

GUIDE TO INVASIVE PLANT BEST MANAGEMENT PRACTICES FOR STANLEY PARK

The following guide is intended to provide users with a basic introduction to the most extensive species in Stanley Park, species currently expanding their range in the Park, and species that are just becoming established in Stanley Park. The guide is set up with photos, general descriptions of the plants, and information on their habitat/ ecology. Information is also provided on basic treatment options, priorities actions for Stanley Park, and potential replacement native plants for these species.

All of the information provided in this document should be considered options towards an ecological approach to invasive plant management. For example, all methods used should be of minimal disturbance to forest soils and ecosystems. Similarly, all native plant plantings that occur as a result of invasive plant removals should be appropriate for the Biogeoclimatic Zone and Site Series in Stanley Park. Furthermore, monitoring of sites on a regular basis should be considered imperative to the success of any invasive plant management plan.

English holly (*Ilex aquifolium*)

Established Species in Stanley Park Natural and Sensitive Areas:



Description

- * Broadleaf evergreen shrub/tree with prickly leaves
- * Can grow from 5 to 18 m high
- * Reddish orange berries (poisonous to humans) are found on female trees

Ecology

- * Native to Europe
- * Grows in shade or sun in well-drained soil
- * High water requirements
- * Reproduction by suckering, layering, or by seed

Removal

- * Small plants can be pulled or dug up when soil is moist.
- * Best to remove all of the plant. Cutting at the base usually results in re-sprouting from the crown, monitoring & follow up required
- * Applying herbicide to a cut stump is the most effective for large plants

Priority Actions for Stanley Park

- * Removal of plants from restoration areas. Hand-pulling for small plants, and mechanical removal for larger plants
- * Control of large, fruiting plants in other areas of the Park; control of lower branches to prevent suckering
- * Removal of holly as seen during field activities elsewhere in the Park

Suggested Alternative Plants

- * Oregon grape (*Mahonia nervosa*)
- * Tall Oregon grape (*Mahonia aquifolium*)
- * Pacific crabapple (*Malus fusca*)
- * Arbutus (*Arbutus menziesii*)

Himalayan blackberry (*Rubus discolor*)

Established Species in Stanley Park Natural and Sensitive Areas:



Description

- * An evergreen shrub with trailing, arching stems
- * Thick canes and curved thorns
- * Can grow up to 7 m in one season, forming dense thickets
- * Have 3 to 5 oval leaflets that are shiny green on top, pale green with fine hairs underneath
- * Pinkish-white flowers with 5 petals in spring; berries are red, turning a deep purple-black in mid-late summer

Ecology

- * Native to western Europe
- * Sunny to partly shady areas with rich, wet to moist soil
- * Thrives in open, disturbed areas such as roadsides and fields

Removal

- * Properly identify invasive blackberry plants; and mark any native plants in the infestations
- * Best method is to cut canes down, then remove root-crowns using a pickaxe or shovel
- * Herbicide applications can be used
- * Mechanical mowing can be used, but recommended when the plants are just beginning to flower. Should not be done on soils prone to compaction or erosion
- * Grazing by goats/ pigs is effective at removing re-growth
- * Replanting with native plants is necessary on sites where large infestations have been removed
- * Requires several years of maintenance

Priority Actions for Stanley Park

- * Hand-pulling of all noticeable invasive blackberry plants in blowdown areas
- * Removal of larger patches (late-July through early August) surrounding blowdown areas, replanting with native plants with high habitat value for wildlife
- * Control of blackberry to prevent fruiting in the Park
- * On-going monitoring of all blowdown areas and targeted regions

Suggested Replacement

- * To prevent re-invasion, replant with native shrubs (such as Salmonberry (*Rubus spectabilis*), tall Oregon grape (*Mahonia aquifolium*), etc.) appropriate to the site, and monitor re-growth.

English ivy (*Hedera helix*)

Established Species in Stanley Park Natural and Sensitive Areas



Description

- * Evergreen vine with lobed, waxy leaves featuring juvenile and mature growth forms
- * Inconspicuous white flowers ripen into hard, blackish berries on mature plants
- * Growing at roughly 1m/year, it forms thick mats which can smother other vegetation
- * Commonly seen growing up tree trunks

Ecology

- * Native to the Caucasus Mtns. in Russia
- * Shade-tolerant, but grows under a range of conditions
- * Prefers moist, nutrient rich soils

Removal

- * Pull by hand, removing the whole plant (esp. roots), mulch with 20cm of mulch following removal when possible
- * Climbing ivy is a priority for removal. Vines should be cut at breast height and removed to the ground; and the area around the tree base cleared of ivy
- * If full removal not possible on mature plants, remove flowers to prevent spread by seed
- * Herbicides not recommended due to thick leaf cuticle

Priority Actions for Stanley Park

- * Manual removal of ivy vines/ patches growing in blowdown areas, Wildlife MEA's or buffer areas
- * Target tree-climbing/ fruiting ivy plants
- * Small, isolated patches; and infestations threatening sensitive habitat

Suggested Alternative Plants:

- * Kinnikinnick (*Arctostaphylos uva-ursi*)
- * Salal (*Gaultheria shallon*)
- * Piggy-back plant (*Tolmiea menziesii*)
- * Bunchberry (*Cornus canadensis*)
- * Western honeysuckle (*Lonicera ciliosa*)

Japanese knotweed (*Polygonum spp*)*

Expanding Species in Stanley Park Natural and Sensitive Areas:



Description

- * Can grow between 1 to 5 m tall
- * Bamboo-like long, hollow stems and heart-shaped leaves
- * Forms dense thickets through extensive creeping rhizomes
- * Can grow up to 8cm per day!
- * Deep, strong rooting systems are able to break concrete

Ecology

- * Ornamental originally from eastern Asia
- * Able to grow under a range of conditions; tolerates full sunlight to semi-shade
- * Thrives in moist environments
- * In North America, the majority of reproduction occurs vegetatively. The plants can re-grow from 1cm long root-fragments; stem fragments can also take root

Removal

- * Very difficult to control using any method
- * Possible to control small stands with repeated pulling of stems (about every two weeks during the growing season) and/or covering the plants with landscape cloth
- * The most effective known method is to inject the stems with herbicide
- * Mechanical mowing is not recommended
- * Research in the UK is underway on biocontrols
- * All plant matter should be bagged, and removed from the site; incineration recommended
- * Regular monitoring during the growing season (April through September) is required... checking a radius of 9 meters around the removed areas

Priority Actions for Stanley Park

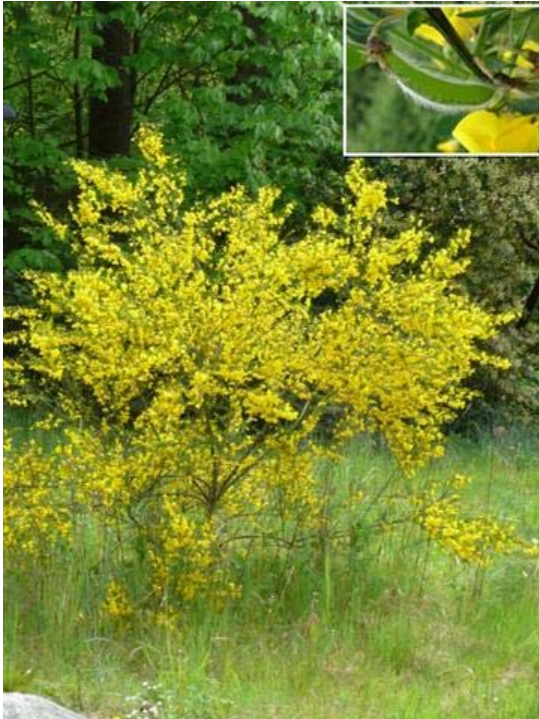
- * High priority plant for removal and eradication from the Park
- * Target smallest patches, and those in close proximity to wet or open areas first
- * Smaller and accessible patches can be dealt with through volunteer efforts

Suggested Alternative Plants

- * Red elderberry (*Sambucus racemosa*)
- * Oceanspray (*Holodiscus discolor*)
- * Mock-orange (*Philadelphus lewisii*)
- * Red-osier dogwood (*Cornus stolonifera*)
- * Thimbleberry (*Rubus parviflorus*)

Scotch broom (*Cytisus scoparius*)

Emergent Species in Stanley Park Natural and Sensitive Areas:



Description

- * A perennial, woody shrub (up to 2m tall), with green branches
- * Blooms between April and June with pea-like yellow flowers which later become seed pods
- * Seed pods are black and around 5cm long containing numerous seeds (seed producing after 3 years)
- * On a warm summer days you can often hear the seed pods popping open

Ecology

- * Native to Mediterranean areas of Europe
- * Shade intolerant, thriving in disturbed, open areas
- * Sandy, well-drained soils
- * Produces phytotoxins and acidifies soils, inhibiting growth of other/ native plants

Removal

- * Seedlings and small plants can be pulled by hand
- * Seed-producing plants should be removed before seeds set
- * Larger plants can be removed using a weed wrench or by cutting the stem below the soil and covering the cut stem/ root mass with soil
- * All removals should ensure minimal soil disturbance
- * Several bio-controls available
- * Herbicide use possible

Priority Actions for Stanley Park

- * Mature plants near blowdown areas (especially E1/E2- near the seawall and N1- beside the meadow) should be removed before seeds distributed to reforested areas
- * Other broom infestations in the Park should also be treated in the near future

Suggested Replacement

A good way to prevent re-invasion is to replant with native shrubs such as:

- * Snowberry (*Symphoricarpos albus*)
- * Saskatoon (*Amelanchier alnifolia*)
- * Nootka rose (*Rosa nutkana*)

Yellow lamium (Yellow archangel) (*Lamium galeobdolon*)

Expanding Species in Stanley Park Natural and Sensitive Areas:



Description

- * A trailing, evergreen, perennial groundcover with square stems
- * The heart-shaped leaves are typically variegated and slightly hairy
- * For a short time, it has small upright yellow flowers

Ecology

- * Very aggressive and well adapted to growing in shaded and open areas
- * Does best in moist shaded sites such as ravines
- * Seeds are typically dispersed by ants, which are attracted to the oils found in the seeds and can carry them up to 70 m from the parent plant

Removal

- * Manual removal by picking the whole plant including roots

Priority Actions for Stanley Park

- * Complete removal of patch near to E2
- * Other patches in close proximity to blowdown (such as near the hollow tree and the Children's Farmyard parking lot) should be second priority

Suggested Replacement

- * Yerba buena (*Clinopodium douglasii*)
- * Piggy-back plant (*Tolmiea menziesii*)
- * Kinnikinnick (*Arctostaphylos uva-ursi*)
- * Bunchberry (*Cornus canadensis*)

Common periwinkle (*Vinca spp*)

Emergent Species in Stanley Park Natural and Sensitive Areas:



Description

- * A perennial, evergreen herb with trailing stems
- * The shiny, dark green leaves are 2 to 3 cm long, opposite and oval shaped
- * The flowers are violet to blue in colour

Ecology

- * Native to Switzerland south to much of the Mediterranean basin and across much of north Africa
- * Grows most vigorously in moist soil with only partial sun, but it will also grow in the deepest shade, even in poor soil
- * Often found in gardens and on the edges of parks and natural spaces where garden waste is illegally dumped

Removal

- * By hand, pulling the above ground portion of the plant and digging out its roots

Priority Actions for Stanley Park

- * Removal from forested/ sensitive areas, or gardens near forested/ sensitive areas
- * Control spread into new areas by gardening staff (it is still actively used as an ornamental plant).

Suggested Replacement

- * Wild ginger (*Asarum caudatum*)
- * Smooth alumroot (*Heuchera micrantha*)
- * Piggy-back plant (*Tolmiea menziesii*)
- * Yerba buena (*Clinopodium douglasii*)

Yellow flag iris (*Iris pseudacorus*)

Expanding Wetland Species:



Description

- * A robust, clumping perennial herb
- * Can grow to 40 cm to 1.5 m tall
- * Only yellow-flowered iris found in BC's wildlands

Ecology

- * Native to Europe and the British Isles, Western Asia, North Africa, and the Mediterranean region
- * Grows in a variety of fertile wetland habitats
- * Reproduces via seed or rhizome
- * Can grow aggressively, out-competing native species and altering wetland habitat

Removal

- * Digging out plants or cutting seedpods off plants after flowering
- * Although not recommended for wetlands, spot-applications of herbicides is an option for large infestations
- * Yellow flag produces a substance in its leaves and rhizomes that can cause skin irritation, so it's important to wear gloves and cover skin when pulling, cutting, or digging

Priority Actions for Stanley Park

- * Control spread into new wetlands by gardening staff (it is still actively used as an ornamental plant).
- * Control further spread in Beaver Lake and Lost Lagoon through seed-head removal
- * Dig-out plants when possible to further control infestation

Suggested Replacement

- * Oregon iris (*Iris tenax*)
- * Wild iris (*Iris setosa*)
- * Western blue iris (*Iris missouriensis*)
- * Skunk cabbage (*Lysichiton americanum*)

Spurge laurel (*Daphne*) (*Daphne laureola*) (potentially eradicated as of July 08)

Emergent Species in Stanley Park Natural and Sensitive Areas:



Description

- * A shade tolerant shrub with oblong, evergreen leaves, yellow-green fluted flowers and small, black berries
- * Looks like it could be from the rhododendron family and is often mistaken for a native species in the local forested areas

Ecology

- * Adapted to shade and semi-shaded areas
- * Commonly found in the understorey of Douglas fir dominated forests along coastal BC

Removal

- * Pull or dig out whole plant by hand (wearing gloves)
- * Considered toxic by Worksafe BC- consult their website for more information

Priority Actions for Stanley Park

- * Remove any plants found in the Park

Suggested Replacement

- * Kinnikinnick (*Arctostaphylos uva-ursi*)
- * Salal (*Gaultheria shallon*)
- * Oregon grape (*Mahonia nervosa*)

Purple loosestrife (*Lythrum salicaria*)*

Emergent Species in Stanley Park Natural and Sensitive Areas:



Description

- * A tall perennial wetland herb
- * Has a square, woody stem with opposite, dark green, lance-shaped leaves and purple-magenta flower spikes
- * Flowers have 5 to 7 petals, which appear from July through October
- * Can grow up to 3 m tall

Ecology

- * Native to Eurasia
- * Found in wetlands such as cattail marshes, sedge meadows and open bogs
- * Occurs along stream and river banks and lake shores
- * Found in ditches and other disturbed wet soil areas
- * Able to produce over 2.5 million seeds per year

Removal

- * Plants can be removed by hand using special hooks to scoop out the roots from the muddy lakeside bottom
- * Biological control using an introduced biological control agent, the Galerucella beetle, to eat the newly produced flower and leaf buds, thereby decreasing productivity of the plants

Priority Actions for Stanley Park

- * Pull or dig-out plants in Beaver Lake and Lost Lagoon
- * Cut off flowers when not possible to remove whole plant

Suggested Replacement

- * Hardhack (*Spiraea douglasii*)
- * Large-leaved lupine (*Lupinus polyphyllus*)
- * Blazing star (*Liatris spicata*)
- * False spirea (*Astilbe arenisii*)

Giant hogweed (*Heracleum mantegazzianum*)

Emergent Species in Stanley Park Natural and Sensitive Areas:



Description

- * Perennial plant, flowering from late spring to mid summer with numerous large white flowers clustered in an umbrella-shaped head
- * Has large stem which can grow between 5 – 10 cm in diameter and is a dark reddish colour, and a deep tap-root
- * Leaves are large and jagged in shape

Ecology

- * Native to Caucasus Mtns and southwestern Asia
- * Grows in a variety of habitats especially moist areas but commonly found near streams, creeks and roads
- * Produces up to 50,000 winged seeds per year per plant

Removal

- * Phototoxic- can cause skin irritation and even blindness. Protective clothing is recommended, consult Worksafe BC for more information
- * Pull plants, ensuring full removal of roots. Easiest when soil is wet.
- Cutting by hand/ mowing is not recommended, as it stimulates plant growth
- * Bio-control: cattle and pigs both eat hogweed
- * Herbicides can be used for larger infestations. Glyphosate can be used for stem injections.
- * Seeds left behind can germinate 7 – 15 years later; annual monitoring is recommended

Priority Actions for Stanley Park

- * Park Board staff will remove entire plants from all areas of the Park with high traffic areas of highest priority

Suggested replacement

- * Red elderberry (*Sambucus racemosa*)
- * Hardhack (*Spiraea douglasii*)
- * Red-osier dogwood (*Cornus stolonifera*)

Fragrant water lily (*Nymphaea odorata*)

Expanding Wetland Species

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Description

- * Perennial plant that forms large dense colonies in ponds and wetlands.
- * Leaves are heart shaped and arise on long flexible stalks from large thick rhizomes
- * Leaves usually found on water surface, with fragrant flowers growing on separate stalks with white-pink petals and a yellow center

Ecology

- * Native to eastern North America
- * Found in freshwater aquatic systems such as ponds, streams and lakes
- * Prefers depths of 1-2m
- * Rapidly reproducing plants take over habitat from native aquatic plants, and increase the rate of pond succession

Removal

- * Can be dug up, although physical control is difficult due to reestablishment from seeds and rhizomes
- * For large infestations, cutting of plants is easiest
- * Herbicide use not recommended for waterways

Priority Actions for Stanley Park

- * Cutting of plants in Beaver Lake recommended, but of secondary importance to purple loosestrife and yellow flag iris infestations
- * Control spread into new areas by gardening staff (it is still actively used as an ornamental plant).
- * Beaver (*Castor Canadensis*) presence in Beaver Lake has resulted in the removal of this plant in areas where they are most active.

Suggested replacement

- * Yellow Pond-Lily (*Nuphar polysepalum*)
- * Watershield (*Brasenia schreberi*)

Creeping buttercup (*Ranunculus repens*)

Expanding Species in Stanley Park Natural and Sensitive Areas:



Description

- * Hairy perennial with fibrous roots and long stalks
- * Dark green leaves often with white spots and divided into 3 leaflets that are lobed and toothed with hairy texture
- * Flowers are bright yellow and large, typically 10 to 35mm wide
- * Has horizontal stems known as stolons rooting at the nodes, giving rise to several erect flowering stems

Ecology

- * Found in moist disturbed sites, fields, pastures, gardens, lawns, ditches and clearings
- * Common at low elevations, especially in settled areas
- * As with most buttercup species, contains a toxin that can result in pain and inflammation in grazing animals

Removal

- * Pull or dig out whole plant using hands, spade or pitch-fork

Priority Actions for Stanley Park

- * Removal of large patches threatening native species in blowdown areas

Suggested Replacement

- * Wild ginger (*Asarum caudatum*)
- * Smooth alumroot (*Heuchera micrantha*)
- * Piggy-back plant (*Tolmiea menziesii*)
- * Yerba buena (*Clinopodium douglasii*)

St John's wort (*Hypericum spp.*)

Emergent Species in Stanley Park Natural and Sensitive Areas:



Description

- * A herbaceous perennial which can grow to 1 – 3 feet in length
- * Has erect stems branching in upper part, Roots are short and trailing
- * Leaves are pale green and oblong and are attached directly to the stem, the flower is bright yellow
- * Used for medicinal purposes e.g. to treat depression, anxiety, and sleep disorders

Ecology

- * A common garden plant, it can be found in uncultivated ground, woods, roadsides and meadows
- * Can alter growth form and habit to promote survival
- * Thrives in areas with either a winter or summer dominant rainfall pattern

Removal

- * Manual removal by picking the whole plant including roots
- * Biological control through beetles

Priority Actions for Stanley Park


- * Hand removal of all plants found in forested and sensitive areas of Stanley Park
- * Hand removal of plants found in cultivated/ heavily managed landscapes of the Park
- * Control spread into new areas by gardening staff (it is used as an ornamental plant).

Suggested Replacement

- * Kinnikinnick (*Arctostaphylos uva-ursi*)
- * Salal (*Gaultheria shallon*)
- * Piggy-back plant (*Tolmiea menziesii*)
- * Bunchberry (*Cornus canadensis*)

English laurel (*Prunus laurocerasus*)

Emergent Species in Stanley Park Natural and Sensitive Areas:

	<p>Description</p> <ul style="list-style-type: none">* Evergreen shrub which can grow to 5-7 meters in height* Trunk and branches are covered by a smooth blackish bark* Leaves are oval, oblong and are finely toothed. Are green and shiny* Flowers are small and white and have a strong odour <p>Ecology</p> <ul style="list-style-type: none">* Originally native to south eastern Europe and Asia minor* Grows in sunlight or partially shaded areas* Prefers moist, well drained, acidic soil and tolerates salt spray* Fast growing; seeds distributed by birds
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Removal

- * Hand pull small seedlings
- * Clip plant before it flowers or remove all spent flowers before they can form fruit
- * Berries, leaves and bark are poisonous, wash hands afterwards

Priority Actions for Stanley Park

- * Pulling/ removal of all plants found in forested and sensitive areas of Stanley Park
- * Removal of seeds from plants in cultivated areas of the Park

Suggested replacement

- * Ninebark (*Physocarpus capitatus*)
- * Oceanspray (*Holodiscus discolor*)
- * Red Elderberry (*Sambucus racemosa*)
- * Salmonberry (*Rubus spectabilis*)

Portugal laurel (*Prunus lusitanica*)

Emergent Species in Stanley Park Natural and Sensitive Areas:

	<p>Description</p> <ul style="list-style-type: none">* Small evergreen shrub which can grow to 5m* Young stalks and branches are reddish in colour* Bark on trunk and larger branches is smooth, blackish-brown* Leaves up to 12cm long are pointed at tips and finely toothed. Are green and shiny* Flowers are small and white, scented* Mature fruit are small black drupes <p>Ecology</p> <ul style="list-style-type: none">* Originally native to Spain and Portugal* Able to grow in forest understory, low light conditions (prefers sunlight)* Prefers moist, well drained soils* Fast growing; seeds distributed by birds
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Removal

- * Hand pull small seedlings
- * Clip plant before it flowers or remove all spent flowers before they can form fruit

Priority Actions for Stanley Park

- * Pulling/ removal of all plants found in forested and sensitive areas of Stanley Park
- * Removal of seeds from plants in cultivated areas of the Park

Suggested replacement

- * Ninebark (*Physocarpus capitatus*)
- * Oceanspray (*Holodiscus discolor*)
- * Red Elderberry (*Sambucus racemosa*)
- * Salmonberry (*Rubus spectabilis*)

Butterfly bush (*Buddleja davidii*)

Emergent Species in Stanley Park Natural and Sensitive Areas:



Description

- * Deciduous shrub with arching branches
- * Flowers in mid to late summer- showy purple flowers with orange centres
- * Single flowers can produce up to 40,000 seeds... up to 3 million seeds per plant
- * Can reproduce vegetatively by sprouting/suckering
- * Mature stems have peeling grey-brown bark
- * Forms dense thickets

Ecology

- * Native to China
- * Typically found on disturbed sites
- * Grows on sunny sites
- * Prefers moist, well-drained soils, but is able to grow anywhere

Removal

- * Hand pull small seedlings; or dig up larger plants, removing as much of the roots as possible (ensure minimal soil disturbance)
- * 'Mowing' mature plants when they are flowering (if too large to dig up)
- * Clip plant before it flowers or remove all spent flowers before they go to seed (June/ July)

Priority Actions for Stanley Park


- * Removal of plants in cultivated areas of the Park; especially around Prospect Point picnic area, Lost Lagoon, and Lumberman's Arch
- * Pulling/ removal of all plants found in blowdown, forested and sensitive areas of Stanley Park
- * Control spread into new areas by gardening staff (it may have been established as an ornamental plant).

Suggested replacement

- * Red flowering currant (*Ribes sanguineum*)
- * Ninebark (*Physocarpus capitatus*)
- * Oceanspray (*Holodiscus discolor*)
- * Red Elderberry (*Sambucus racemosa*)

Touch forget-me-not (*Impatiens parviflora*)

Emergent Species in Stanley Park Natural and Sensitive Areas:

	<p>Description</p> <ul style="list-style-type: none">* Annual succulent herb, growing 20-80 cm tall* Alternate leaves are stalked, saw-toothed 3-12 cm long* Pale yellow flowers have pouched sepals with straight spurs directed backwards* Close relative of the highly invasive Policeman's Helmet <p>Ecology</p> <ul style="list-style-type: none">* Native to Himalayas* Prefers shaded, moist nutrient-rich woodlands* Commonly found in disturbed areas beside forests and ditches
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Removal

- * Manual removal by picking the whole plant including roots
- * Potential seed banks in soil may require up to 3 removals

Priority Actions for Stanley Park


- * Hand removal of all plants found in forested and sensitive areas (especially riparian areas) of Stanley Park
- * Hand removal of plants found in cultivated/ heavily managed landscapes of the Park

Suggested Replacement

- * Wild ginger (*Asarum caudatum*)
- * Piggy-back plant (*Tolmiea menziesii*)
- * Bunchberry (*Cornus canadensis*)

Gorse (*Ulex europaeus*)*

Emergent Species in Stanley Park Natural and Sensitive Areas:

	<p>Description</p> <ul style="list-style-type: none">* Perennial evergreen shrub growing 1-3 meters tall* Bright yellow pea-like flowers at the end of branches in February and March* Sharp, spiny thorns along branches (more as plant ages)* Primarily reproduces by seed* Oils in the plant cause fire hazard <p>Ecology</p> <ul style="list-style-type: none">* Fixes Nitrogen, and does well in a range of soil conditions* Does best in moist, well-drained soils* Best in moderate shade to full sun* Commonly found on disturbed sites
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Removal

- * Seedlings and small plants can be pulled by hand
- * Larger plants can be removed using a weed wrench or by cutting the stem below the soil and covering the cut stem/ root mass with soil
- * Herbicides can be used. Replanting recommended following applications
- * Gorse weevil used as biocontrol in some areas, with limited success; goats also used in some cases

Priority Actions for Stanley Park

- * Mature plants near blowdown areas (especially E1/E2- near the seawall) should be removed before seeds distributed to reforested areas
- * Other broom infestations in the Park should also be treated in the near future

Suggested Replacement

- * Snowberry (*Symphoricarpos albus*)
- * Saskatoon (*Amelanchier alnifolia*)
- * Nootka rose (*Rosa nutkana*)

Morning glory (Bindweed) (*Ipomoea spp*)

Expanding Species in Stanley Park Natural and Sensitive Areas:



Description

- * Perennial vine, most active growth from late-spring through summer
- * Tubular flowers have 5 petals, and are white or pinkish-white in colour
- * Leaves are heart-shaped in appearance
- * Reproduction by seed and vegetative

Ecology

- * Native to Eurasia
- * Very common invasive plant in gardens and disturbed areas
- * Form dense mats that out-compete native species, and strangle others

Removal

- * Manual removal by picking the whole plant including roots- easiest to do this during early summer when the plant is visible, and not yet fruiting. Care must be taken to avoid erosion into waterways
- * Can re-grow easily from left roots. Monitoring required several times per year.

Priority Actions for Stanley Park


- * Pulling/ removal of all plants found in forested and sensitive areas of Stanley Park. Current priority is Lost Lagoon

Suggested Replacement

- * Wild ginger (*Asarum caudatum*)
- * Piggy-back plant (*Tolmiea menziesii*)
- * Bunchberry (*Cornus canadensis*)
- * Western honeysuckle (*Lonicera ciliosa*)

Climbing nightshade (Bittersweet) (*Solanum dulcamara*)

Expanding Species in Stanley Park Natural and Sensitive Areas:

	<p>Description</p> <ul style="list-style-type: none">* Perennial vine, can also appear semi-woody and shrub-like* Star-shaped purple flowers, with petals pointed backwards* Berries are red, eggshaped or round* Leaves are dark green, with two 'ear-shaped' lobes near the base* Strong odour when leaves are crushed* Whole plant contains toxins (member of the nightshade family—same as the ones in green potatoes) <p>Ecology</p> <ul style="list-style-type: none">* Originally from Eurasia* Found along waterways and open areas* Can form dense thickets, out-competing native plants* Seeds dispersed by birds, or root/ stem fragments carried by water
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Removal

- * Manual removal by picking the whole plant including roots- easiest to do this during early summer when the plant is visible, and not yet fruiting. Care must be taken to avoid erosion into waterways
- * Can re-grow easily from left roots. Monitoring required several times per year.
- * Herbicides are not recommended, however, glyphosate and triclopyr have been used

Priority Actions for Stanley Park

- * Pulling/ removal of all plants found in forested and sensitive areas of Stanley Park. Current priority is Lost Lagoon

Suggested Replacement

- * Wild ginger (*Asarum caudatum*)
- * Piggy-back plant (*Tolmiea menziesii*)
- * Bunchberry (*Cornus canadensis*)
- * Western honeysuckle (*Lonicera ciliosa*)

Reed canary grass (*Phalaris arundinacea*)

Expanding Wetland Species:



Description

- * Perennial, cool-season rhizomatous grass
- * Creeping rhizomes can form thick layers, out-competing other plants
- * Stems can grow 2m tall, and leaves are typically 2cm wide, and up to 50cm long
- * Hollow stems with clasping auricles
- * Inflorescence are pale purple (rather than pale green) when flowering in May and June

Ecology

- * Native to Eurasia (some debate over whether native to interior of the Pacific Northwest of North America)
- * Found in wetlands, ditches and roadsides
- * Seeds dispersed easily through a range of means
- * Highly competitive with native species due to dense infestations

Removal

- * Manual removal through digging up whole plants in small patches
- * Mowing over 5 times per year for a 10-year timeframe will control the plants (under this amount will not control it)
- * Covering the infestation with shade cloth. Layers of cardboard or through solarization has also worked
- * Herbicide applications have proven successful in some areas

Priority Actions for Stanley Park

- * Monitoring of infestation near Beaver Lake and associated creeks and riparian areas.
- * Pulling/ removal of all plants found in wetland and sensitive areas of Stanley Park

Suggested Replacement

- * Hardhack (*Spiraea douglasii*)
- * Large-leaved lupine (*Lupinus polyphyllus*)
- * Native grass species

References for BMPs

King County's weed control Best Management Practices page is highly informative, with factsheets on each species and their control.

<http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-control-practices/bmp.aspx>

The Nature Conservancy's Invasive Plant Database and Documents- detailed information on control for a wide range of species.

<http://tncinvasives.ucdavis.edu/esadocs.html>

Invasive Plant Species in Stanley Park

Definitions

Emergent Species:

- Limited distribution or a new invader
- Serious potential threat
- Goal: eradication¹

Expanding Species:

- Abundant in some areas; unrecorded or of limited distribution in other areas
- Serious threat to uninfested areas
- Goal: control² and eventual eradication

Established Species:

- Abundant or widespread
- High impacts in areas already infested, serious threats uninfested areas
- Goal: control and containment/management³ in priority areas

Watch List:

- Species yet-to-be identified within the Park, but have caused problems elsewhere in the Region
- Candidates for an Early Detection Rapid Response management approach
- Goal: to monitor for species and implement EDRR plan immediately upon sighting

Trailside Species:

- Non-native species considered a nuisance, but of minimal concern to natural area biodiversity at this time
- Goal: to minimize spread into forest understory or ESAs

Classified Species Lists

Emergent Species in Stanley Park's Natural and Sensitive Areas:

Butterfly Bush (*Buddleja davidii*)

Touch forget-me-not (*Impatiens parvifolia*)

St John's Wort (*Hypericum spp.*)

Common periwinkle (*Vinca spp*)

Spurge Laurel (Daphne) (*Daphne laureola*) (potentially eradicated as of July 08)

Giant Hogweed (*Heraclium mantegazzianum*)

English Laurel (*Prunus laurocerasus*)

Portugal Laurel (*Prunus lusitanica*)

Gorse (*Ulex europaeus*)*

Scotch Broom (*Cytisus scoparius*)

Purple Loosestrife (*Lythrum salicaria*)*

Expanding Species in Stanley Park Natural and Sensitive Areas:

Japanese Knotweed (*Polygonum spp*)*

Yellow Lamium (Yellow Archangel) (*Lamium galeobdolon*)

Creeping Buttercup (*Ranunculus repens*)

Morning Glory (Bindweed) (*Ipomoea spp*)

Climbing Nightshade (Bittersweet) (*Solanum dulcamara*)

Expanding Wetland Species (In Beaver Lake and/or Lost Lagoon):

Fragrant Water Lily (*Nymphaea odorata*)

Yellow Flag Iris (*Iris pseudacorus*)

Reed Canary Grass (*Phalaris arundinacea*)

¹ Eradication is the total elimination of species and associated plant material

² Control is the partial elimination of new and existing invasive plants and associated material

³ Management limits the spread of invasive plant infestations to additional areas

Established Species in Stanley Park Natural and Sensitive Areas:

Himalayan Blackberry (*Rubus discolor*) *Evergreen Blackberry (*Rubus laciniatus*) is also present and growing in similar habitat types with similar impacts*

English Ivy (*Hedera helix*)

English Holly (*Ilex aquifolium*)

Watch List

Himalayan Balsam (Policemen's Helmet) (*Impatiens glandulifera*)

Common Hop (*Humulus lupulus*)

Clematis (syn. traveller's joy) (*Clematis vitalba*)

Garlic Mustard (*Alliaria petiolata*)

Leafy Spurge (*Euphorbia esula*)*

Trailside Species (Examples of most extensive trailside weeds):

Pineapple Weed (*Matricaria discoidea*)

Broad Leaved Plantain (*Plantago major*)

Sow Thistle (*Sonchus spp*)

Canada Thistle (*Cirsium arvense*)

Burdock (*Arctium spp*)

Common Tansy (*Tanacetum vulgare*)

Sorrel/ Dock (*Rumex spp.*)

Rose Campion (*Lychnis coronaria*)

Great Mullein (*Verbascum thapsus*)

Common Foxglove (*Digitalis purpurea*)

Wall Lettuce (*Lactuca muralis*)

Nipplewort (*Lapsana communis*)

California Poppy (*Eschscholzia californica*)

Herb Robert (*Geranium robertianum*)

* Species have been identified by the IUCN in the 'Top 100 worst invasive species in the world'

Table 1. Summary of effectiveness for a range of control methods for some invasive plants found in Stanley Park. The effectiveness of each control method is rated on a scale of 0–3, with 0 being ineffective and 3 demonstrating proven effectiveness. Boxes designated with an -1 indicates treatments that may worsen the infestation by increasing seed germination or dispersing root fragments. An asterisk (*) indicates control methods which are generally inappropriate for the type of habitat in which the species is found (e.g., forested areas cannot be mowed). The terms “n/a” means *not applicable* and “n/i” mean *no information*. Green boxes indicate control methods that are considered effective (rated 2 or 3).

The information included in this chart is slightly adapted from: Page, N and P Lilley. 2008. City of Coquitlam Invasive Plant Management Strategy, March, 2008. Prepared by Raincoast Applied Ecology. Vancouver, BC. *Permission for use granted by Lanny Englund, City of Coquitlam.*

Control Method	Himalayan Blackberry	English Ivy	Yellow Lamium	Knotweed (+ others)	Morning Glory	Purple Loose-strife	Scotch Broom	Giant Hogweed
Mowing	2	1*	0*	-1	1	1*	1	1
Pruning	2	3 ^f	0	0	0	1 ^k	1	1 ^h
Raking	n/a	1	1	n/a	1	n/a	n/a	0
Brushcutting	2	1*	0	-1	0	0*	1	1
Grazing ^a	2*	n/i*	n/i*	n/i*	n/i*	n/i*	n/i*	2*
Root pulling ^b	1	2	2	0	2	2	3	0
Root cutting	1	1	1	-1	2	n/a	1	3
Tilling	2	1*	1*	-1*	2	2*	-1	2
Excavating ^c	3	2*	2*	3	2	2*	2	3
Woodchips ^d	2	n/i*	1	0	1	0	1	1
Geotextile	2	n/i*	n/i*	2	2	0	0	2
Insect pest	n/a	n/a	n/a	n/a	n/a	3 ^g	n/a	n/a
Stem injection ^e	n/a	n/a	n/a	3 ⁱ	n/a	n/a	n/a	3

Symbols

- ^a pigs, cattle, goats, sheep
- ^b by hand
- ^c excavation of both roots and surrounding soil
- ^d deciduous or mixed chips approx. 30 cm in depth
- ^e injection of glyphosate into the stem using specialized equipment
- ^f ivy removal from trees only
- ^g introduction and maintenance of Galerucella beetles
- ^h prevents flower development
- ⁱ depends on the age of knotweed plants (established plants may be difficult to kill with herbicides)

Table 2. Recommended timing for prescribed control methods. In most cases, work is recommended during the growing season when plants are visible and have put energy into leaf and flower development. The early growing season is recommended for some species such as Scotch broom to prevent the dispersal of seed. All control method timing should take into account breeding bird season, fisheries window and potential seasonal impacts of control methods. The information included in this chart is slightly adapted from: Page, N and P Lilley. 2008. City of Coquitlam Invasive Plant Management Strategy, March, 2008. Prepared by Raincoast Applied Ecology. Vancouver, BC. *Permission for use granted by Lanny Englund, City of Coquitlam.*

Control Method	Himalayan Blackberry	English Ivy	Yellow Lamium	Knotweed	Morning Glory	Purple Loose-strife	Scotch Broom	Giant Hogweed
Mowing	Late July-Sept	n/a	n/a	Late July-Sept ^b	May-Sept	July-Sept	May-June ^a	May-June ^a
Pruning	Late July-Sept	n/a	n/a	Late July-Sept ^b	n/a	July-Sept	May-June ^a	May-June ^a
Raking	n/a	All year	n/a	n/a	May-Sept	n/a	n/a	0
Brushcutting	Late July-Sept	n/a	n/a	n/a	n/a	n/a	May-June ^a	May-June ^a
Grazing	Late July-Sept	n/i*	n/i*	n/i*	n/i*	n/a	n/i*	May-Sept
Root pulling	Late July-Sept	All year	All year	n/a	May-Sept	* May-June ^a	Dec-June ^c	n/a
Root cutting	Late July-Sept	All year	All year	n/a	May-Sept	n/a	n/a	Apr-June
Tilling	Late July-Sept	All year	All year	n/a	May-Sept	n/a	n/a	Apr-June
Excavating	All year	All year	All year	All year	May-Sept	* May-June ^a	All year	Apr-Aug
Woodchips	Late July-Sept	n/a	n/a	All year	May-Sept	n/a	May-June	n/a
Geotextile	Late July-Sept	n/a	n/a	All year	All year	n/a	n/a	All year
Insect pest	n/a	n/a	n/a	n/a	n/a	All year ^e	n/a	n/a
Stem injection	n/a	n/a	n/a	Aug-Sept ^d	n/a	n/a	n/a	May

Symbols

- ^a before seeds have formed
- ^b mowing or pruning must be accompanied by removal of stems from the site to prevent resprouting or collection and on-site mulching/composting during hot weather
- ^c Scotch broom can be pulled at any time of the year except when seeds are present (to prevent dispersal)
- ^d herbicide use after cutting and 1 m high regrowth
- ^e repeated introductions of *Galarucella* may be required for successful establishment (or re-establishment)
- * Purple loosestrife must be removed during the breeding bird season and outside of the fisheries window because this is the only time it is visible, but also before the seeds have set. Extreme care should be taken when working in wetlands and riparian areas at this time.

Table 3. Estimated length of control phase (in years) before restoration (replanting) can begin. These estimates are very general and do not reflect site-specific issues such as the intensity of the control method (e.g., mowing frequency), seed-bank, or the amount of root energy. Many sites will require monitoring and maintenance in perpetuity.

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Control Method	Himalayan Blackberry	English Ivy	Yellow Lamium	Knotweed	Morning Glory	Purple Loose-strife	Scotch Broom	Giant Hogweed
Mowing	2-5 yrs	n/a	n/a	n/a	1-3 yrs	2-5 yrs	2-5 yrs	2-5 yrs
Pruning	2-5 yrs	n/a	n/a	n/a	n/a	ongoing	1-3 yrs	ongoing
Raking	n/a	2-5 yrs	2-5 yrs	n/a	1-3 yrs	n/a	n/a	n/a
Brushcutting	2-5 yrs	n/a	n/a	n/a	n/a	n/a	1-3 yrs	2-5 yrs
Grazing	2-5 yrs	n/a	n/a	n/a	n/a	n/a	n/a	2-5 yrs
Root pulling	1-3 yrs	2-5 yrs	2-5 yrs	n/a	1-2 yrs	ongoing	1-5 yrs	n/a
Root cutting	1-3 yrs	2-5 yrs	2-5 yrs	n/a	1-2 yrs	n/a	n/a	1-3 yrs
Tilling	1-3 yrs	2-5 yrs	2-5 yrs	n/a	1-2 yrs	n/a	n/a	1-3 yrs
Excavating	1-3 yrs	1-2 yrs	1-2 yrs	1-2 yrs	1-2 yrs	1-2 yrs	1-2 yrs	1-2 yrs
Woodchips	1-3 yrs	n/a	n/a	n/a	1-2 yrs	n/a	1-5 yrs	n/a
Geotextile	1-2 yrs	n/a	n/a	>5 yrs	1-2 yrs	n/a	n/a	1-3 yrs
Insect pest	n/a	n/a	n/a	n/a	n/a	ongoing	n/a	n/a
Stem injection	n/a	n/a	n/a	1-5 yrs	n/a	n/a	n/a	1-3 yrs