>Additional Alternatives for Gardens: Black elderberry <i>Sambucus racemosa var. melanocarpa</i></p> <p>Peegee hydrangea <i>Hydrangea paniculata</i> 'Grandiflora'</p> <p>False Solomon's seal <i>Maianthemum (Smilacina) racemosum subsp. amplexicaule</i></p>

Lamium – yellow archangel
Lamium galeobdolon



erbe.altervista.org



F. Steele, DHC

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Evergreen, low-growing vine</p> <p>Flowers: Bright yellow, blooming in spring</p> <p>Leaves: Heart-shaped, serrated; upper sides often have silver/white pattern and wrinkly texture</p> <p>Stem: Square shaped, hairy</p> <p>Location: Riparian areas, forested areas, gardens; shade tolerant; often associated with garden waste dump sites and garden edges</p>	<p>Rapidly displaces native vegetation, forming dense carpets in understory. Roots can strangle other plants.</p> <p>Commonly dumped illegally from spent hanging baskets. Also grown as a garden ground cover which spreads into adjacent natural areas.</p> <p>Can produce copious seeds that are dispersed primarily by ants.</p>	<p>Repeated mechanical removal can be done by pulling above ground portion and digging as much root as possible. Remaining root fragments will re-sprout. Cover treatments (black plastic or thick layers of cardboard and mulch) may be effective. Pesticides may be used in certain situations where BMPs indicate that either a) the invasive plant is more harmful to the environment than the use of pesticides or b) other control methods are not effective, feasible or are considered to be more harmful to the environment than the use of pesticides.</p> <p>Timing: Any time of year. Avoid large stream-side removals during rainy months where erosion is a concern.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least twice annually for re-growth and new seedlings.</p>	<p>Heavily mulch site after pulling. Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites:</p> <ul style="list-style-type: none"> Salmonberry (M-W) <i>Rubus spectabilis</i> Sword fern (M-W) <i>Polystichum munitum</i> Piggy-back plant (M-W) <i>Tolmiea menziesii</i> Dull Oregon grape (D-M) <i>Mahonia nervosa</i> Kinnikinnick (D) <i>Arctostaphylos uva-ursi</i> <p>Additional Alternatives for Gardens:</p> <ul style="list-style-type: none"> Hostas <i>Hosta spp.</i> and hybrids Barrenwort <i>Epirnedium spp.</i> and hybrids Yerba Buena <i>Clinopodium douglasii</i> Alumroot <i>Heuchera</i> hybrids Bunchberry <i>Cornus canadensis</i>

Periwinkle
Vinca minor
Vinca major



City of Surrey



F. Steele, DHC

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Evergreen, low-growing herb with trailing stems</p> <p>Flowers: Blue to purple, blooming in spring and intermittently through summer</p> <p>Leaves: Shiny, dark leaves, opposite and oval shaped, 2-3 cm long</p> <p>Stem: Slender, somewhat woody, green</p> <p>Location: Riparian areas, forested areas, gardens. Often originates in residential gardens. Prefers shade.</p>	<p>Displaces native vegetation, forming dense carpets in understory.</p> <p>Commonly dumped illegally. Grown as a garden ground cover which spreads into adjacent natural areas.</p>	<p>Pull the above ground portion and dig entire root.</p> <p>Timing: Any time of year. Avoid large stream-side removals during rainy months where erosion is a concern.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least once annually for re-growth and new seedlings.</p>	<p>Heavily mulch site after pulling. Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites:</p> <ul style="list-style-type: none"> Salmonberry (M-W) <i>Rubus spectabilis</i> Sword fern (M-W) <i>Polystichum munitum</i> Dull Oregon grape (D-M) <i>Mahonia nervosa</i> Piggy-back plant (M-W) <i>Tolmiea menziesii</i> Kinnikinnick (D) <i>Arctostaphylos uva-ursi</i> <p>Additional Alternatives for Gardens:</p> <ul style="list-style-type: none"> Hostas <i>Hosta spp.</i> and hybrids Barrenwort <i>Epirhedium spp.</i> and hybrids Yerba Buena <i>Clinopodium douglasii</i> Alumroot <i>Heuchera</i> hybrids Woodland strawberry <i>Fragaria vesca</i>

Policeman's helmet
(Himalayan balsam)
Impatiens glandulifera



F. Steele, DHC



F. Steele, DHC

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Annual herb, growing 1-2 m tall. Emits a strong, sweet, gasoline-like smell.</p> <p>Flowers: Showy white, pink or reddish flowers shaped like an English policeman's helmet</p> <p>Leaves: Smooth, egg-shaped clustered in groups of 3-5; toothed edges</p> <p>Stem: Upright, hollow, smooth and purple-tinged</p> <p>Location: Riparian areas, roadsides, forest edges, and gardens</p>	<p>Displaces native vegetation, forming dense colonies in riparian areas. Increases erosion potential when it dies back in the winter.</p> <p>Seed capsules explode at maturity launching seed up to 5 meters from the plant. Seed can travel by water.</p>	<p>Hand pull from base of plant prior to seed set. Where there is risk of stream bank erosion, cut plant at base to avoid soil disturbance.</p> <p>Timing: Spring. Avoid treatment once seeds appear to prevent further spread. Seeds can start as early as June.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least once annually for new seedlings (seeds last for 18 months).</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites:</p> <ul style="list-style-type: none"> Salmonberry (M-W) <i>Rubus spectabilis</i> Sword fern (M-W) <i>Polystichum munitum</i> Red elderberry (M-W) <i>Sambucus racemosa</i> Red-osier dogwood (W) <i>Cornus stolonifera</i> Willow species (W) <i>Salix spp.</i> <p>Additional Alternatives for Gardens:</p> <ul style="list-style-type: none"> Cardinal flower <i>Lobelia cardinalis</i> Beard-tongue <i>Penstemon barbatus</i> Wild bleeding heart <i>Dicentra formosa</i> Red columbine <i>Aquilegia formosa</i> Pink monkey flower <i>Mimulus lewisii</i>

Purple loosestrife
Lythrum salicaria



F. Steele, DHC



R. Westbrook, US Geological Survey

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Perennial herb, growing to 3m tall</p> <p>Flowers: Purple-magenta spikes, blooming from July to October</p> <p>Leaves: Opposite to whorled, dark green, lance-shaped</p> <p>Stem: Stiff, smooth, square, woody</p> <p>Mistaken Identify: Can be confused with native fireweed but purple loosestrife does not produce windborne seeds. Loosestrife more common in wetlands and moist areas</p> <p>Location: Non-forested wetlands and riparian areas, disturbed wet soil areas (including roadsides ditches), gardens.</p>	<p>Aggressively invades wetland areas displacing native vegetation.</p> <p>Plant roots can alter waterways.</p> <p>Reduces food sources for wildlife.</p> <p>Each plant can produce up to 2.5 million seeds. Can also reproduce by root fragments.</p>	<p>Pull from base of plant, taking care to remove all rhizomes. Small patches can be dug. Remaining root fragments will re-sprout. Biological control (Galerucella beetle) of large infestations is relatively successful but may require ongoing, repeat introductions and will not lead to eradication.</p> <p>Timing: July to August when plant is blooming (and therefore clearly visible) but prior to seeds appearing.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least once annually for re-growth and new seedlings. Eradication of large infestations is unlikely but repeated annual treatment will contain the plant at lower levels.</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites:</p> <ul style="list-style-type: none"> Hardhack (W) <i>Spiraea douglasii</i> Red-osier dogwood (W) <i>Cornus stolonifera</i> Willow species (W) <i>Salix spp.</i> Pacific ninebark (M-W) <i>Physocarpus capitatus</i> Cattail (W) <i>Typha latifolia</i> <p>Additional Alternatives for Gardens:</p> <ul style="list-style-type: none"> Blazing star <i>Liatis spicata</i> Tall Delphinium <i>Delphinium elatum</i> Bloody iris <i>Iris sanguinea</i> Spike speedwell <i>Veronica spicata</i>

Reed canarygrass
Phalaris
arundinacea



University of Wisconsin Horticulture



N. Ali, DHC

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Grass, growing to 2 m tall</p> <p>Flowers: Dusty pink to yellow or brown flowering heads to 30 cm long, composed of many small spikelets</p> <p>Leaves: Green to yellow, broad flat leaves (up to 25 mm wide) with parallel veins</p> <p>Stem: Hollow, jointed, up to 2 m long. Typically unbranched, though new shoots may grow at leaf base.</p> <p>Location: Riparian areas, disturbed wet soil areas, (including roadsides), agricultural areas</p>	<p>Aggressively invades riparian areas displacing native vegetation. Forms dense stands.</p> <p>Reduces wildlife habitat value.</p>	<p>Cut or mow plants regularly and frequently to prevent seed production and weaken root reserves. Rhizomes are very difficult to pull and remaining fragments will readily sprout. Digging may damage sensitive riparian areas.</p> <p>Disposal: Can be left on site to decompose.</p> <p>Follow-up: Cut plants three times per year for minimum four years. Eradication or control of large infestations is unlikely, often unfeasible and has the potential to damage sensitive riparian areas.</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites:</p> <p>Hardhack (W) <i>Spiraea douglasii</i></p> <p>Red-osier dogwood (W) <i>Cornus stolonifera</i></p> <p>Willow species (W) <i>Salix spp.</i></p> <p>Pacific ninebark (M-W) <i>Physocarpus capitatus</i></p> <p>Cattail (W) <i>Typha latifolia</i></p>

Scotch broom
Cytisus scoparis



District of West Vancouver



District of West Vancouver

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Evergreen shrub, growing 3 m tall</p> <p>Flowers: Yellow, pea-like, sometimes for red markings</p> <p>Fruit/Seeds: Flat pods with fine hairs on edges</p> <p>Leaves: Lower leaves stalked and have three leaflets. Upper leaves simple and un-stalked.</p> <p>Stem: Five-angled, ridged, woody, brown to green</p> <p>Location: Roadsides, disturbed areas, dry areas; mainly found in non-forested sites</p>	<p>Forms dense colonies which displace native vegetation. Serious threat to sensitive and rare ecosystems such as rock/ lichen plant communities. Produces a toxic substance that prevents other plants from establishing.</p> <p>Limits movement of large animals and reduces access for recreation. Reduces sight lines along roadways and trails.</p> <p>Increases fire hazard.</p>	<p>Pull small plants when soil is moist, ensuring all root is removed. Cut large plants below ground or as close to base as possible to reduce resprouting.</p> <p>Timing: May to July prior to seed ripening but during flowering season when plants are stressed.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least twice annually for re-growth and new seedlings. Seed can remain viable for at least 30 years.</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites: Nootka rose (D-M) <i>Rosa nutkana</i></p> <p>Snowberry (D-M) <i>Symphoricarpos albus</i></p> <p>Red-flowering currant (D) <i>Ribes sanguineum</i></p> <p>Thimbleberry (D-M) <i>Rubus parviflorus</i></p> <p>Red alder (D-M) <i>Alnus rubra</i> (will provide shade and competition for nitrogen to reduce broom growth)</p> <p>Additional Alternatives for Gardens: Shrubby cinquefoil <i>Dasiphora (Potentilla) fruticosa</i></p> <p>Forsythia <i>Forsythia hybrids</i></p> <p>Deciduous yellow azalea <i>Rhododendron luteum</i></p> <p>Japanese kerria <i>Kerria japonica</i> 'Pleniflora'</p>

Small flowered touch-me-not
Impatiens parviflora



F. Steele, DHC



F. Steele, DHC

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Annual herb, growing to 40 cm tall</p> <p>Flowers: Small, whitish-yellow flowers shooting from short stems at top of plant</p> <p>Leaves: Broad, toothed, veined</p> <p>Stem: Erect</p> <p>Location: Moist, forested areas; shade tolerant</p>	<p>Displaces native vegetation, forming dense colonies in understory.</p> <p>Seed capsules explode at maturity. Seed can travel by water.</p>	<p>Hand pull from base of plant prior to seed set.</p> <p>Timing: Spring. Avoid treatment once seeds appear to prevent further spread. Seeds can start as early as June.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least once annually for new seedlings.</p>	<p>Plant native or non-invasive species including:</p> <p>Native Plants for Restoration Sites:</p> <ul style="list-style-type: none"> Sword fern (M-W) <i>Polystichum munitum</i> Dull Oregon grape (D-M) <i>Mahonia nervosa</i> Piggy-back plant (M-W) <i>Tolmiea menziesii</i> Salmonberry (M-W) <i>Rubus spectabilis</i> <p>Additional Alternatives for Gardens:</p> <ul style="list-style-type: none"> Hostas <i>Hosta spp.</i> and hybrids Barrenwort <i>Epirnedium spp.</i> and hybrids Yerba Buena <i>Clinopodium douglasii</i> Alumroot <i>Heuchera</i> hybrids Woodland strawberry <i>Fragaria vesca</i> Wild ginger <i>Asarum caudatum</i>

Spurge laurel
(*Daphne laurel*)
Daphne laureola



F. Steele, DHC



F. Steele, DHC

How to Identify	Danger/Impact	How to Remove/Control	Restoration and Planting Alternatives
<p>Size: Evergreen shrub 0.5-1.8 m tall, clusters of stems</p> <p>Flowers: Fragrant, yellow, bell shaped flowers clustered at branch tips</p> <p>Fruit: Small, black berries</p> <p>Leaves: Oblong, evergreen, waxy</p> <p>Stem: Woody, upright, often branched</p> <p>Mistaken identity: closely resembles members of the Rhododendron family</p> <p>Location: Forested areas, gardens; shade tolerant</p>	<p>Displaces native vegetation and unfavourably changes the soil chemistry.</p> <p>All parts of the plant are toxic. Sap can cause skin irritation and consumption of any plant parts (including berries) can be fatal.¹⁶</p> <p>Although toxic to humans, seeds are readily eaten by birds and spread in their droppings.</p> <p><small>¹⁶ Work Safe BC Toxic Plant Warning for spurge laurel: www.worksafebc.com/publications/health_and_safety/bulletins/toxic_plants/assets/pdf/tp0601.pdf</small></p>	<p>Dig plant removing as much root as possible. A weed wrench may aid removal of larger plants. For very large clumps cut stems below the soil or as low as possible to prevent re-sprouting. Bag seeds and berries to avoid spread.</p> <p>Caution: Wear gloves and protective clothing. Do not transport in closed vehicle or burn or chip as plant can release noxious chemicals.</p> <p>Timing: Avoid treatment once fruit appears.</p> <p>Disposal: Place in municipal Green Waste Program containers for composting. Do not compost in home compost bin.</p> <p>Follow-up: Monitor at least once annually for re-growth and new seedlings.</p>	<p>If soil disturbance occurs, plant shade tolerant native plants including:</p> <p>Native Plants for Restoration Sites: Oregon grape (D-M) <i>Mahonia nervosa</i> or <i>aquifolium</i></p> <p>Red elderberry (M-W) <i>Sambucus racemosa</i></p> <p>Vine maple (M) <i>Acer circinatum</i></p> <p>Additional Alternatives for Gardens: Skimmia cultivars <i>Skimmia spp.</i></p> <p>Winter daphne <i>Daphne odora</i></p> <p>Rhododendron cultivars <i>Rhododendron spp.</i></p> <p>Huckleberry (M) <i>Vaccinium ovatum</i> (evergreen), <i>V. parvifolium</i>, or <i>V. membranaceum</i></p>