

**Introduced species survey and management recommendations
at the Talking Tree Nature Reserve on Galiano Island**



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Summary

Although it has played a key role for decades, introduced species management (or, invasive species management) continues to be an important component of ecological restoration. The establishment and dispersal rates of harmful introduced species is becoming more prevalent, especially given the issues they pose to smaller, separated populations of native species. Galiano Island is in the Salish Sea off the east coast of Vancouver Island, British Columbia, and hosts many unique ecosystems at risk of invasion from introduced species. This report examines one property on the island, the Talking Trees Nature Reserve, and describes the introduced species found on the site that are specifically targeted by the Galiano Conservancy Association (GCA)—the non-profit organization who acquired and is dedicated to the stewardship of this property. By using systematic examination techniques, we mapped the introduced species of concern using ArcGIS applications. Of the list of target species, the property hosted Scotch broom (*Cytisus scoparius*), English holly (*Ilex aquifolium*), and tansy ragwort (*Jacobaea vulgaris*). We provide recommendations for the management of each of these species, including the suggestions of hand-pulling, cutting, and girdling, as well as advice on time of year and how often to perform re-treatments of the area. Ultimately, our findings demonstrate the importance of regular surveying and repeated management of targeted species to promote stewardship of a given site.

Territory acknowledgement

The Talking Trees Nature Reserve described in this report is located within the shared, traditional and unceded territories of the Penelakut, Hwlitsum (Lamalcha), and Hul'qumi'num-speaking peoples, who have lived on and stewarded the land for time immemorial.

Introduction

Restoration and management for biodiversity in protected areas often centers around the removal of harmful introduced species, and has done so for many decades (Gann *et al.*, 2026). In addition to initiating displacement of many native species, introduced species often shift ecosystem dynamics and alter ecosystem function in irreparable ways (Mooney and Hobbs, 2000). This is largely because introduced species are often able to grow faster and establish earlier in the season than native species, resulting in reduced light, moisture, soil integrity, nutrients for plants, and natural habitat, as well as increased competition for resources with native species, and changes in soil chemistry. Additionally these species often result in significant socio-economic challenges due to the costs necessary to rectify areas of heavy introductions, potentially diverting resources from broader ecosystem restoration and management (Kettenring & Adams, 2011).

Detrimental introduced species, such as gorse (*Ulex europaeus*) and Scotch broom (*Cytisus scoparius*) have caused significant problems across the Southern Gulf Islands in British Columbia for decades, and continue to present major ecological integrity issues regarding restoration (Parks Canada, 2025). The Galiano Conservancy Association (GCA) is working to mitigate these risks through their Introduced Species Management Plan, with the latest version from 2021. The GCA is a land trust and registered charity in the province of British Columbia with the goal of providing “community-based acquisition, management and conservation of land and habitat” (GCA, n.d.), located on Galiano Island, British Columbia. This management plan specifically targets thirteen of the most common and pervasive introduced species that are actively managed by the Millard Learning Centre and through the GCA’s properties.

The newest acquisition to the GCA’s properties was the Talking Trees Nature Reserve, located south-centrally on the southern side of Galiano Island, and extends from Trincomali channel to the central ridgeline of the island, adding to the Mid-Island Protected Areas Network (MIPAN)—a group of properties that spans over 660 hectares to protect a significant portion of the island’s habitat diversity (Fig. 1). As an initial assessment of the Talking Trees property—Galiano Island District Lot 50 (DL-50), this report provides an overview of species introductions across the site as part of an initial management plan for the Galiano Conservancy Association (GCA). To assess the condition of the newest addition, we performed a survey of the

Talking Trees property in July 2026 with the goal of marking targeted introduced species for management.

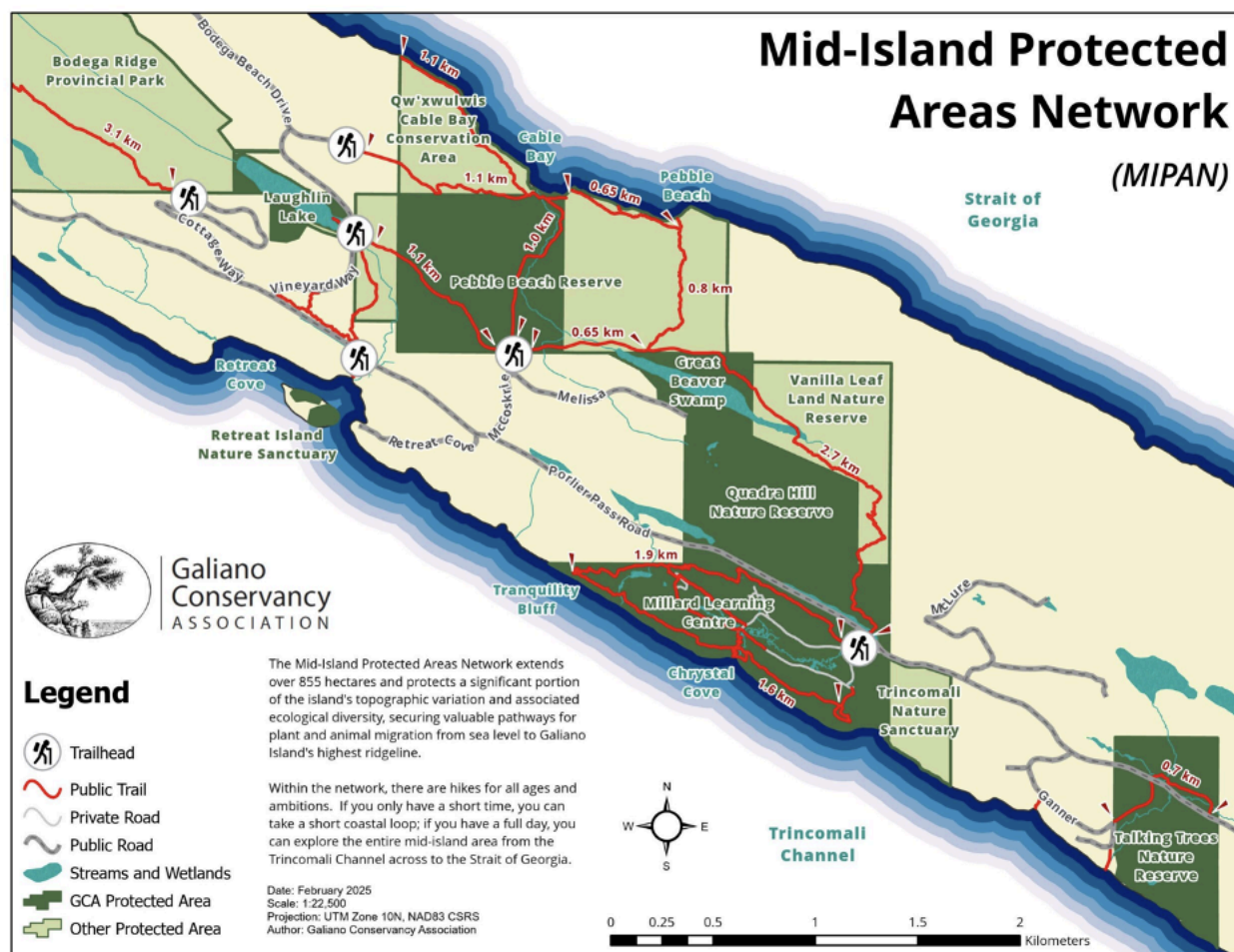


Figure 1. Mid-Island Protected Areas Network (MIPAN) owned by the Galiano Conservancy Association (GCA) for the purpose of preserving and restoring sections of Galiano island. The map above describes trails and roads throughout the MIPAN, and categorizes areas as protected either by the GCA or by another organization. The Talking Trees Nature Reserve is located in the far southeast corner of the map.

Site description

Talking Trees is located within the biodiverse Coastal Douglas-Fir biogeoclimatic zone. Due to a climatic rain shadow from both the Vancouver Island and Olympic mountain ranges, the Southern Gulf Islands often experience very dry summers and moderate rainfall in the winters.

Many of the plants in this area are at the northern end of their range, including Garry oak (*Quercus garryana*) and arbutus (*Arbutus menziesii*), and are able to live on these islands due to the mild climate.

The Talking Trees Property (DL-50) extends between Trincomali channel and the central ridgeline of Galiano Island (Fig. 2), and spans 42 hectares of primarily old-growth forest. As of the acquisition of the property in April, 2024, it connected the southeastern end of the GCA's MIPAN, which encompasses several properties owned by the non-profit that are undergoing restoration. Due to a quick acquisition and many ongoing projects, the survey we conducted was the first to systematically examine this property. It will act as a preliminary baseline survey of introduced species composition for any future restorative planning and activities done by the GCA on this site.

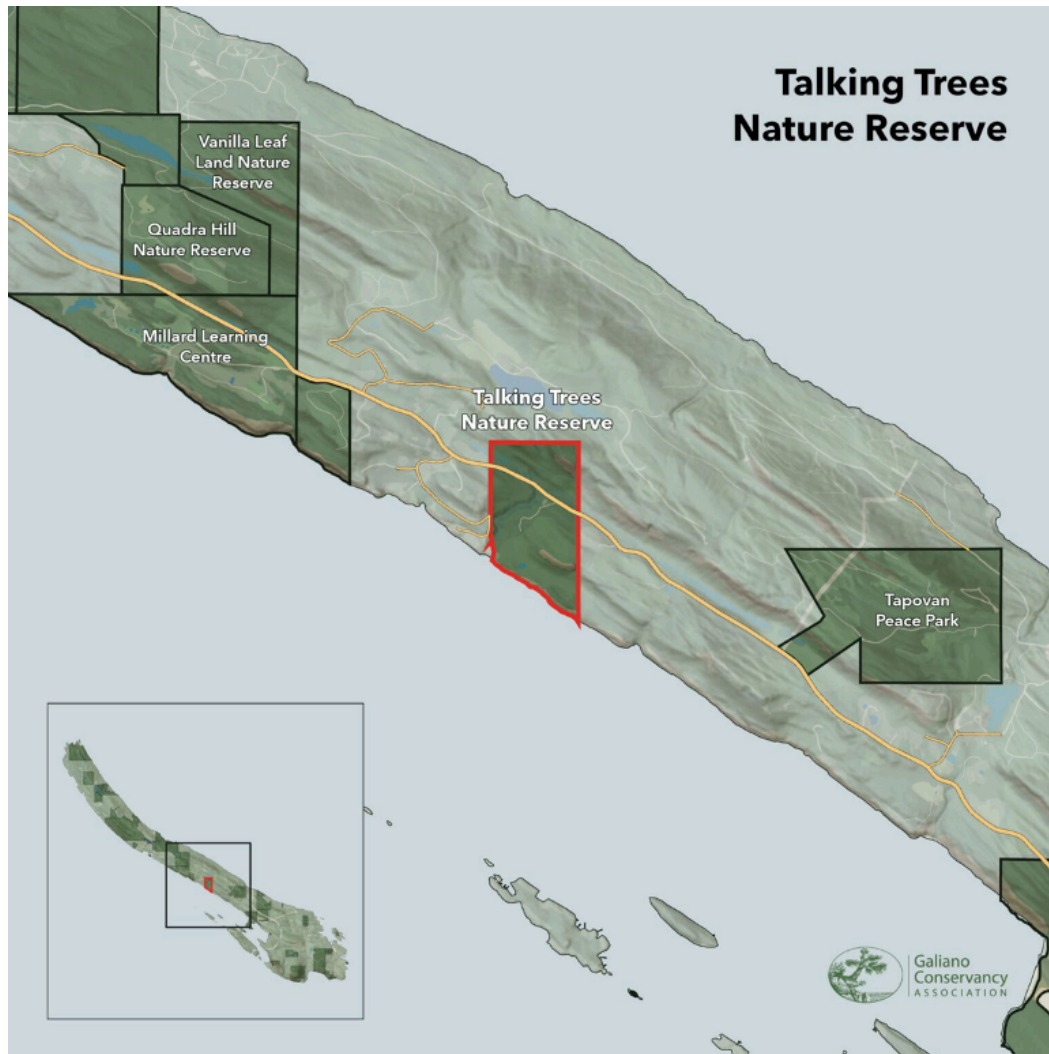


Figure 2. Talking Trees Nature Reserve (DL-50), located on Galiano Island, British Columbia (GCA, n.d.). The Talking Trees property is located near the centre of the island, with the main road, Porlier Pass Rd., running through the middle. It stretches from the coast of Trincomali channel to the central ridgeline of the island, and is located southeast of The Millard Learning Centre.

Goals and objectives

Goal

To conduct preliminary surveys of introduced species populations across the Talking Trees Nature Reserve to provide management recommendations.

Objectives

- Collect data & map introduced species of concern.
- Provide recommendations for species management at the site.

The main purpose of this project was to provide a baseline survey of introduced species found on the Talking Trees property – District Lot 50 (DL-50) – to inform future restoration initiatives. By conducting this survey, the aim was to better understand what introduced species are present, where these species are located on the property, and in what quantities, so that this information would serve as a guide for the GCA for future management of the site. Short term management will likely involve removal of introduced species, followed by continual, repeated surveying to track species composition and management strategies.

Methods

Surveying techniques

Our methods were based on similar surveying done by previous UVic students, interns, and staff on different properties owned by the GCA (e.g. Quadra Hill (Desormeaux *et al.*, 2023)), as well as personal communications with GCA staff members, such as Adam Huggins. Due to the size of the property and vegetation density throughout the site, in addition to time constraints, running transects as a survey method was immediately ruled out. Instead, we opted to strategically traverse the landscape in such a way to cover the most ground possible, while avoiding impassable obstacles (e.g. bushes, large fallen trees, etc.). We began by examining the edges of all existing paths, including driveways, trails, and old roads, as well as any anthropogenic infrastructure, including a small cabin, shed, old machinery parts and lumber. Sites of disturbance can act as vectors of introduced species, so we wanted to prioritize them. We then selected large areas of the property to survey, by walking from one edge to the other. We used the ArcGIS FieldMaps application to orient ourselves on the landscape, as well as binoculars to survey areas either less accessible or inaccessible to us. Once we reached the property line, we walked along the property line approximately 20-30 meters, as this was the approximate visible range, before proceeding back towards the original direction. By doing so, we conducted a zig-zag or s-shaped survey pattern. Due to technological difficulties, our tracks were not successfully recorded with the ArcGIS QuickCapture application.



Figure 3. English holly tree (*Ilex aquifolium*) tagged with biodegradable orange flagging tape located at Talking Trees Nature Reserve, on Galiano Island, British Columbia.

Data collection

To select survey species, we used the GCA's list of targeted introduced species determined the most likely to impact ecosystems on Galiano Island (Appendix 1). Prior to surveying, we familiarized ourselves with the target species, and in the field, brought photos of each organism to ensure correct identification. When an individual of one of the targeted species was found, it was marked with biodegradable flagging tape (Fig. 3). Flagging was done either on the individual, or on a nearby tree, depending on plant height. To document details about each individual or clump, we used the ArcGIS QuickCapture application. This recorded plant maturity, location of sighting, size of the patch (i.e. individual, clump, or area), property (i.e. Talking Trees), project (stewardship-MIPAN), a photo of the plant for future identification, and any notes about the plant or site, such as general height of the individual(s) and the number of plants in a clump. A clump was recorded if there were two or more plants next to each other. This info was then automatically attached to a point location on the map, with a measured

accuracy, typically, of under 1m using an Arrow 100+ GPS. Attempts were also made to document the path we travelled during surveying through QuickCapture, however captured tracks were not retained on the app.

Results

From the list of targeted introduced species by the GCA, only three different introduced species were found: English holly (*Ilex aquifolium*), Scotch broom (*Cytisus scoparius*), and tansy ragwort (*Jacobaea vulgaris*). Throughout the property, each of these species was primarily found in a given ecosystem (Fig. 4); English holly was mostly found in the Douglas fir-salal ecosystem, while all Scotch broom sightings occurred in the Western red cedar-grand fir system, and with the Tansy ragwort sighting again in the Douglas fir-salal forest. Additionally, while the English holly and tansy ragwort were found in undisturbed old-growth and second or third generation forests, Scotch broom was only found in disturbed sites. These disturbed sites included the cliff in front of a small cabin, and by the side of Porlier Pass Rd. All digital data are stored in the ArcGIS FieldMap application of the GCA.

A few other introduced species were found but were not mapped as they were identified as non-target species in the GCA Millard Learning Centre Introduced Species Management Plan (2014), meaning they are not actively managed. These included common foxglove (*Digitalis purpurea*) scattered throughout the property, especially near roads and trails, as well as a few patches of rose campion (*Lychnis coronaria*), with one large one on either side of a trail.



Figure 4. The locations of introduced species found on the Talking Trees Nature Reserve property on Galiano Island, British Columbia, Canada. Points coloured in pink represent English holly (*Ilex aquifolium*), points in yellow represent Scotch broom (*Cytisus scoparius*) and the point in green represents tansy ragwort (*Jacobaea vulgaris*). Roads are represented by lines (dark red), while trails are orange, and streams, ponds and riparian areas are represented by light blue. In comparison, the teal coloured polygon represents the Western red cedar ecosystem, while the Douglas fir - salal ecosystem is coloured dark green, and the arbutus - Garry oak ecosystem is

represented by the orange polygon. Roads and trails were mapped by The Galiano Conservancy Association (GCA), while ecosystem layers come from mapping performed by Madrone Environmental Services in 2008. These layers were added to the ArcGIS QuickCapture and ArcGIS FieldMaps applications by GCA staff member Adam Huggins.

Discussion

From the list of introduced species the GCA staff is targeting for management, we only found three different species, in relatively small quantities, present on the Talking Trees Nature Reserve. This was significantly less than we expected to find, given the amount of introduced species present at the Millard Learning Centre property. Apart from the three targeted species we found (English holly, Scotch broom, and tansy ragwort), we also found common foxglove and rose campion, which we did not map as they were identified as non-target species by the GCA. The decision to not actively manage these species, even though they are non-native species, aligns with the middle-ground approach with regards to non-native species suggested in Shakelford *et al.* (2013). This is because looking at species impact instead of place of origin (e.g. native or non-native) when taking management decisions allows for efficient management, which is especially important when resources are limited. This is the case for the GCA as it is a small organization and needs to optimise its restoration and conservation efforts.

English holly was one of the introduced species we expected to find as it is a common introduced species and GCA staff also mentioned we would probably find some in the large Douglas fir-salal ecosystem in the lower right side of the property. We did find some English holly in that area, however, we did not expect to find such a large amount. As seen in Figure 3, many of the English holly trees and bushes were found in areas away from observable disturbances, with some being very deep into the Douglas fir-salal ecosystems. This aligns with what we expected, as English holly is spread by birds dispersing seeds far from the parent tree (Zika, 2010). The English holly trees varied greatly in size with some of the trees we found being over eight meters and some being small seedlings. Some of the large trees we found were berry-producing trees and these are crucial to target for removal because they contribute to the fast spread of the plant (Stokes *et al.*, 2014). Therefore, efforts should be made to remove the large berry-producing trees first. Projections have shown that delaying the removal of English holly for just a few years

can significantly increase the number and size of trees making the process of removing them more difficult (Stokes *et al.*, 2014). We recommend the removal and management process to be started as soon as possible, to avoid additional work in the future.

As expected, the clumps of Scotch broom were found adjacent to disturbed areas. A few clumps were found on the shoreline below, by the small cabin on the property (Fig. 4). While the other Scotch broom plants were located alongside Porlier Pass Road. We were relieved to have found only a handful of clumps of Scotch broom, because they can spread aggressively and are one of the more common introduced species on Galiano island. Additionally, none of the shrubs we found were very large, which will make the removal easier. It is important to control Scotch broom right after the species establishes, as one study found its removal can negatively affect the soil chemistry and native plant communities (Slesak *et al.*, 2022). Slesak *et al.* found that soil quality was affected by the removal of Scotch broom, as this is a nitrogen-fixing species. This meant that sites with already poor soil quality were exacerbated by the removal of the Scotch broom. Since the Talking Trees property is relatively undisturbed, we can assume that the soil quality should be good and so the removal of Scotch broom shrubs should have relatively little impact. There still remain risks in the removal of Scotch broom and targeting young plants before they increase in number will reduce the chances of the soil chemistry and plant communities being impacted. As there are currently very few Scotch broom plants on the property, their removal should be of highest priority.

Tansy ragwort is generally found in disturbed areas such as pastureland or roadsides, which makes it surprising that we found it far into the Douglas fir-salal forest. Seeds of this plant can be spread by wind, water, people and animals (ISCBC, 2024), so it is possible seeds were attached to an animal walking in that area. Because we only identified a small clump of two plants, it should be relatively easy to remove them, but does not require immediate attention as it is still a small population.

The biggest limitations in this project were the large size of the property, the rough terrain and the limited time. Because we only had four days to cover the entire property, and that we knew some of the terrain would be difficult to navigate, we did not use transects, and instead we strategically targeted areas near disturbance first and then did our best to cover the rest of the property. Transects would not have been much more difficult to implement, although they would

have allowed a more systematic way of ensuring the property was covered. Some areas of the property such as the north-east corner were inaccessible to us. Because most of the time there were only two of us looking for the introduced plants among these large ecosystems, we might have missed some. Furthermore, some of the target species such as English holly are hard to distinguish from native plants in forests with thick understory. This was especially the case when lots of salal (*Gaultheria shallon*) and Oregon grape (*Mahonia aquifolium*) bushes were present and English holly tended to blend in. Some of the strategies we used were looking for shiny leaves and using binoculars to scan areas that were further away.

Although we did find the mapped ecosystems present on the ArcGIS Field Maps given to us by GCA staff to be similar to those present on the property, an ecosystem survey of the property has not yet been completed. Defining the different ecosystems present and mapping them in the future would help with the understanding of where introduced species might appear and plan for their management.

Recommendations for introduced species management

Introduced species can be managed in many ways, and deciding on which approach to use depends on the size of the plants, how many there are, and the resources and time available. Outlined below are suggestions on how to manage each of the three introduced species we found on the property.

English holly

Hand pulling small seedlings is recommended, while mature trees should be cut at ground level before berries form (GCA Introduced Species Management Plan, 2014). Hand pulling should only be done with minimal soil disturbance, and best when soil is moist. To ensure the roots are all removed, shovels can be used to loosen the soil (FVISS, n.d.). It is important to remove all plant material, especially the berries as they contain seeds; debris can be composted if it does not contain berries (GCA Introduced Species Management Plan, 2014). It is also recommended to monitor cut stumps for regrowth and cut back re-growth if there is any (ISCBC, n.d.). We suggest going back every two years to check for regrowth. A new method to try would be girdling larger trees by removing a ring of bark around the trunk at the base of the tree, as this may be beneficial by eventually killing the tree (FVISS, n.d.).

Scotch broom

For plants with stems less than approximately 1.5 cm in diameter, hand pulling during the wet months is recommended (Metro Vancouver and ISCMV, 2021). A very small weed wrench can be used if needed. It is critical to minimize soil disturbance when removing the shrubs as it can facilitate re-establishment; wet soil minimizes the disturbance (Metro Vancouver and ISCMV, 2021). For larger plants, cutting at or slightly below ground level is possible during the spring when the plant is in bloom (Metro Vancouver and ISCMV, 2021), however this strategy should not be required as we did not find any large Scotch broom plants on the property. To dispose of plant material, pile under conifers where no ground vegetation is present. If seeds are present, plants should be dried, burned and ashes should be transported offsite (GCA Introduced Species Management Plan, 2014).

Tansy ragwort

Hand pulling is recommended for small infestations, when soils are moist to remove the entire root system (Scott, 2019). This is the case at the Talking Trees property as we only found one clump of plants. Re-treatment is necessary as leaving a small part of the root system may result in the plant growing back. We recommend a quick check every year, as they were only found in one spot. Plants should be removed from the site to avoid ingestion or re-sprouting (GCA Introduced Species Management Plan, 2014).

Conclusion

This report assessed the presence of introduced species and made management recommendations in the newly acquired Talking Trees Nature Reserve, District Lot 50 on Galiano Island. We conducted a survey by foot of the property looking for introduced species from a list of species of concern. We found three species of concern: English holly, Scotch broom, and tansy ragwort, and collected locational and observational data of all plants found. English holly was the most prevalent of the three and was found mostly in Douglas fir-salal ecosystems. We were able to provide the GCA with a map and recommendations for the removal of each of the species we found. We recommend conducting surveys for introduced species on the property in the future every five years to monitor for new species. This interval will ensure plants grow to a manageable size, and resources from the conservancy are used in an efficient manner. We hope

our findings and recommendations can have a part in preserving the remarkable Talking Trees property, home to many important ecosystems.

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Appendices

Appendix 1. Table of introduced species targeted by the Galiano Conservancy Association for removal and restoration, due to their negative impacts on existing ecosystems (GCA, n.d.; ISCBC, 2025). Only species of highest concern are included in this list. Characteristics and a photo are provided for each species to better understand their impacts and for identification purposes.

Species	Characteristics	Photo
Morning glory (<i>Convolvulus arvensis</i>)	- Trailing stems- take over and kill other plants by twining around them - Large, showy, funnel- shaped flowers - Introduced from Eurasia	 Attila Steiner. 2017. iNaturalist observation: https://www.inaturalist.ca/photos/59397798.
Common hawthorn (<i>Crataegus monogyna</i>)	- Tall shrub, with short thorns, white flowers and red fruit - Can form dense thickets, which may alter understory structure and inhibit wildlife	 Mirella. 2021. iNaturalist observation: https://www.inaturalist.ca/photos/169763327.
Scotch broom (<i>Cytisus scoparius</i>)	- Spindly, deciduous shrub with bright yellow flowers, and black hairy seedpods. - Small alternate leaves. - Spread aggressively to create monocultures that overwhelm native plants by preventing regeneration. - Fixes soil nitrogen, which encourages other introduced weeds. - Seed pods remain viable for over 30 years. - Impenetrable to most wildlife.	 Ina Seibert. 2020. iNaturalist observation: https://www.inaturalist.ca/photos/70985676.

English holly (<i>Ilex aquifolium</i>)	- Shrub to small tree with shiny, toothed evergreen leaves. - Distinctive bright red berries - Reproduces by seed or cutting, and often shades out native species.	 Joan Septembre. 2021. iNaturalist observation: https://www.inaturalist.ca/photos/117929954.
Saint John's wort (<i>Hypericum perforatum</i>)	- Perennial herb with bright yellow, 5-petaled flowers. - Leaves are dark green and opposite, with transparent spots when held to the light. - Grows in dense patches that can outgrow and crowd out native plants. - Contains a poison that causes burns on the skin of light-skinned farm animals when exposed to sunlight.	 Akolter. 2021. iNaturalist observation: https://www.inaturalist.ca/photos/283622526.
English ivy (<i>Hedera helix</i>)	- Evergreen, climbing shrub. - Fast-growing- outcompetes native species, shades out other plants and chokes host trees.	 Toby Rasmussen. 2025. iNaturalist observation: https://www.inaturalist.ca/photos/513094764.
Yellow flag iris (<i>Iris pseudacorus</i>)	- Perennial with showy yellow flowers and a simple stem. - Spreads via seeds and rhizome pieces dispersed in water. - Poisonous to grazing animals. - Fast growing and spreading, so outgrows native wetland plants. - Alters rivers and riparian areas through desiccation.	 Roy Pilcher. 2014. iNaturalist observation: https://www.inaturalist.ca/photos/930459.

Tansy ragwort (<i>Jacobaea vulgaris</i>)	- Short-lived perennial with bright yellow flowers that have a daisy-like appearance. - Toxic to humans and livestock. - Can displace native grassland vegetation.	 Arne Åsnes. 2019. iNaturalist Observation: https://www.inaturalist.ca/photos/48560335.
Reed canary grass (<i>Phalaris arundinacea</i>)	- Perennial grass with seeds present in spring-summer. - Seeds disperse easily and outcompete native plants. - Can survive drought conditions and provide little food for wildlife.	 Annk. 2020. iNaturalist Observation: https://www.inaturalist.ca/photos/78038371.
Himalayan blackberry (<i>Rubus armeniacus</i>)	- Medium tall thicket-forming shrub with prickly leaf stalks and clusters of white flowers. - Seeds stay viable in the soil for many years. - Outcompetes native plants, and prevents shade-intolerant trees from establishing (e.g. Douglas fir)	 Nature Ali. 2007. iNaturalist Observation: https://www.inaturalist.ca/photos/12593150.
Evergreen blackberry (<i>Rubus laciniatus</i>)	- Shrub with hooked prickles and highly toothed, alternating leaves. - Exhibits white or pink flowers in the spring. - Less aggressive than Himalayan blackberry, but may hinder regeneration of shade-intolerant conifers.	 Bill Apostle Stefanidis. 2022. iNaturalist Observation: https://www.inaturalist.ca/photos/223841507.

Sweet briar (<i>Rosa rubiginosa</i>)	- Thorny shrub with white or pink flowers. - Similar in appearance to the Nootka rose, but has curved thorns. - Spreads quickly through seed dispersal and can displace native vegetation. - Impacts the composition of native ecosystems.	 Brantastic. 2025. iNaturalist Observation: https://www.inaturalist.ca/observations/296402539.
Common tansy (<i>Tanacetum vulgare</i>)	- Perennial herb with numerous flowerheads clustered together. - Alternate, fern-like leaves. - Can form dense thickets that outcompete native plants. - Can be toxic in large quantities.	 Robert D Stevenson. 2019. iNaturalist Observation: https://www.inaturalist.ca/photos/45581182.
Periwinkle (<i>Vinca minor/major</i>)	- Trailing, free-rooting plant with blue-purple, 5-petaled flowers. - Can create a monoculture by competing with native vegetation and interfering with tree and shrub regeneration.	 Nicolas Lagiere. 2022. iNaturalist Observation: https://www.inaturalist.ca/observations/109133010.