INVASIVE PLANT REMOVAL MANAGEMENT PLAN

FOR MALTBY LAKE LANDS

PREPARED FOR:
FRIENDS OF MALTBY LAKE WATERSHED SOCIETY
SAANICH, BC

PREPARED BY:
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CORVIDAE PROJECT #2025-277
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APRIL 2026

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ENVIRONMENTAL CONSULTING INC

EXECUTIVE SUMMARY

Corvidae Environmental Consulting Inc. (Corvidae) was retained by the Friends of Maltby Lake Watershed Society to develop an Invasive Plant Removal Management Plan (IPRMP) for the Maltby Lake Lands in Saanich, British Columbia. The approximately 45-hectare property contains a mosaic of ecologically significant habitat, including mature forest, Garry oak ecosystems, rocky outcrops, wetlands, riparian areas, and the aquatic environment of Maltby Lake. Many of these ecosystems are classified as sensitive and provide important habitat for biodiversity, including Species at Risk.

Field surveys were conducted in December 2025 and January 2026 by two Qualified Environmental Professionals (QEPs) with Corvidae, to document ecosystem conditions, invasive plant presence, and restoration opportunities. A total of 43 ecosystem polygons were delineated and assessed using a standardized scoring system that evaluated ecosystem priority, condition, and restoration potential. This approach allowed for the identification and ranking of restoration priorities across the property.

Survey results indicate that the majority of the site remains in relatively good ecological condition, with extensive areas of intact native vegetation. Several invasive plant species are present and in some areas, well established. The most prevalent species observed include Scotch broom, English holly, Spurge-laurel, Himalayan blackberry, Canada thistle, and Bur chervil. Scotch broom represents the greatest concern due to its widespread distribution and dominance within sensitive Garry oak and rocky outcrop ecosystems.

Ten ecosystem polygons were identified as high priority for restoration, primarily due to the presence of sensitive habitats combined with moderate to high invasive plant cover. An additional five polygons were classified as moderate priority, while twelve were considered low priority due to minimal invasive presence. Fifteen polygons were excluded from prioritization as they represent non-sensitive or highly disturbed ecosystems. One aquatic polygon (Maltby Lake) requires further assessment during the growing season to evaluate the extent of yellow flag iris infestation.

Priority restorations efforts should focus on:

1. Revegetation of a disturbed bike park area to prevent invasive establishment.
2. Targeted removal of dense Scotch broom infestation in high-value ecosystems, and
3. Progressive treatment of other high-priority polygons, particularly those with ecological sensitivity or potential Species at Risk habitat.

This plan outlines species-specific removal methods consistent with regional best management practices, emphasizing manual and mechanical control techniques, careful timing to prevent seed spread, and strict sanitation protocols to limit further dispersal. Long-term success will depend on sustained monitoring and follow-up treatments due to persistent invasive seedbanks.

Restoration of native vegetation is identified as a critical component of invasive species management. Replanting disturbed areas with appropriate native species will enhance ecosystem resilience, reduce reinvasion risk, and support habitat values. Additional mitigation measures are provided to protect wildlife, including considerations for nesting birds and regulatory requirements for work in riparian and aquatic environments.

Further studies are recommended to support adaptive management, including spring surveys to assess seasonal plant communities and invasive species extent, as well as targeted surveys for Species at Risk, such as Western Painted Turtle, Sharp-tailed Snake, and Western Screech Owl.

Implementation of this IPRMP will support the long-term ecological integrity of the Maltby Lake Lands by reducing invasive species impacts, enhancing native biodiversity, and guiding restoration efforts in a strategic and effective manner.

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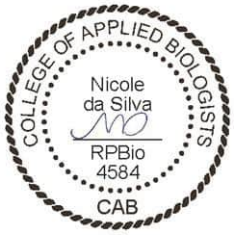

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CAVEAT

This Invasive Plant Management Plan has been prepared using the best information available at the time of writing, including applicable municipal planning documents, publicly available mapping databases, communications with the client, multiple site visits, and other project-specific documentation. The management plan has been developed to support compliance with relevant environmental legislation, regulations, and bylaws and to identify and mitigate potential environmental effects associated with invasive plant removal and management activities.

This report and assessment were prepared by a qualified environmental professional. All relevant technical manuals and guidelines were adhered to, and the findings and recommendations are grounded in current knowledge, supplemented by professional judgment where data gaps exist. The Invasive Plant Management Plan has been conducted in alignment with Corvidae's professional scope of practice and in accordance with the code of ethics established by the College of Applied Biology.

1 INTRODUCTION

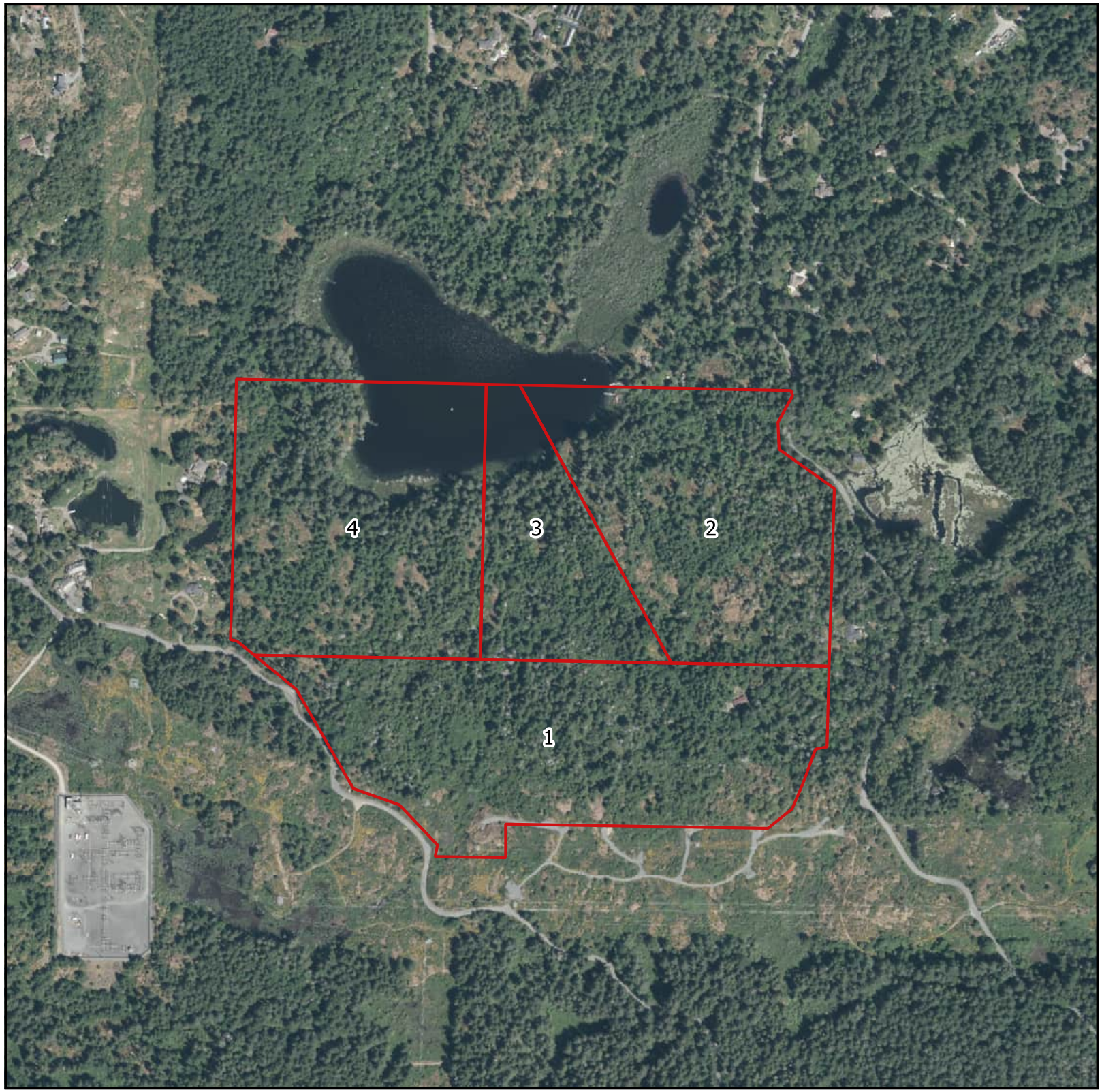
Corvidae Environmental Consulting Inc. (Corvidae) was retained by the Friends of Maltby Lake Watershed Society to prepare an Invasive Plant Removal Management Plan (IPRMP) for the Maltby Lake lands in Saanich, British Columbia (the "Survey Area"; Figure 1). The property encompasses approximately 45 hectares (Lots 1-4 of the Maltby Lake lands) and supports a diverse range of ecosystems, including mature and second-growth forest, Garry oak woodlands, rocky outcrops, wetlands, riparian areas, and the aquatic environment of Maltby Lake. Many of these ecosystems are identified as sensitive and contribute important ecological functions, including the provision of habitat for wildlife and species at risk.

Invasive plant species are non-native plants that spread rapidly and can outcompete native vegetation, resulting in reduced biodiversity, altered ecosystem processes, and degraded habitat quality. Within sensitive ecosystems such as Garry oak meadows and riparian areas, invasive species can significantly impact ecological integrity by displacing native plant communities, modifying soil conditions, and reducing the availability of food and habitat resources for wildlife.

The purpose of this IPRMP is to identify and map invasive plant species within the Survey Area, evaluate and prioritize areas for management, and provide practical, site-specific recommendations for invasive plant removal and ecological restoration. This plan is intended to support ongoing stewardship of the Maltby Lake lands by guiding efficient allocation of resources and promoting long-term ecosystem resilience.

This report is based on a combination of desktop review and field surveys conducted in December 2025 and January 2026 by Corvidae's Qualified Environmental Professionals (QEPs). The findings are used to inform a structured prioritization framework and to develop management strategies consistent with regional best management practices.

Implementation of this plan will assist in reducing the spread and impact of invasive species, protecting sensitive ecosystems, and enhancing native biodiversity across the Maltby Lake lands.



Survey Area

Figure 1

Maltby Lake, Saanich, BC

Legend

Survey Area

Imagery Source: CRD 2025

UTM Zone 10U, NAD 83

N

0 70 140 210 m

1:7,000

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2 METHODS

This IPRMP was developed using a combination of desktop and field methods in order to determine priority areas of restoration within the Maltby Lake lands.

2.1 DESKTOP REVIEW

Baseline biophysical conditions were compiled by reviewing the best available data and information including existing reports for the area and conducting searches of online databases:

- BC Conservation Data Centre (BC CDC 2026),
- BC HabitatWizard (Province of BC 2026),
- Aerial photographs of the Property (Google Earth 2026), and
- CRD mapping system and database (CRD 2026).

After a review of the above resources, preliminary ecosystem polygons across the Survey Area were delineated, classified, and mapped.

2.2 FIELD SURVEY

Field surveys were completed within the Survey Area by two QEPs from Corvidae. The surveys took place on December 11th and 23rd 2025, and January 27th, 2026.

Each ecosystem polygon identified during desktop review was surveyed to document the following:

- Ecosystem classification (non-sensitive and sensitive ecosystems),
- Ecological community classification,
- Invasive species presence,
- Estimated percentage cover of invasive species,
- Other disturbances (e.g., garbage, bike park), and
- Potential species-at-risk habitat and sensitive wildlife habitat features.

All wildlife and vegetation species observed during the surveys were recorded.

2.3 DATA ANALYSIS

A scoring system was developed and applied to each discrete ecosystem polygon, in order to determine restoration priorities. The system was adapted from the “Standard for Mapping Ecosystems at Risk in British Columbia” and the “Additional Environmentally Significant Areas Mapping Project” completed for District of Saanich (Ministry of Environment 2006; Moraia Grau and Associates 2012). The scoring system assessed Condition, Restoration Potential, and Ecosystem Priority for each ecosystem polygon (Table 1).

First, ecosystems were assessed for priority by ecosystem type. All non-sensitive ecosystems (e.g., young forest), or ecosystems that are subject to enduring disturbance (e.g., adjacent to BC Hydro right-of-way) were not considered a priority for restoration and thus were removed from further consideration in the assessment process.

The remaining sensitive ecosystems were assigned an Ecosystem Priority (P) score of '4' for those which require invasive species management, and '2' for ecosystems which require monitoring due to low invasive cover. Ecosystems were then assessed for Invasive Index (I) and Restoration Potential (R).

After removing the non-sensitive ecosystems (Low 'P' score) from the assessment process, the Restoration Priority of the remaining ecosystems was calculated by totaling the 'P', 'I', and 'R' scores.

Restoration Priority = P + I + R

The ecosystems were then ranked in order of restoration priority: Low, Medium, and High.

Table 1. Criteria used to evaluate restoration priorities

Ecosystem Priority (P)	
High (4)	Red-listed or sensitive ecosystems requiring management (>5% invasive cover).
Medium (2)	Red-listed or sensitive ecosystems requiring monitoring (<5% invasive cover).
Low (0; removed from assessment process)	Non-sensitive ecosystems, or ecosystems which are subject to enduring disturbance.
Invasive Index (I)	
4	Significant cover of exotic/invasive species (40-75%)
3	Some cover of exotic/invasive species (10-40%)
2	Minor cover of exotic/invasive species (<10%)
1	Exotic/invasive species dominate the vegetation layer and may total >75%
Restoration Potential (R)	
4	The natural species, soils and disturbance regime are mostly intact, only a minor control of invasive species is needed.
3	natural species, soils and disturbance regime are present, but sustained invasive species work is needed to achieve restoration.
2	Alterations to the natural disturbance regime require major work. The removal of invasive species will leave major portions of exposed soil, requiring plantings. Many years of work will be needed, to achieve a complete natural appearance.
1	The Site is dominated by invasive species and may be affected permanently

3 DESKTOP AND FIELD SURVEY RESULTS

The desktop data and field survey findings are summarized below. Results focus on characterizing invasive plant presence within the Survey Area to inform targeted management and mitigation measures. A comprehensive review of invasive plant conditions within the Survey Area is provided to inform the basis for invasive plant management strategies outlined in subsequent sections of this report.

3.1 ECOSYSTEMS

The Property is located within the Coastal Douglas-fir (CDF) biogeoclimatic zone, specifically in the Moist Maritime Coastal Douglas-fir Subzone (CDFmm) (BC CDC 2026). The CDFmm occurs at low elevations (<150 m) along southeast Vancouver Island, the southern Gulf Islands, and part of the Sunshine Coast. The CDFmm has the mildest climate in Canada. This subzone has a long growing season with warm, dry summers and mild, wet winters.

The Survey Area contains multiple ecosystem types, including five sensitive ecosystems that are listed under the BC Sensitive Ecosystems Inventory (SEI)[1], which defines sensitive ecosystems as being fragile and / or rare ecosystems with a potential to support rare species, wildlife habitats, and biodiversity. Ecosystems are outlined below in Figure 2. SEI ecosystem descriptions are provided in Appendix B.

Sensitive ecosystems within the Survey Area include:

- Older forest (OF),
- Terrestrial Herbaceous (‘rocky outcrop’; HT),
- Woodland (WD,
- Riparian (RI),
- Wetland (WN),
- Aquatic (Maltby Lake). Note: Aquatic ecosystems are not included under the SEI, however these ecosystems are inherently sensitive and ecologically valuable. Therefore, the aquatic ecosystem of Maltby Lake has been included as a “sensitive ecosystem” for the purposes of this report.

The SEI also identifies ‘Other Important Ecosystems’ which are not categorized as *sensitive* but are valuable for their contributions to biodiversity and important to wildlife. Other Important Ecosystems within the Survey Area include:

- Older Second Growth Forest (SG).

Non-sensitive ecosystems within the Survey Area include:

- Disturbed, and
- Young forest.

[1] BC Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands 1993-1997.

Ecosystem Types within the Survey Area

Figure 2

Maltby Lake Watershed Society

Legend

- Survey Area
- Wetland
- Stream

Ecosystem Polygons

- Disturbed
- Older Forest
- Terrestrial Herbaceous
- Riparian
- Woodland / Terrestrial Herbaceous
- Young Forest
- Aquatic/Wetland
- Older Second Growth Forest

Imagery Source: CRD 2025

UTM Zone 10U, NAD 83

N

0 30 60 90 120 m

1:2,650

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3.2 SPECIES AT RISK AND CRITICAL HABITAT

Several species and ecological communities at risk (mapped by the British Columbia Conservation Data Centre [CDC]) occur over the Maltby Lake lands. The locations of these occurrences are shown in Figure 3. Publicly available Species at Risk (SAR) element occurrences within the Survey Area include Western Painted Turtle (Pacific Coast Population), and Western Screech-owl, *kennicottii* subspecies (CDC 2026). Ecological community element occurrences which overlap the Survey Area include Douglas-fir / dull Oregon-grape, and Western Redcedar / Vanilla-leaf.

Maltby Lake also contains mapped critical habitat for Western Painted Turtle (CDC 2026). Potential habitat for Sharp-tailed Snake (mapped by CRD) is identified within Polygon 12. Corvidae QEPs field-verified this potential habitat polygon, and a second potential habitat polygon was observed within Polygon 17.

No SAR were directly observed or detected during the field surveys. However, likelihood of SAR observations was reduced because the surveys took place in the winter, when most herbaceous plants are dormant and wildlife species may be hibernating, or have reduced activity levels. Therefore, it is possible that SAR may be present within the Survey Area but were not observed. A list of all vegetation and wildlife species observed during the field survey is provided in Appendix C

Invasive plant species pose a risk to SAR and their habitats, particularly in sensitive ecosystems such as Garry oak ecosystems and riparian habitat. Species at risk depend on native plant diversity and habitat structure for survival. Invasive plant species have the ability to disrupt these conditions through competition and displacement, habitat alteration, and changes to soil chemistry and light availability. For example, Scotch broom is a highly aggressive shrub that creates dense thickets that shade-out native vegetation and reduces habitat suitability for ground nesting birds and native pollinators. Similarly, Bur chervil forms dense monocultures in open meadows that outcompete low-growing natives forbs, reducing availability for host plants for at-risk butterflies and native pollinators. Both Scotch broom and Bur chervil are particularly problematic in Garry oak meadows, where many rare and SAR native plant species occur.

Species at Risk Occurences and Habitat

Figure 3

Maltby Lake Watershed Society

Legend

Survey Area

Species and Ecological Communities at Risk (Publicly Available Occurrences)

- Douglas-fir / dull Oregon-grape
- Painted Turtle - Pacific Coast Population
- western redcedar / vanilla-leaf
- Western Screech-Owl, kennicottii subspecies

Critical Habitat for Federally Listed Species at Risk

- Western Painted Turtle Pacific Coast population

Potential Sharp-tailed Snake Habitat

Imagery Source: CRD 2025

UTM Zone 10U, NAD 83

N

0 40 80 120 160 m

1:3,500

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3.3 VEGETATION

Majority of the Survey Area is undisturbed and composed of mature native vegetation. Dry forests in the CDFmm zone are typically dominated by Douglas-fir (*Pseudotsuga menziesii var. menziesii*), Arbutus (*Arbutus menziesii*), and Western Redcedar (*Thuja plicata*). Grand Fir (*Abies grandis*) and Shore Pine (*Pinus contorta var. contorta*) may also be present. Salal (*Gaultheria shallon*), Dull Oregon-grape (*Mahonia nervosa*), Ocean Spray (*Holodiscus discolor*), Baldhip Rose (*Rosa gymnocarpa*), and Red Huckleberry (*Vaccinium parvifolium*) are common in the shrub layer. Bracken Fern (*Pteridium aquilinum*), Snowberry (*Symphoricarpos spp.*), grasses, and Pacific Sanicle (*Sanicula crassicaulis*) are common in the herb layer. Oregon Beaked Moss (*Eurhynchium oreganum*), Step Moss (*Hylocomium splendens*), and Electrified Cat's-tail Moss (*Rhytidiadelphus triquetrus*) dominate the well-developed moss layer (Nuszdorfer et. al 1991). A complete list of all plant species observed within the Survey Area is provided in Appendix C.

3.3.1. INVASIVE PLANT SPECIES

During the winter 2025/2026 invasive plant species surveys, no species on the Saanich eradicate list[2] were identified. The Provincial Priority Invasive Species List, the CRD Priority Invasive Plants list and the Coastal Invasive Species Committee Invasive Species list were used to identify invasive plant species within the Survey Area. A list of all invasive species observed during the survey period are provided below in table 1 and concentrated areas of invasive species are shown in Figure 3.

Scotch broom was the most commonly observed invasive plant species and is considered established at a high extent within the Survey Area (i.e., dominant and widespread, forming continuous infestations). Scotch broom is commonly established in majority of the rocky outcrop ecosystem polygons. English holly and spurge-laurel were observed within all ecosystem classes within the Survey Area to a moderate extent (i.e., identified in multiple small patches). Bur chervil, Canada thistle and Himalayan blackberry have established at a low extent (i.e., present in small, isolated patches or as scattered individuals) across the Survey Area. Bur chervil was identified in 1-3 rocky outcrop locations. Himalayan blackberry was highly established within one riparian ecosystem within the survey area, while low to moderate populations were identified in other riparian zones. Canada thistle was periodically scattered across all ecosystem classes. Notably, the field assessment was conducted outside of the growing season, the extent of invasive species establishment within the Survey Area is based on these conditions.

Table 2. Invasive plant species observed within the Survey Area during the Winter 2025/2026 field surveys

Common Name	Scientific Name	BC Provincial Status[a]	Provincial Priority Invasive Species[c]	CRD Priority Invasive Plants[d]	Coastal Invasive Species Committee[e]
Bur chervil	*Anthriscus caucalis*	Exotic	Management	--	Control
Canada thistle	*Cirsium arvense*	Exotic	--	Control	Control
English holly	*Ilex aquifolium*	Exotic	Management	Control	Control
Himalayan blackberry	*Rubus armeniacus*	Exotic	Reg. Containment / Control		Control

[2] Saanich Invasive Plants. 2025.

Common Name	Scientific Name	BC Provincial Status[a]	Provincial Priority Invasive Species[c]	CRD Priority Invasive Plants[d]	Coastal Invasive Species Committee[e]
Scotch broom	*Cytisus scoparius*	Exotic	Reg. Containment / Control	Control	Control
Spurge-laurel	*Daphne laureola*	Exotic	Management	Control	Control

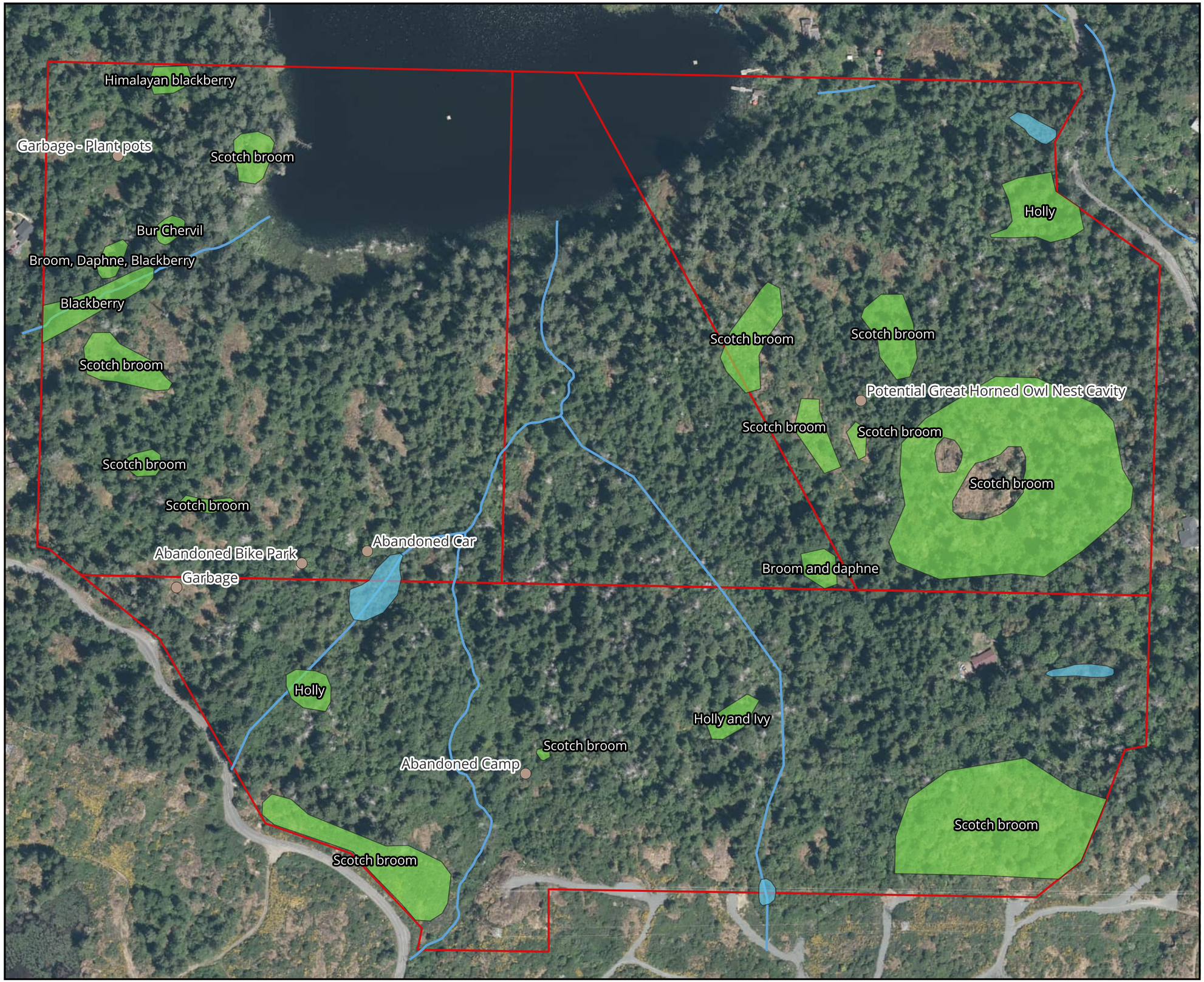
[a] BC CDC 2026

[b] *Red listed: native species or ecological communities that are extirpated, endangered, or threatened status in B.C| Blue listed: native species or ecological communities that are that are of special concern (formerly vulnerable) in B.C. | Yellow listed: species or ecological communities that are apparently secure and not at risk of extinction.*Gov. B.C. 2023.

[c] BC. Provincial Priority Invasive Species BC Inter-Ministry Invasive Species Working Group. January 2026

[d] Capitol Regional District. Invasive Species. 2026.

[e] Coastal Invasive Species Committee. Priority Invasive Plants. 2019.



Areas of Concentrated Invasive Species And Points of Interest

Figure 4

Maltby Lake Watershed Society

Legend

- Points of Interest
- Areas of Concentrated Invasives
- Wetland
- Stream
- Survey Area

Imagery Source: CRD 2025

UTM Zone 10U, NAD 83

N

0 30 60 90 120 m

1:2,650

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3.4 EVALUATION OF RESTORATION PRIORITIES

A total of 43 discrete ecosystem polygons were identified within the Survey Area. The priority criteria outlined in Table 1 (Section 2) were applied to each polygon. The results of the restoration priority evaluation are provided in Table 3 and shown in Figure 4.

Ten polygons received a score of 10 to 12 and are assigned a *High* priority for restoration. These ecosystems are general Terrestrial Herbaceous, Woodland ecosystems with high sensitivity, and significant cover of Scotch Broom.

Five polygons received a score of 11 and were assigned a *Moderate* priority for restoration. These ecosystems are generally Terrestrial Herbaceous, Woodland ecosystems with high sensitivity, and a low cover of Scotch Broom. Except for Polygon 41, which is a riparian ecosystem with low overall cover of English Holly.

Twelve polygons received a score of 7-8 and were assigned a *Low* priority for restoration. These ecosystems are generally sensitive ecosystems which contain a very low percentage cover (<5%) of invasive species. Except for Polygon 23, which is a riparian ecosystem with very high density of Himalayan Blackberry. Because of this extremely dense infestation, likelihood of successful restoration in this polygon is low and would require substantial effort.

No polygons received a score of 1-6. Fifteen polygons were classified as non-sensitive, or subject to enduring disturbance, and therefore were assigned a score of 0. These ecosystems are not currently a priority for restoration, except for one area within Polygon 22, where there is an abandoned bike park (see Section 4).

Polygon 4 (Maltby Lake) has not been completely assessed so it has not been assigned a priority yet. This ecosystem contains infestations of Yellow-flag Iris. However, this invasive species was not visible during the winter field surveys and so the full extent of the infestation could not be assessed. A follow-up assessment in the spring will be required to complete the assessment of Polygon 4.

Table 3. Results of Restoration Priority Evaluation by Polygon.

ID	Ecosystem Classification	Sensitive Ecosystem (Y/N)	Enduring Disturbance (Y/N)	P	I	R	Score (C+R+P)	Restoration Priority
1	Disturbed	N	Y	n/a	n/a	n/a	0	--
2	HT	Y	Y	n/a	n/a	n/a	0	--
3	Disturbed	N	Y	n/a	n/a	n/a	0	--
4	Aquatic	Y	N	4	*	*	*	Assessment Not Complete
5	OF	Y	N	2	2	4	8	Low
6	OF	Y	N	2	2	4	8	Low
7	OF	Y	N	2	2	4	8	Low
8	SG	N	N	n/a	n/a	n/a	0	--
9	SG	N	N	n/a	n/a	n/a	0	--
10	Young Forest	N	N	n/a	n/a	n/a	0	--
11	WD - HT	Y	N	4	2	3	9	Moderate

ID	Ecosystem Classification	Sensitive Ecosystem (Y/N)	Enduring Disturbance (Y/N)	P	I	R	Score (C+R+P)	Restoration Priority
12	WD - HT	Y	N	4	4	2	10	High
13	HT	Y	N	4	3	3	10	High
14	HT	Y	N	4	2	4	10	High
15	Young Forest	N	N	n/a	n/a	n/a	0	--
16	HT	Y	N	4	2	3	9	Moderate
17	HT	Y	N	4	2	4	10	High
18	WD - HT	Y	N	4	2	4	10	High
19	RI	Y	N	2	2	4	8	Low
20	Young Forest	N	N	n/a	n/a	n/a	0	--
21	Young Forest	N	N	n/a	n/a	n/a	0	--
22	Young Forest	N	N	n/a	n/a	n/a	0	Low-High**
23	RI	Y	N	4	1	2	7	Low
24	HT	Y	N	4	4	2	10	High
25	Young Forest	N	N	n/a	n/a	n/a	0	--
26	HT	Y	N	4	2	3	9	Moderate
27	HT	Y	N	4	2	4	10	High
28	HT	Y	Y	n/a	n/a	n/a	0	--
29	HT	Y	Y	n/a	n/a	n/a	0	--
30	HT	Y	Y	n/a	n/a	n/a	0	--
31	HT	Y	Y	n/a	n/a	n/a	0	--
32	HT	Y	N	2	2	4	8	Low
33	HT	Y	N	2	3	4	9	Moderate
34	HT	Y	N	4	4	2	10	High
35	HT	Y	N	4	3	3	10	High
36	HT	Y	N	2	2	4	8	Low
37	HT	Y	N	2	2	4	8	Low
38	HT	Y	N	2	2	4	8	Low
39	HT	Y	N	4	4	4	12	High
40	HT	Y	N	2	2	4	8	Low
41	RI	Y	N	4	2	3	9	Moderate
42	WN	Y	N	2	2	4	8	Low
43	RI	Y	N	2	2	4	8	Low

*Condition (C) and Restoration Potential (R) of Polygon 4 (Maltby Lake) not yet assessed due to seasonal timing of field surveys

**Majority of Polygon 22 is low priority except for a portion of the area which is an abandoned bike park.

Prioritized Restoration Areas

Figure 5

Maltby Lake Watershed Society

Legend

- Wetland
- Stream

Restoration Areas Prioritized

- High
- Moderate
- Low
- Assessment not complete
- Area Not Currently a Priority for Restoration

- Survey Area

Abandoned Bike Park

Imagery Source: CRD 2023

UTM Zone 10U, NAD 83

N

0 30 60 90 120 m

1:2,650

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4 RECOMMENDATIONS

It is recommended that restoration efforts be focused on areas evaluated as a *High* restoration priority (Table 3; Figure 3). Suggested priorities are discussed below. Invasive plant removal methods and native planting recommendations to be followed during restoration are provided in Section 5.

4.1 PRIORITY ONE – BIKE PARK REVEGETATION

The suggested first priority for restoration is revegetation of the abandoned bike park within Polygon 22. The bike park area is a high priority for preventative restoration because it contains an extensive area of unvegetated, disturbed soil which is likely to become infested with invasive species. During the field surveys, no invasive species were observed in this area yet; however, they are likely to establish quickly given the conditions. It is recommended that any invasives discovered within the bike bark area be removed, and any bare soil be revegetated using a native seed mix and/or native plant stock.

4.2 PRIORITY TWO – POLYGON 12

The suggested second priority for restoration is Polygon 12, a Woodland-Terrestrial Herbaceous Outcrop. This polygon is a suitable candidate for prioritized restoration. This ecosystem is high in elevation compared to the rest of the Maltby Lake lands and contains dense, mature Scotch Broom, so it is likely contributing Scotch Broom seeds to surrounding ecosystems. It is also reasonably accessible due to its proximity to residential areas. The ecosystem may also provide potential habitat for SAR such as Sharp-tailed Snake.

4.3 PRIORITY THREE – OTHER *HIGH* PRIORITY ECOSYSTEMS

The suggested third priority for restoration includes any of the ecosystems identified as *High* Priority in Table 3 and Figure 3. Specifically, The Friends of Maltby Lake Watershed Society may choose to prioritize Polygon 17 which also may provide potential habitat for Sharp-tailed Snake. Alternatively, Polygon 13 or 14 may be prioritized due to the dense Scotch Broom infestations and relative ease of access.

5 INVASIVE PLANT REMOVAL METHODS

This section outlines recommended removal methods for target invasive plant species within the Survey Area. Methods are consistent with regional best management practices (BMPs) used by the Capital Regional District (CRD) and the District of Saanich, and follow an Integrated Pest Management (IPM) approach emphasizing prevention, mechanical control, and targeted follow-up.

5.1 GENERAL GUIDANCE

- Conduct invasive species removal as per Section 5.4. Areas of high density invasives may require replanting with native species following invasive removal if substantial areas of bare soil are exposed (refer to invasive areas shown in Figure 4).
- Hand removal is most effective when soil moisture is high, allowing for complete root extraction.

- In general, plants should be removed prior to seed set to prevent further spread, if feasible. See Section 5.4 for specific timing for each species. If plants cannot be removed before setting seed, take care during removal to reduce seed spread by immediately bagging each plant after it's removed.
- All invasive plant material should be bagged and disposed of at an approved landfill (listed below).
- Monitor annually for re-establishment from the seedbank, which may persist for multiple years.
- Clean equipment to prevent spread between removal sites. Use a brush, scraper or pick to remove soil and plant fragments from tools and boots, and bag them for landfill disposal. Disinfect with water, a 10% bleach solution mixed with gentle soap. Allow the tools to sit for 1 minute in the mixture and rinse into household sink where runoff won't enter storm drains, ditches or natural areas. Allow equipment to dry before reuse.
- Do not knock soil off equipment in sensitive areas (i.e., riparian or rocky outcrops).

5.2 MANUAL REMOVAL TOOLS AND EQUIPMENT

Effective manual control of invasive plant species requires the use of appropriate hand tools and equipment to ensure removal is thorough, efficient, and minimizes disturbance to surrounding soils and native vegetation. The selection of tools should be based on target species characteristics (e.g., root structure, growth form), site conditions, and infestation size.

5.2.1. HAND TOOLS

Shovels and Spades: Used for digging out deep-rooted species and removing entire root systems, particularly for tap-rooted or rhizomatous plants. Sharp, flat-edged spades are preferred for precision in sensitive areas.

Hand Trowels: Suitable for small infestations or individual plants, allowing targeted removal with minimal soil disturbance.

Weeding Knives (Hori Hori): Effective for prying out plants with compacted roots or in rocky soils; useful for accessing plants in tight or sensitive locations.

Hand Pullers / Weed Wrenches: Designed for woody invasive species and shrubs, enabling leverage-assisted root removal with reduced operator strain.

Pruners and Loppers: Required for cutting back woody stems and small branches prior to root removal.

Hand Saws: Used for larger woody species where stems must be cut before stump removal or treatment.

5.2.2. SPECIALIZED EQUIPMENT

Root Extractors: Mechanical or manual devices that assist in removing entire root systems of larger plants, particularly in restoration settings.

Tarps and Collection Bags: Used to contain and transport removed plant material, preventing seed dispersal and spread of vegetative fragments.

Soil Sieves (where appropriate): May be used in high-value sites to remove root fragments or bulbs from excavated soil.

5.2.3. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Gloves: Durable, puncture-resistant gloves to protect against thorns, sharp tools, and skin irritants.

Safety Glasses: Recommended when cutting or working in dense vegetation.

Sturdy Footwear: Steel-toed or reinforced boots with good traction for uneven terrain.

Long Sleeves and Pants: To minimize skin exposure to irritant species and environmental hazards.

5.2.4. CLEANING AND MAINTENANCE SUPPLIES

Brushes and Scrapers: For removing soil and plant material from tools and equipment.

Disinfectant Solution (e.g., 10% bleach solution mixed with gentle soap): Used to clean tools between sites or infestations to prevent spread of invasive propagules.

Water Supply (portable): For rinsing tools and equipment. Do not use water from onsite aquatic ecosystems.

All tools and equipment must be cleaned before entering and leaving a site, in accordance with regional best management practices, to prevent the unintentional spread of invasive species. Tool selection and use should prioritize minimizing soil disturbance and avoiding damage to adjacent native vegetation and sensitive ecosystems.

5.3 DISPOSAL SITES

Approved disposal sites for the Saanich area:

- **Hartland Landfill** accepts all invasive species if bagged and labelled as invasive plants.
- **Saanich Garden Waste Disposal** – accepts the below species without seeds:
    - Scotch broom,
    - English ivy,
    - English holly,
    - Himalayan blackberry,
    - English hawthorn, and
    - Periwinkle.
- **Do not** compost any invasive plant materials.

Species that can be piled on-site to dry and decompose prior to flowering:

- Canada thistle (if no flowering or seeding material is present)
- English holly

Species that must be bagged and disposed of at a facility:

- Bur chervil
- Himalayan blackberry
- Scotch broom
- Spurge-laurel
- Yellow flag-iris

5.4 SPECIES SPECIFIC REMOVAL METHODS

5.4.1. BUR CHERVIL

Removal Method

Small infestations should be removed through hand-pulling or digging, ensuring the entire taproot is extracted. For larger infestations, where hand-pulling would be too time consuming, infestations can be sprayed with 10% vinegar. Note, vinegar will affect any herbaceous plant or moss that it comes in contact with. So, care must be taken to target spraying as much as possible. Spray in late winter (January-February) while most native annuals are still dormant. Spray thoroughly to wet plant leaves. Apply on dry, sunny day, and during a dry period (no rain for 48 hrs) for maximum efficacy. Return to site after one week and reapply. Monitor weekly and reapply if new growth still present, or remove remaining live plants by hand.

Treatment Timing

For hand-removal, spring to early summer, conduct removal prior to flowering and seed set. For vinegar treatment, late winter (January-February).

Disposal

Non-seeding material may be left on the property in areas only where low risk of spread exists such as, high organic soils with full sun or designated compost sites with no animal access. All flowering and seeding material must be bagged and disposed of at an approved landfill.

5.4.2. CANADA THISTLE

Removal Method

Control is typically achieved through repeated cutting, mowing, or hand-pulling, which reduces plant vigor by depleting root energy reserves. Complete eradication is unlikely due to extensive rhizome systems. Cutting should occur multiple times per growing season (2–4 times) to effectively stress the plant. Removal is most effective when conducted prior to flowering, preventing seed production. Avoid fragmentation of roots during pulling, as this may stimulate additional shoots. If cut before flowering, plant material may be left on-site to decompose.

Treatment Timing

Complete cutting prior to flowering in the early spring and repeat often (every 2-3 weeks) throughout the growing season.

Disposal

If cut before flowering, material may be left on-site to dry and decompose. If flowering or seeding material is present, all plant material must be bagged and disposed of at an approved landfill.

5.4.3. ENGLISH HOLLY

Removal Method

Seedlings and saplings can be hand-pulled. Mature plants should be cut at ground level using hand tools or power equipment. Where feasible, root systems should be removed to prevent re-establishment. This may require power equipment depending on stump and root size. Removal should occur prior to berry production to prevent dispersal by birds. Minimize disturbance to surrounding soil and vegetation during removal. Holly does not readily resprout from cut material and may be piled on-site to dry and decompose.

Treatment Timing

Removal should occur prior to winter berry production (January) to prevent dispersal by birds.

Disposal

English holly does not readily resprout from cut material and may be piled on-site to dry and decompose. Alternatively, material can be bagged and disposed of at a landfill.

5.4.4. HIMALAYAN BLACKBERRY

Removal Method

Manually cut canes at ground level using loppers or brush cutters. Where feasible, excavate root crowns to reduce regrowth. Repeated cutting is often required for effective control. Expect regrowth; repeat treatments over multiple seasons are required. Continuous efforts to weaken the root system is required.

Treatment Timing

Spring to early summer, before fruit production.

Disposal

Plant material can be burned when conditions and fire bylaws allow. Otherwise, all plant material must be bagged and disposed of at a landfill. Do not store Himalayan blackberry on-site to decompose as the canes are likely to re-root and this will cause further spread.

5.4.5. SCOTCH BROOM

Removal Method

Small plants can be hand-pulled with minimal soil disturbance. Larger plants should be cut below the root crown (below the soil surface) using loppers. It is important to cut low enough to prevent re-sprouting. Scotch broom has a long-lived seedbank (can remain dormant and survive over multiple decades). Avoid disturbing soil to not stimulate germination from the seedbank. For particularly large plants, with particularly deep root systems, stems can be cut ~4-6 inches above the soil (below the lowest branch if possible) and the bark on the remaining stem can be peeled back like a banana (girdled). Peeling the bark exposes the stem leading to desiccation. This method is experimental so monitor annually for success.

Treatment Timing

March to early June when plants are flowering, but prior to seed set. Removal can occur year-round, provided seed dispersal is avoided. Peeling bark method is best completed in the dry months.

Disposal

All plant material should be removed from site, as cut material can release allelopathic compounds. All plant material must be bagged and disposed of at a landfill.

5.4.6. SPURGE-LAUREL

Removal Method

Small plants can be hand-pulled. Larger plants should be cut just below the soil surface to remove the root crown. Repeated removal may be required due to resprouting and seedling recruitment. Plant sap is toxic and can cause skin, eye, and respiratory irritation. Always wear gloves when handling spurge laurel as it produces a noxious substance which can cause severe eye and skin irritation. Do no transport inside an enclosed vehicle as the plants can cause respiratory irritation.

Treatment Timing

Removal can occur year-round, though care should be taken to avoid spreading berries.

Disposal

All plant material must be bagged and disposed of at a landfill.

5.4.7. YELLOW FLAG IRIS

Removal Method

Hand-pull to remove as much of the root system as possible. Ongoing maintenance / removal is likely. (Note: Removal of aquatic vegetation requires a notification to the Province under Section 11 of the Water Sustainability Act). Control of yellow flag iris requires careful management due to its aggressive rhizomatous growth and frequent occurrence in wetlands, ditches, and shallow aquatic environments. Small infestations may be controlled through hand-pulling or digging, ensuring complete removal of rhizomes. Larger infestations typically require mechanical excavation or cutting combined with repeated follow-up treatments. In aquatic settings, removal may involve cutting and isolating rhizomes to prevent downstream spread. All rhizome material must be removed, as fragments can readily re-sprout and spread. Work in saturated soils or shallow water should proceed cautiously to minimize sediment disturbance and turbidity, which can facilitate spread. Installation of containment measures (e.g., silt curtains) may be required in aquatic environments to prevent fragment dispersal. Mechanical removal may not be appropriate in highly sensitive habitats without environmental monitoring. Repeated treatments are often required due to persistent rhizomes and seedbanks. Follow-up removal is typically required for multiple years to achieve effective control. Restoration with native wetland species is recommended to reduce reinvasion potential. Personnel should wear gloves and protective clothing, as plant sap may cause skin irritation in some individuals.

Treatment timing

Ideally late spring to early summer. Removal is most effective when conducted prior to flowering and seed set.

Disposal

All plant material, including rhizomes and seed heads, must be carefully contained, bagged, and disposed of at an approved landfill. In some cases, material may be dried thoroughly (desiccated) in a secure location prior to disposal.

6 NATIVE PLANT RESTORATION

Restoration of native vegetation is a critical step following the removal of invasive plant species to prevent re-invasion and to enhance ecosystem function. Once invasive populations have been effectively controlled, the site should be assessed for residual soil disturbance, erosion risk, and the presence of invasive propagules. Areas cleared of invasive species often have exposed soil or altered microhabitats, which can be highly susceptible to colonization by opportunistic non-native plants if left unmanaged. Implementing a timely restoration strategy helps stabilize the site, promotes biodiversity, and supports the recovery of native plant communities.

Objectives

- Re-establish native plant communities representative of local ecosystems within areas of exposed soils identified as at-risk for invasive species re-establishment,
- Reduce susceptibility to invasive species re-establishment,
- Enhance habitat for wildlife and species at risk, and
- Stabilize soils and minimize erosion.

6.1 PLANTING INSTALLATION GUIDELINES

Planting locations will ultimately be determined on-site by site conditions and should take micro-sites (e.g., steep slopes) into consideration. Plant installation guidelines are outlined below:

- The use of native species should aim to replicate natural structural diversity, including a mix of groundcover, shrubs, and canopy species, to support wildlife habitat and ecological processes.
- Planting should take place in the fall months to increase plant survivorship.
- Species will be planted in locations suitable for their respective growth conditions (e.g., light, moisture, soil type).
- Plantings should be arranged in loose groupings rather than at uniform distances to achieve a more natural aesthetic.
- If smaller plants are used, increase density. If potted plants are 2 gal or larger, allow at least 1 m between plants and apply native seed mix in between.
- Planting holes must have loose, scarified soil at 100 mm depth and backfilled with soil that is free of subsoil, rocks, roots and debris.
- Given the site topography, water for planting may not be feasible in all restoration areas on the property, therefore planting in these areas should be completed in late fall when rainwater is available.

6.2 NATIVE PLANT SELECTION

Detailed guidance on planting is outside the scope of this report. However, this service can be provided to Friends of Maltby Lake Watershed Society if requested. At this time, a preliminary list of native plants recommended to be planted within the bike park area is provided in Table 4. A preliminary planting list for Woodland/Terrestrial Herbaceous Ecosystems is provided in Table 5.

Table 4. Recommended Planting List for Bike Park Restoration

Common Name	Species
Trees	
Bigleaf maple	*Acer macrophyllum*
Red alder	*Alnus rubra*
Douglas-fir	*Pseudotsuga menziesii*
Black cottonwood	*Populus trichocarpa*
Shrubs	
Dull Oregon-grape	*Mahonia nervosa*
Nootka rose	*Rosa nutkana*
Salal	*Gaultheria shallon*
Salmonberry	*Rubus spectabilis*
Thimbleberry	*Rubus parviflorus*
Forbs	
Sword fern	*Polystichum munitum*
Fringecup	*Tellima grandiflora*
Siberian miner's lettuce	*Claytonia sibirica*

Table 5. Recommended Planting List for Woodland/Terrestrial Herbaceous Ecosystems

Common Name	Species
Trees	
Garry oak	*Quercus garryana*
Arbutus	*Arbutus menziesii*
Shrubs	
Oceanspray	*Holodiscus discolor*
Common snowberry	*Symphoricarpos albus*
Forbs	
Yarrow	*Achillea millefolium*
Nodding onion	*Allium cernuum*
Great camas	*Camassia leichtlinii ssp. suksdorfi*
Common camas	*Camassia quamash ssp. maxima*
Menzie's larkspur	*Delphinium menziesii*
Small-flowered Blue-eyed Mary	*Collinsia parviflora*
Sea blush	*Plectritis congesta*
Grasses	
California brome	*Bromus carinatus*
California oatgrass	*Danthonia californica)*

Satinflower Nurseries in Saanich stocks native seed blends. The Satinflower Diversity Meadow – Garry Oak Ecosystem or Garry Oak Ecosystem Graminoids seed blend would be recommended within Woodland / Terrestrial Herbaceous ecosystems on the property. The Satinflower Woodland seed blend is recommended for the forested ecosystem areas.

7 RESTORATION MITIGATION MEASURES

To ensure protection of the environment during restoration activities, the following mitigation measures should be implemented:

- Invasive vegetation removal activities within riparian, aquatic, and wetland ecosystems (e.g., Maltby Lake, Polygon 41) may require permitting under the Riparian Areas Protection Regulation (RAPR), or Water Sustainability Act (WSA). Consult a Qualified Environment Professional (QEP) before engaging in restoration activities within these areas.
    - At this time, none of the prioritized restoration areas require instream vegetation removal.
- During restoration, avoid disturbance of woody debris which may provide habitat for wildlife.
- Between March 1st and August 15th is the peak of the migratory bird nesting period. During this time, birds are likely to be nesting not only in trees, but in shrubs, or directly on the ground. Exercise caution when removing invasive vegetation during this time period to avoid disturbance or destruction of active bird nests which are protected under the Wildlife Act, and Migratory Birds Convention Act. Bird behaviors which may indicate the presence of an active nest include:
    - Repeatedly returning to an area with food or nest materials;
    - Loud, repetitive and persistent alarm calling;
    - Fleeing from an area once approached but remaining within proximity to the suspected nest location;
    - Dive-bombing and becoming territorial/aggressive within the suspected nest area.
    - Circling/flying overhead repeatedly.
- If an active bird nest is discovered during restoration activities, vacate the area and stop all disturbance within 30 m of the nest. Contact a QEP for guidance.
- Reduce soil disturbance as much as possible. Where feasible, schedule restoration activities to occur outside of periods of heavy/prolonged precipitation.

8 FUTURE RECOMMENDATIONS AND STUDIES

Future recommendations to further the restoration activities and ecological enhancement within the Maltby Lake lands include:

- Follow-up field surveys in Spring 2026 to assess Yellow-flag Iris infestation within Maltby Lake.
- Follow-up rare plant surveys in Spring 2026 to assess sensitive ecosystems for SAR presence.

Studies to determine potential habitat restoration opportunities for SAR include:

- Western Painted Turtle surveys and habitat assessment within Maltby Lake.
- Sharp-tailed Snake surveys within polygons with potential habitat (e.g. Polygons 12 and 17).
- Western Screech Owl (WSOW) call playback surveys, and/or passive acoustic monitoring using autonomous recording units (ARUs) to determine potential WSOW nesting presence in the area.
- Aquatic survey of Maltby Lake to study presence of freshwater jellyfish and/or rare sponges.
- Blue-grey Taildropper surveys.

9 SUMMARY

An Invasive Plant Management Plan of the Survey Area within the Maltby Lake Lands in Saanich, BC has been presented in this report, including species specific removal methods and restoration considerations. Provincial and municipal best management practices for invasive plant removal have been provided and used to outline the removal methods in this report. Implementation of the removal methods recommended in this report will minimize future invasive plant species establishment within the protected lands.

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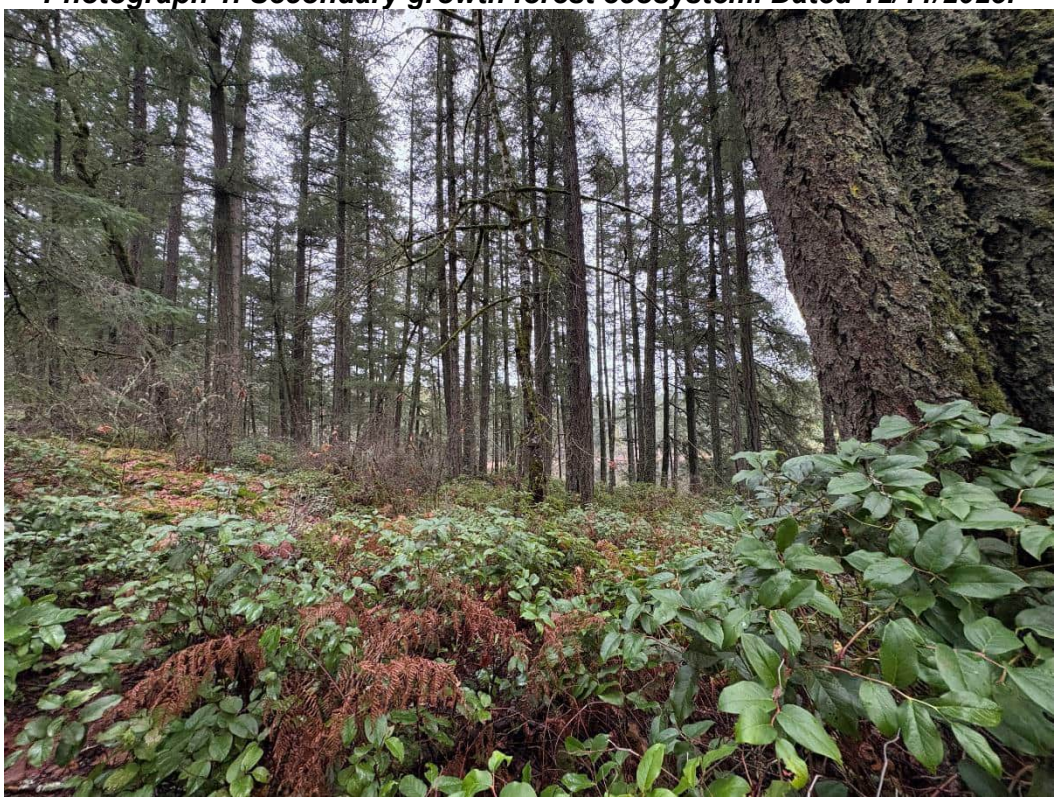
APPENDIX A: SITE PHOTOGRAPHS

Photograph 1. Secondary growth forest ecosystem. Dated 12/11/2025.



Photograph 2. Older growth forest ecosystem. Dated 12/11/2025.

Photograph 3. Maltby Lake – Open water ecosystem. Dated 12/11/2025.

Photograph 4. Riparian area ecosystem. Dated 12/11/2025.

Photograph 5. Herbaceous rocky outcrop ecosystem with Garry Oak sensitive ecosystem. Dated 12/11/2025.

Photograph 6. Thick stands of invasive Himalayan Blackberry within riparian habitat. Dated 12/11/2025.

Photograph 7. Dense mature Scotch broom identified in a thick stand within a rocky outcrop Garry Oak sensitive ecosystem on the Property. Dated 01/27/2026.

Photograph 8. Mature stands of English Holly identified within Riparian areas. Dated 12/23/2025.

Photograph 9. Area of high disturbance and exposed soils prone to invasive weed species colonization. Dated 12/11/2025.

Photograph 10. Evidence of isolated stands of Spurge-laurel. Dated 12/11/2025.

APPENDIX B: ECCC – SENSITIVE ECOSYSTEMS INVENTORY: EAST VANCOUVER ISLAND AND GULF ISLANDS 1993-1997

3.4 Terrestrial Herbaceous (HT)

Natural grasslands and moss-dominated ecosystems (HT):
rock outcrops are a dominant feature (HT:ro)
shrub cover is more than 20% (HT:sh)

Three categories of Terrestrial herbaceous ecosystem are recognized for this project: sites with continuous vegetation cover (HT); sites with rock outcrops as a dominant feature (HT:ro) (Photo 3); and sites with more than 20% shrub cover (HT:sh). They occur as open wildflower meadows and grassy hilltops and in most cases are interspersed with bare rock outcrops. They develop where thin, rapidly draining soils and difficult environmental conditions restrict the establishment of trees and shrubs. Nutrients are quickly leached out during winter rains, and summer heat and light conditions can create drying conditions. Most frequently, this results in less than 10% tree cover and less than 20% shrub cover. HT ecosystems may have taken a hundred years or more to reach their current state and composition.

There may be an overlap with species common to the Coastal Bluff (CB) ecosystem, although HT ecosystems are more extensive, complex and species rich. Where environmental conditions are more conducive for woodland and forest development, HT ecosystems may be interspersed with other SEI ecosystems such as woodland, older forest and older second growth forest.

Terrestrial Herbaceous ecosystems are **sensitive** for the following reasons:

- **Rarity:** Undisturbed sites are rare both within the SEI study area and in the rest of coastal B.C. A variety of individual rare species also occur here.

- **Fragility:** Whereas the bedrock beneath is generally stable, the species that inhabit these ecosystems are less so. Micro-habitats and niches may encompass only a few square inches or feet. Thin soils are easily disturbed, and herbaceous plants can be easily trampled, or dislodged onto bare rock where they cannot re-establish.

- **High biodiversity:** The various combinations of environmental factors affecting these HT sites have created a diversity of micro-habitats that meet the requirements of many different plants, animals and invertebrate species. These include hummocks, hollows and vernal pools.

- **Specialized habitats:** There are a number of species unique to these habitats within the SEI study area. Some are rare, and are only known to occur in these ecosystems. Others represent populations surviving at their most northern or western range limits.

Terrestrial Herbaceous

Site Factors

Terrestrial herbaceous ecosystems are found outside the salt spray zone near shorelines, all the way to the summits of local hills and mountains. They occur in very small patches, often in a mosaic of several types of herbaceous community and often within a larger forested site or landscape. Level to moderately sloped (<30%), typically thin soiled, most of these dry sites are exposed and open. Bedrock is exposed as rock outcrops. Pockets of deeper soils may support sparse trees.

Plants

General attributes: Many of the plants are similar to those in woodlands, but these polygons are dominated by grasses and mosses.

Trees and shrubs: Where they occur, trees are Douglas-fir, arbutus, Garry oak, and lodgepole pine; sparse shrub cover includes oceanspray, snowberry, salal, baldhip rose and tall Oregon-grape.

Herbs: In some areas, wildflowers completely dominate the vegetation in spring and include nodding onion, harvest brodiaea, and common camas, blue-eyed grass, shooting-star, fawn lily, sea blush, and saxifrage. Native grasses, if present, may include California oatgrass, Junegrass, western fescue, blue wildrye, and Columbia brome. Sedges include short-stemmed sedge and long-stoloned sedge.

Mosses and lichens: Roadside rock moss is typical. In shady and moister microsites, mosses include electrified cat's tail moss, step moss, and Oregon beaked moss.

Community types: Includes some rare types such as the Idaho fescue–Junegrass, long-stoloned sedge-rock moss and California oatgrass–Idaho fescue communities.

Rare plants: A variety of rare plants can occur such as seaside rein orchid, slimleaf onion, Lemmon's needlegrass, prickly pear cactus, and farewell to spring.

Introduced species: Sweet vernalgrass, hedgehog dogtail and other introduced grasses are common, and Scotch broom threatens many sites.

Animals

Amphibians & Reptiles: Garter snakes are likely to be relatively common and the red-listed Sharp-tailed Snake is a slight possibility.

Birds: Trees around the perimeter can be expected to receive high bird use. Vesper Sparrow and Streaked Horned Lark, now vanished from the study area, are grassland species that used these sites, and a variety of other more common sparrows, such as Lincoln's, Savannah and Song, still do so.

Mammals: Voles, mice, shrews and cottontail rabbits are likely to be common, and they attract a variety of predators including a number of raptors. Black-tailed Deer can be expected to make high use of these sites in spring and summer.

Invertebrates: Invertebrate production appears to be very high, and a wide variety of aerial insectivores – swallows, flycatchers, bats, and others – are likely to hunt insects over these openings. These sites also have very high values for butterflies including the Zerene Fritillary and the Anise Swallowtail.

3.5 Wetland (WN)

Wet soils and moisture-dependent plants:
Bog (WN:bg); Fen (WN:fn); Marsh (WN:ms); Swamp (WN:sp);
Shallow water (WN:sw); Wet meadow (WN:wm)

Wetland ecosystems are among the most productive environments in the world. Six classes of wetland are recognized for this project: Bog (WN:bg), Fen (WN:fn), Marsh (WN:ms), Shallow Water (WN:sw), Swamp (WN:sp), and Wet Meadow (WN:wm). They occur where the water table is at, or near, or above the soil surface and soils are saturated for sufficient length of time that excess water and resulting low soil oxygen levels are principal determinants of vegetation and soils development (Mckenzie and Banner 1998). Photos 4, 5, and 6 show examples of marsh, shallow water and swamp wetlands.

Wetlands often occur as mosaics of several wetland classes (for example, WN:ms:sp:sw) or are transitional between two classes. (For example, common transitions occur between bogs and fens, as well as between fens and swamps.) This reflects the variation of the wetland environment, particularly seasonal water depth as well as successional processes. The concentric pattern of species distribution around some wetlands is an example of this process.

Wetland ecosystems are **sensitive** for the following reasons:

- **Highly threatened:** They are among the most threatened habitats in the world, mainly due to drainage, land reclamation, pollution and overuse by competing land interests.

- **Rarity:** Wetlands are naturally uncommon in this area because of the rain-shadow climate with its low annual precipitation and pronounced summer dry period.

- **High biodiversity:** Wetlands support a high number of habitat niches which provide critical habitats for numerous mammal, bird, reptile, amphibian, fish and vertebrate species.

- **Vulnerability to changes in hydrology and water quality:** Wetlands respond to small changes to hydrology such as reduced summer flow or lowering of the water table through drainage. Urban storm drainage, nutrient rich agricultural run-off, sediment from road building and other forestry activities and even limited changes in nitrogen or phosphorous levels can reduce the zone in which a specific wetland community can live.

Wetland

Site Factors

Bog: Peat wetland with water table at or near the surface; stagnant water originating from precipitation. Surfaces often raised or level with surroundings and are isolated from nutrient-rich groundwater. Bogs are thus very low in nutrients and are generally acidic in nature; organic substrate.

Fen: Peat wetland with the water table at or a few centimetres above or below the surface. Primary water source is groundwater or runoff from adjacent mineral uplands resulting in mineral-rich environments. Water not stagnant, but moves through peat by seepage, or open channels; organic substrate.

Marsh: May be freshwater, estuarine or saline nutrient-rich wetlands, permanently, seasonally or diurnally inundated. Marshes that dry by late summer, or at low tide, expose matted plants and unvegetated mud or salt flats, but saturation persists near the surface. Mainly mineral substrate with an occasional, well-decomposed peat veneer (freshwater sites) derived primarily from marsh plants. The substrate is strongly influenced by water chemistry, which in turn reflects basin geology and regional climate.

Shallow Water: Permanent, shallow water areas less than 2 m in depth in mid-summer. Sparse rooted vegetation. This class of wetland includes what are often termed ponds and sloughs.

Swamp: Characterized by periodic flooding and nearly permanent sub surface water flow through mixtures of mineral and organic materials. Thin organic layers, when present, are generally well-decomposed wood, although sedge material may occur below. A deep, well-humidified humus layer may also be present. Nutrient content is variable and dependent on water minerals. Standing or gently flowing water through pools or channels is typical and results in greater aeration than in fens, so sufficient dissolved oxygen occurs to support either shrubs or trees.

Wet Meadow: Wet meadows are one of the rarer wetland types. These herbaceous wetlands are on mineral materials, generally gleysols, which are periodically saturated but rarely inundated. After seasonal saturation, the water table drops below the rooting zone leaving a nutrient-rich, well-aerated rooting medium.

Plants

Bog: ***Trees & shrubs:*** Trees usually absent; may get scattered, small-stature lodgepole pine or western red cedar. Ericaceous shrubs common, such as Labrador tea, western bog-laurel, and bog cranberry. ***Herbs:*** Bog gentian and other acid loving species. ***Mosses & lichens:*** Covered or filled with poorly to moderately decomposed sphagnum peat mosses. Ribbed bog moss may also be observed.

Fen: ***Shrubs:*** Non-ericaceous shrubs such as sweet gale and hardhack, especially around the perimeter. ***Herbs:*** Densely herbaceous with sedges such as Sitka sedge, water sedge, dulichium and inflated sedge; grasses such as reed canarygrass and creeping bentgrass, other grasslike species such as common rush and common spike-rush. ***Mosses & lichens:*** Well to poorly decomposed sedge and/or brown moss such as sickle moss.

Marsh (freshwater): ***Herbs:*** Extensive emergent herbaceous community typified by a wide variety of sedges, rushes, grasses and reeds. Sedges are numerous and include beaked sedge, Sitka sedge and slough sedge. Other plants include cattail, tapered rush, hard-stemmed bulrush, buckbean, creeping spike rush and small flowered forget-me-not. ***Mosses & lichens:*** Due to regular flooding, the moss layer is usually sparse. ***Rare species:*** Henderson's checker-mallow.

Marsh (brackish and saline): ***Herbs:*** Dominated by American glasswort, seashore saltgrass, alkaligrass, seaside plantain, tufted hairgrass, arctic rush and Lyngby's sedge. ***Rare community types:*** Tufted hairgrass-Henderson's checker-mallow. ***Rare species:*** Fleshy jaumea, beach sand-spurry and slender arrowgrass. ***Introduced species****:* European glasswort.

Shallow Water: ***Aquatics:*** Submerged and floating plants. Common species include floating-leaved pondweed, yellow pond-lily, and watershield. ***Rare species:*** Water-pepper.

Swamp: ***Trees & shrubs:*** Wooded wetlands dominated by 25% or more cover of flood-tolerant trees or shrubs including western red cedar, Pacific crab apple, willows and hardhack, which may be dense. ***Herbs:*** Skunk cabbage, sedges and other flood tolerant species such as horsetail may be present.

Wet Meadow: ***Herbs:*** The mixture of flood-tolerant grasses, low sedges, rushes, and forbs provide a grassy overall appearance. Wet meadow vegetation includes tufted hairgrass, cow-parsnip, and tall mannagrass. ***Rare species:*** Northern adder's tongue, Henderson's checker-mallow, greensheathed sedge and Geyer's onion.

3.6 Riparian (RI)

All stages of floodplain vegetation (RI:1-7)
Riparian gullies [RI:g]

A *riparian ecosystem,* as identified for this project, is a distinct ecological system and is not to be confused with the term *riparian zone*. A riparian zone describes a fixed width management area surrounding streams and wetlands, with no consideration of ecological boundaries. Riparian ecosystems vary in width, from less than one metre adjacent to a small stream with steep banks to more than 100 metres near large rivers, and are delineated by site-specific vegetation, soil, and elevation features.

For the SEI, riparian ecosystems are classified according to seven **structural stages**[23] and include riparian gullies (RI:g). They are often a complex of more than one stage because of their highly dynamic nature; the dominant stage is listed first (e.g., RI:4:5:6:g). Abbreviated descriptions of each structural stage are given below.

- **RI:1 Sparse/bryoid** - moss and lichen dominated, <10% treed, <20% shrub/herb.
- **RI:2 Herb** – herb dominated, <20% shrub, <10% treed.
- **RI:3 Shrub/herb** – >20% shrub, <10% treed.
- **RI:4 Pole/sapling** – trees >10 m tall, densely stocked, 10 - 40 years old.
- **RI:5 Young forest** – self-thinning evident, 40 - 80 years old.
- **RI:6 Mature Forest** – 80 - 250 years old.
- **RI:7 Older forest** - >250 years old.

Riparian ecosystems are nutrient-rich environments with rapid tree growth and understories which are rich in species and sometimes impenetrably dense (Photo 7). They occur on floodplains next to lakes, streams and rivers, where higher soil moisture and light conditions support plant communities and soils distinct from surrounding terrestrial areas; these areas rarely have summer soil moisture deficits. They commonly vary in dominant plant species, vegetation age, and structure radiating out from the aquatic feature; this pattern of zonation is more pronounced along large rivers. Nearest the river channel, grasses, sedges, and some forbs colonize the highest part of exposed gravel or cobble bars; adjacent to this, young trees grow rapidly once seeds have lodged between rocks and are covered by gravel or silt; upslope of this, mixed forests thrive in the rich, moist soils and are tolerant of periodic winter flooding.

Although gullies are sloped and not on floodplains, they receive moisture and nutrients from above and as such, are also particularly rich and productive sites. Gullies are not always associated with surface water flow; in many cases, seepage areas along the gully walls maintain moist soil conditions. Gullies are important since their typically steep sides often make them inaccessible, particularly to human disturbance. This permits growth of species that are susceptible to disturbance.

Riparian ecosystems are highly dynamic. Chronic and episodic disturbances such as periodic flooding, wind throw, stream channel changes, slope failures and debris flows are common in riparian ecosystems, increasing structural forest features such as snags, downed

[23] See Appendix 2 for full descriptions of these stages

logs, and a multi-layered, uneven aged canopy, as well as the range of successional stages from recently exposed gravel bars to western red cedar forest.

This ecosystem type is often naturally linear. However, the complex history of forestry, agriculture, and urban development in this study area has increased the fragmentation and reduced the continuity of many riparian ecosystems.

Riparian ecosystems are **sensitive** for the following reasons:

- **High biodiversity:** Riparian areas support a disproportionately high number of species for the area they occupy. They contain water, cover and food, the three critical habitat components for wildlife, and have a concentration of varied habitat niches that are important for wildlife species. They also have a greater diversity of plant composition and structure than uplands. The elongated shape of most riparian ecosystems maximizes the amount of edge habitat and creates diverse and productive habitats for many species. Riparian ecosystems also have different microclimates from surrounding coniferous forests due to increased humidity, a higher rate of transpiration, and greater air movement. These conditions are preferred by some species during hot weather.

- **Aquatic Habitat Protection:** Riparian ecosystems contribute to the ecological health of adjacent aquatic areas through shading, bank stability, and the addition of large logs into the stream or lake margin.

- **Wildlife corridors:** Riparian ecosystems are often linear and may function as linkages or corridors within the broader landscape. In highly fragmented landscapes such as eastern Vancouver Island, wildlife species depend on a series of inter-connected habitat patches.

Examples of mature riparian ecosystems occur along the Qualicum River, Nanaimo River, Quinsam Lake and River system, Haslam Creek, Oyster River, Englishman River system (Figure 14), French Creek and Nile Creek

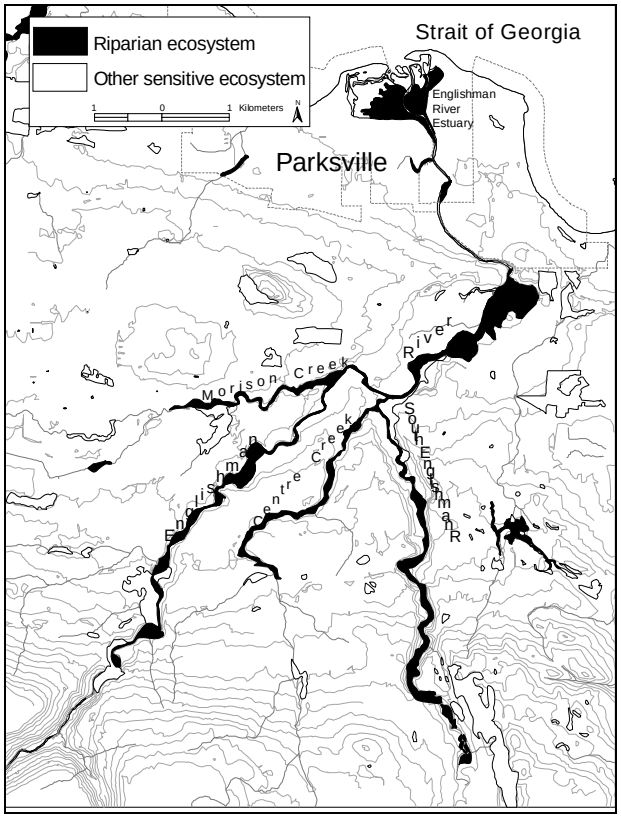


Figure 14: Riparian ecosystem polygons on the tributaries and main stem of the Englishman River

Riparian

Site Factors

Alongside lakes, streams, and rivers and influenced by fluctuating water tables and periodic flooding. Inundation can be seasonal to only every few years. Slope is moderate to virtually level, although mounding may occur. Rich, moist fluvial and lacustrine soils produce lush vegetation. Soil texture may range from sorted silts and sands to coarse gravels and rounded boulders. Soils are usually classified as Gleysols or Regosols. Because of the limited time available for decay, sites subjected to frequent flooding have absent or poorly developed forest soils. Riparian gullies are not subject to flooding. Slopes are generally steep, and soils are variable.

Plants

***General*:** Vegetation varies with flooding frequency. Vegetation in gullies is generally not strongly influenced by the water. The vegetation community that develops depends on soil moisture and nutrient availability.

***Trees & shrubs**:* Typically a mix of flood-tolerant conifers together with red alder, black cottonwood, willows, and bigleaf maple. Shrubs include salmonberry, red elderberry, and devil's club. For sites flooded infrequently (i.e. less than once every five years), mature stands may be dominated by conifers such as western red cedar, Sitka spruce, and western hemlock.

Herbs: Herbs include false lily-of-the-valley, foamflower, and ladyfern.

***Mosses & lichens**:* Mosses can include Menzies' tree moss, slender beaked moss, and badge moss.

***Rare Plants**:* Rare plants in riparian forests may include Smith's fairybells, semaphore grass, and the giant chain fern.

Animals

***Amphibians & Reptiles**:* Frogs (e.g. Tree frog, Red-legged Frog), salamanders and snakes occur in these polygons.

***Birds**:* Belted Kingfishers, Great Blue Herons and Bald Eagles are characteristic species of these ecosystems. Herons and eagles may nest in mature stands whereas kingfishers nest in river and lake shore banks. Warblers also nest here.

***Mammals**:* Mammals sometimes associated with riparian ecosystems include the Vancouver Island Water Shrew (red-listed), Mink, Raccoon and River Otter. Floodplains are also of high value to deer, to elk where they occur, and to bears. Riparian areas provide important travel corridors for animals, which often follow streams. Cougar, deer, bear, Raccoon, River Otter, Mink and others can be expected to utilize these corridors for travel. Gullies also fulfill this role in providing travel routes across the landscape. Streams within gullies may also contain chutes or pools adding to micro-habitat diversity.

***Invertebrates**:* Riparian habitats are particularly rich in insect life providing a food source for birds, small mammals, amphibians, reptiles and fish. These ecosystems are used by a wide variety of invertebrates during their lifetime, that require water for one or more stages of their development.

3.7 Woodland (WD)

Open broad-leaved forests with canopy covering less than 50% (WD)
Pure stands of Garry oak or Trembling aspen
Mixed stands of Douglas fir-Garry oak and Douglas fir-arbutus[24]

In a region where coniferous forest often extends from the ocean to the mountain tops, open woodlands are distinct in ecology, history and biological diversity. The open stand structure, soil conditions, and disturbance regime creates an environment which allows a rich mosaic of wildflowers, grasses and shrubs to thrive. Part of the value of woodlands is due to the diversity of shrub, herb and moss species in the understorey. Woodlands often occur on rocky knolls, south facing slopes, and ridges where summer soil moisture is low and shallow soils are common (Photo 8). Many occur in bedrock-dominated areas where fissures and folds in the rock collect seepage flow. Trembling aspen woodlands are an exception, and are typically associated with moist, rich sites.

Historically, frequent lightning-induced wildfires, aboriginal burning, and elk and deer grazing prevented coniferous forests from crowding out the oak woodlands. Fires thinned out competing coniferous species, recycled nutrients into the soil, released and **scarified** seeds, and maintained the open woodland canopy for sunlight to enter. All of these processes are critical to maintaining woodland health and the natural cycles in the ecosystem.

Woodlands occurred as inter-connected patches across the landscape. However, they have declined dramatically over the last 50 years and the remnants now occur in widely scattered fragments throughout the southern half of the study area. Hebda (1993) speculates that only 1-5% of the original Garry oak habitat remains.

These ecosystems occur often in combination with other ecosystems: remnant patches of older Douglas-fir forest (OF), older second growth forest (SG), open meadows (HT) or rock outcrops (HT:ro).

Woodlands are **sensitive** for the following reasons:

- **Rarity**: The Garry oak woodland is amongst the rarest ecosystems in Canada; only remnants survive. Much has been converted to agricultural use, evidenced by large solitary oaks that were left as shade for livestock. Several rare plant associations also occur. These are the most northern deciduous woodlands on the North American Pacific Coast, which contributes to their importance to biological diversity. Peripheral populations such as Garry oak are often genetically significant, and adapted to conditions at the fringe for that species. These populations may also be more vulnerable to climate change or other large-scale disturbances.

- **High biodiversity:** Oak woodlands support the highest plant species diversity of any terrestrial ecosystem in coastal B.C. Woodlands in general support a rich assemblage of plants, insects, reptiles and birds that are drawn to the habitat diversity and food sources. This high biological diversity is closely linked to elements of stand structure including the open canopy, mixed age classes, snags, seasonal leaf fall, organically enriched upper

[24] Pure arbutus second growth forests from logging and fire succession not included.

soil layers and also to the proximity and inter-mixing of Woodlands with other ecosystems. Even the bark of Garry oak and arbutus provides habitat for insects, spiders, mosses and lichens.

- **Specialized habitats:** Many species rely on specialized habitats such as vernal pools, snags, rotten limbs, downed logs or rock outcrops that are associated with woodland ecosystems.

Examples of woodland ecosystems include Mt. Tzuhelam in the Cowichan Sub-unit, Mt. Maxwell on Saltspring Island (Figure 15), and Christmas Hill, Observatory Hill and Summit Park in Victoria.

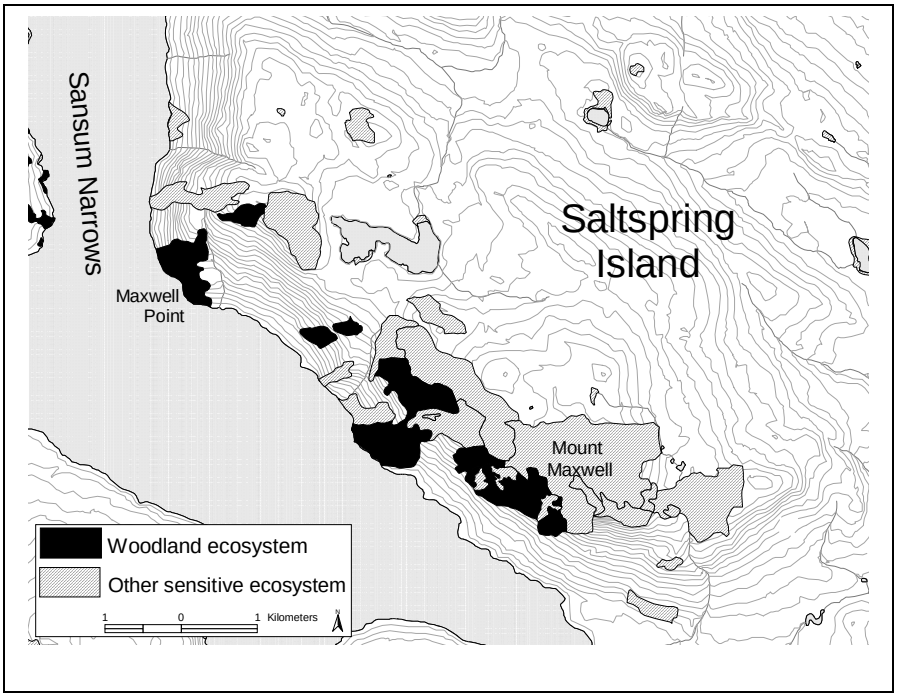


Figure 15: Woodland polygons on Saltspring Island

Woodland

Site Factors

Often occur on some of the driest sites that can support trees. Garry oak woodlands are commonly in areas that comprise a mosaic of rock outcrops and shallow soils. Deep soil parkland supporting Garry oak ecosystems is an exception as most of these areas have been converted to agricultural use. On deep soils, the woodlands may be mixed with herbaceous meadows. Aspen stands in contrast typically occur on moist sites. They are often very small – most are too small to map at the project scale.

Plants

General*:* Well adapted to a frequent fire regime, Garry oak meadow areas were actively burned by aboriginal peoples to promote camas crops and hunting opportunities. This may have perpetuated the oaks in some areas that would otherwise have succeeded to Douglas-fir dominant forests.

Trees & shrubs: Typically Garry oak with or without arbutus; Douglas-fir trees occasional. Shrubs often include snowberry, oceanspray, and baldhip rose. Hairy honeysuckle is common. Aspen stands are dominated by trembling aspen and may have fairly dense hardhack shrubs or herbaceous understories.

Herbs: These sites support colorful spring displays of wildflowers. Herbs may include common and great camas, death camas, broad-leaved or few-flowered shooting star, Easter lily, chocolate lily, spring-gold, and satin-flower. Brittle prickly pear cactus occurs on some sites. Rarities include, white-top aster, and Nuttall's quillwort. Prairie violet can occur on deep soil sites.

Mosses & lichens: Mosses include electrified cat's tail moss and Oregon beaked moss.

Communities: Ecosystems known to occur in this category include: Garry oak–brome; Garry oak–arbutus; Garry oak–oceanspray; Garry oak–snowberry, and Douglas-fir–Garry oak–oniongrass.

Animals

General: As these polygons are often very small, wildlife values are strongly influenced by adjacent communities. Many of the animal species discussed elsewhere will utilize these woodland habitats at times, although they also use other ecosystems. There are a number of species that have been specifically linked to this ecosystem type, and many of these have vanished from the general study area or are in decline.

Amphibians & Reptiles: Alligator Lizards occur in these woodland sites, and the red-listed Sharp-tailed Snake could occur. Garter snakes are relatively common.

Birds: Species of concern in this category include Lewis' Woodpecker and Western Bluebird. The latter two have essentially disappeared from this part of their former ranges. The Western Wood Pewee is also of some concern.

Mammals: Deer utilize these sites for herbaceous plants in spring and early summer and for solar insulation in winter and spring. Deer in turn attract Cougar; although this species is now rarely seen in the more urbanized areas where most of the remnant woodlands occur. Rabbits and Deer Mice use these types and attract predators including raptors. Raccoons and squirrels also favour woodland sites.

Invertebrates: Invertebrate production in woodlands appears to be very high attracting many aerial insectivores including Pacific Slope Flycatcher, Western Wood Pewee, Hutton's Vireo, warblers, swallows, and probably a number of bat species. Some butterflies associated with these sites are the Large Marble White believed **extirpated**, the Chalcedon Checkerspot, which has been extirpated, Edith's Checkerspot and Moss' Elfin. The Propertius Dusky Wing butterfly is entirely dependent on Garry oak as the larval food, and Brown Elfins use arbutus as the larval food plant.

3.8 Older Forest (OF)

Conifer-dominated stands older than 100 years
Coniferous forests (OF:co),
Coniferous stands with a deciduous component of >15% (OF:mx)

Older forest is not necessarily *old-growth forest*. Whereas definitions of 'old-growth' vary by jurisdiction, it is often related to the lack of large scale human disturbance and a specific size or age of trees. Most remaining older forests in the SEI study area have been influenced by some form of harvesting. The minimum age of 100 years for this ecosystem type was selected because many of the features associated with high biodiversity values in older forests begin to develop after 80 years. Two categories are identified for this project: coniferous stands (OF:co) and coniferous stands composed of more than 15% deciduous trees (OF:mx). See Photo 9 for an example of an older forest.

Two distinct forest types[25] occur in the study area. Forests with Douglas-fir as the dominant tree species have developed on the warmer, drier sites at lower elevations (<150m) of the southern portion of the study area; the low soil moisture of these forests favour an open stand structure and low growth of woody shrubs and herbs and grasses in the understorey. More northward and at higher elevations, western hemlock predominates due to a cooler and wetter climate the floor of this forest type develops a dense litter and moss layer which builds up over time due to the cool, damp and acidic conditions.

Older forests are biologically rich ecosystems that are distinct from younger, second-growth forests in both structure and composition. Trees are generally large and tall. On some sites, Douglas-fir or western red cedar may be greater than 1.5m in diameter and more than 55m tall. Older forests are also structurally diverse. Snags, some as tall as the forest canopy, others reduced to low mounds on the forest floor, are intermixed with live trees of varying ages. Fallen logs with rows of western hemlock seedlings sprouting from a mat of mosses and lichens lie along the forest floor, and shrubs and Douglas-fir saplings grow dense and high where a gap in the forest canopy has formed. Structural features can take more than a century to develop in coastal forests.

Older forests in the study area are highly fragmented by roads, logging, and urban development. The flat topography of much of the study area, in conjunction with proximity to transportation and markets, has resulted in several logging passes over most of the landscape; hence, only isolated patches remain.

Older forests are **sensitive** for the following reasons:

- **Rarity:** Only remnants exist of forests which were much more extensive throughout the study area only 150 years ago. Several of the specific forest ecosystems, particularly the drier types, are found nowhere else in Canada.
- **High biodiversity:** Older forests support a rich community of wildlife, plant and

[25] See Section 1.4.1 for a discussion of the Biogeoclimatic Ecosystem Classification system developed for forest classification and management in B.C.

invertebrate species which were once common throughout the landscape.

- **Specialized habitats:** Many species are dependent or associated with specific habitat features only found in older forests. Fungi, canopy insects, and lichens are examples of species groups that account for a huge proportion of the biological diversity of older forests. For example, some lichens are not found in coastal forests younger than 100 years.

Examples of major stands of older forest occur east of Sooke Lake, on Niagara Mountain, in the Pike Lake area, between French Creek and Morningstar Creek, and adjacent to the lower reaches of Chef Creek at Deep Bay (Figure 16).

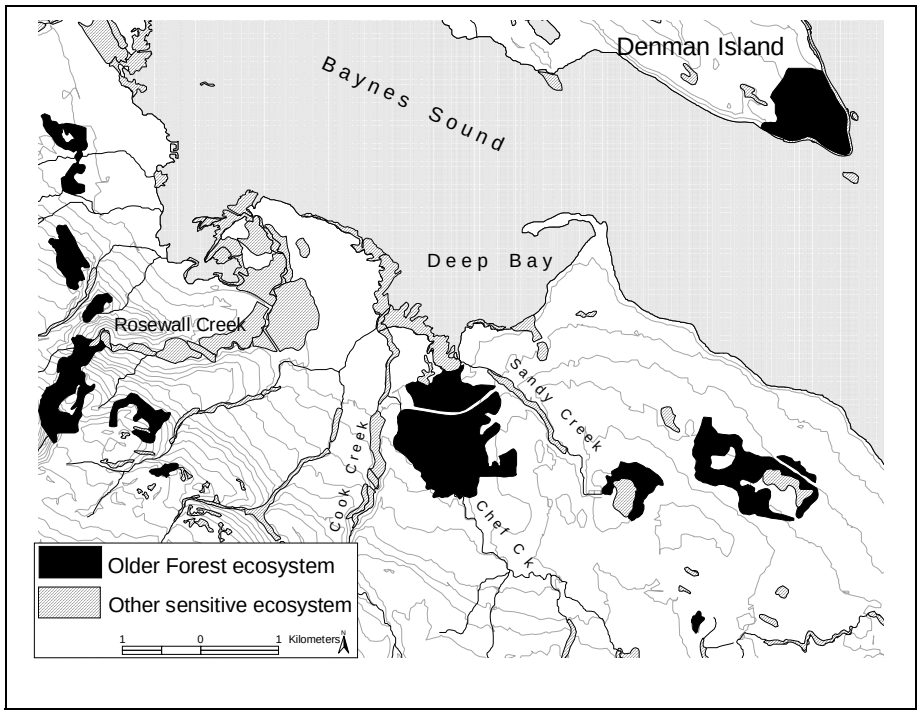


Figure 16: Older forest polygons in the Deep Bay, Rosewall Creek area

Older Forest

Site Factors

Site conditions are highly variable, and a wide range of ecosystem types can occur within this ecosystem.

Plants

General*:* Possible plant communities are many and are determined by site factors especially soil moisture and nutrient regimes. Species composition is highly variable. Rare plants occur less often within forested ecosystems than in open habitats.

Zonal (average) Sites: *Trees & shrubs:* Douglas-fir dominates; grand fir and Pacific dogwood may be present. Shrubs include dull Oregon-grape, and salal may be dense. ***Herbs:*** may include sword fern, vanilla-leaf, twinflower; fairyslipper and other orchids may also be found. ***Mosses & lichens:*** Thick moss layers generally blanket much of the forest floor, and a variety of fungi and lichen exist, including step moss, Oregon beaked moss and lanky moss.

Dry Sites: *Trees & shrubs:* On drier than average sites, arbutus occurs with the Douglas-fir. As well as salal and dull Oregon-grape, shrubs may include baldhip rose and ocean spray. ***Herbs*** and ***Mosses*** are similar to above but may also include Pacific sanicle and electrified cat's tail moss. ***Rare species*** include poison oak.

Moist Sites: *Trees & shrubs:* In moister than average forests, western red cedar, grand fir or western hemlock may dominate, red alder and bigleaf maple are common. Shrubs are diverse and can include red elderberry, red huckleberry and salmonberry. ***Herbs*** are also diverse and can include ladyfern and foamflower. ***Mosses & lichens:*** Menzies' tree moss and leafy mosses occur and Lettuce lung lichen may be present in the moister older forests. In very wet forests, skunk cabbage and Indian hellebore may occur. ***Rare species*** include Smith's fairybells.

Animals

General: Habitat values are variable depending upon the ecosystem types present.

Amphibians & Reptiles: Moister forest sites are good habitat for amphibians such as Red-legged Frog, as well as a number of salamanders.

Birds: In general, old-growth stands provide optimal habitat for cavity nesting birds such as the Pileated Woodpecker and for birds that require large-limbed trees for nesting and roosting, e.g. Western Screech Owl, Bald Eagle, and Red-tailed Hawk. Smaller raptors including Cooper's Hawk, Merlin and a number of owl species breed in older forests in the study area. A very wide range of small birds also breed in older forests, including kinglets, chickadees, juncos, many migratory warblers, flycatchers, and others. Numerous birds overwinter in old-growth. Good cone production provides food for many seed eating birds such as crossbills, finches, and pine siskins.

Mammals: Old-growth stands appear to provide optimal roosting habitat for many bats. A variety of studies have linked certain bat species to old-growth forests (see Christy and West 1993, for example). Black Bears find excellent feeding, security cover and denning opportunities in the moister old forests in particular. Old forests also provide many excellent deer winter habitats and important elk habitats Good cone production supports healthy squirrel populations.

The following ecosystem types are not categorized as sensitive *but are valuable for their contributions to biodiversity and importance to wildlife.*

3.9 Older Second Growth Forest (SG)

Coniferous forests 60-100 years old with <15% deciduous component (SG:co)
Coniferous forests 60-100 years old with a deciduous component of > 15% (SG:mx)

Two categories of older second growth forest ecosystem are identified for this project: large stands of conifer-dominated forest between 60 and 100 years old with less than 15% deciduous trees (OF:co) and those with more than 15% deciduous tree cover (OF:mx). All older second growth forests have been influenced by logging or other human disturbance since settlement of Vancouver Island and the Gulf Islands began in the middle of the 19th century.

Biologically, the richest second growth forests are over 80 years old, contain deciduous and coniferous trees, are large and are connected to other natural ecosystems. The broad variation in stand age, polygon size, vegetation composition, and other attributes of older second growth forest ecosystems makes it difficult to describe characteristic vegetation or wildlife use in these areas. They are differentiated from older forests by the presence of large stumps created by logging, and the general lack of snags and other structural elements of decay (Photo 10). Whereas these structural features begin to develop in stands as young as forty years, large snags and downed logs only occur after 80 to 100 years.

Older second growth forest is **important** for the following reasons:

- **Future older forests:** Within 20 years, many of the second growth forests that were logged early this century will become older forests. Disturbance and competition will increase the number of structural forest features such as snags and downed logs, and wildlife species associated with older forest will increase. The biodiversity values of second growth forests generally become higher with age.

- **Landscape Connectivity:** Older second growth forest stands provide connections between other natural areas that promote the movement and dispersal of many forest dwelling species across the landscape. Wildlife populations in remnant ecosystems surrounding large patches of second growth forest may be maintained by frequent immigration from the forest patch. As well, smaller patches may be recolonized following disturbance events by individuals that survived in the larger and more stable second growth forest.

- **Buffers:** Older second growth forests can minimize disturbance to sensitive ecosystems that occur within or adjacent to the forest patch. Where they border or surround wetlands, patches of older forest or other sensitive ecosystems, the second growth area serves an important role in buffering the adjacent sensitive areas. Buffers provide a vegetated area that bears the brunt of edge effects such as windthrow, invasive species colonization and increased access. They may also maintain micro-climate conditions that are critical in wetland and riparian ecosystems.

Examples of some of the large tracts of older second growth forest occur in the Crystal Lake area, around Langley Lake, on Maple Mountain, in East Sooke Park and in the Seal Bay area (Figure 17).

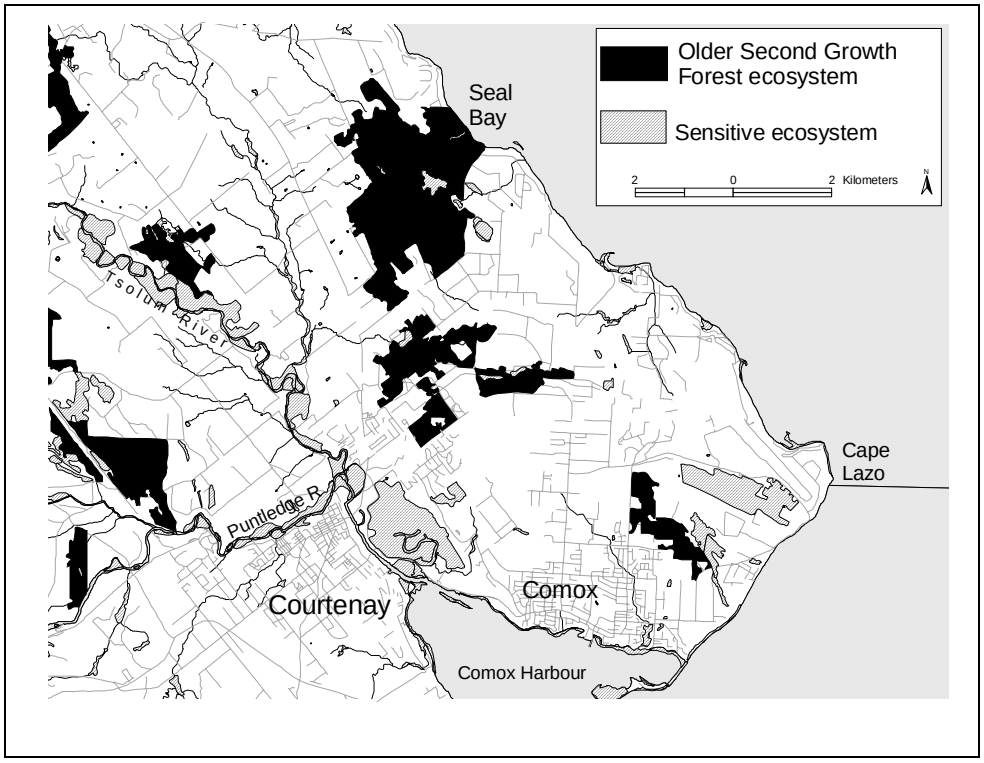


Figure 17: Older second growth forest polygons in the Comox Valley

Older Second Growth Forest

Site Factors

As with the older forests, these ecosystems may be any one (or a combination) of a wide range of potential forested types; site factors vary widely.

Plants

General: Stand composition is very variable depending on moisture and soil nutrients, past disturbance, and treatment history. Stands typically consist of a mix of tree species varying in age and size as trees are maturing. The canopy is more open than in younger forests, with understorey shrub and herb layers becoming well developed. Fallen logs and stumps may be from the maturing trees and also left from the previous old-growth.

Trees & shrubs: Douglas-fir may be established and may range from young seedlings to large maturing trees. Grand fir and Pacific dogwood may be present. Shrubs include dull Oregon-grape, and salal may be dense. In wetter, richer sites with a strong deciduous component, bigleaf maple and red alder may be common

Herbs: Herbs include sword fern, vanilla-leaf, twinflower; fairyslipper and other orchids may be found. Grasses are largely absent. In wetter, richer sites salmonberry and devil's club may occur with salal and red huckleberry, Lady fern, vanilla-leaf, foamflower, and sword fern.

Mosses & lichens*:* Moss layers are often relatively thin, and a fairly low species diversity of fungi and lichens is typical. Step moss, Oregon beaked moss and lanky moss may be found. In wetter, richer sites, mosses such as Menzies' tree moss and large leafy moss may be found. Fungi and lettuce lung or other lichens may occur, but diversity will be limited.

Animals

Amphibians & Reptiles*:* Whereas older second growth stands certainly provide habitat for a variety of amphibians and a few snake species, the quality of habitat for many species, especially a number of the terrestrial salamanders, is likely to be in part dependent on the quantity and quality of available coarse woody debris. This may be a limiting factor in many second growth forests.

Birds*:* As these are mature stands they often produce vigorous cone crops providing an important food source for seed eating birds including crossbills, finches, and Pine Siskins. Numerous common bird species utilize this ecosystem, which also supports some cavity nesting bird populations in the more mature stands. Similarly, raptors will nest in the larger trees, but suitable candidate trees are fewer than in older forest and nesting densities are lower.

Mammals*:* Older second growth stands currently afford important habitats for a wide range of typical coastal animal species including deer, bear, raccoon, squirrel, and others. However, compared to older forests, these stands are generally of lower quality for those animal species that require old growth attributes such as large old trees or large downed logs. Black Bears den in and under very large old trees and logs, which are increasingly absent in the second growth stands. Bears use these components within existing second growth where they have been left from earlier logging. These stands have the potential to produce the necessary habitat elements in the future. However, repeated harvests will see these elements lost unless they are managed for. Existing second growth stands often provide important corridors connecting other habitats together and permitting the dispersal of animals across the landscape.

APPENDIX C: VEGETATION AND WILDLIFE SPECIES OBSERVATIONS

Table 6. Plant species observed on the Property during field surveys on in December and January of 2025/2026

Common Name	Scientific Name	BC Provincial Status[a]	*SARA* Schedule 1 Status[b]	Provincial Priority Invasive Species[c]	CVRD Priority Invasive Plants[d]	Coastal Invasive Species Committee[e]
Arbutus	*Arbutus menziesii*	Yellow	--	--	--	--
Baldhip rose	*Rosa gymnocarpa var. gymnocarpa*	Yellow	--	--	--	--
Balsam poplar	*Populus balsamifera*	Unknown	--	--	--	--
Bebb's willow	*Salix bebbiana*	Yellow	--	--	--	--
Bigleaf maple	*Acer macrophyllum*	Yellow	--	--	--	--
Bittercress sp.	*Cardaminesp.*	--	--	--	--	--
Black raspberry	*Rubus leucodermis var. leucodermis*	Yellow	--	--	--	--
Bladder parsley	*Lomatium utriculatum*	Unknown	--	--	--	--
Bracken fern	*Pteridium aquilinum var. pubescens*	Yellow	--	--	--	--
Broom fork moss	*Dicranum scoparium*	--	--	--	--	--
Bur chervil	*Anthriscus caucalis*	Exotic	--	Management	--	Control
Canada thistle	*Cirsium arvense*	Exotic	--	--	Control	Control
Cattail sp.	*Typha sp.*	--	--	--	--	--
Chickweed	*Cerastium sp.*	--	--	--	--	--
Columbine sp.	*Aquilegia sp.*	Unknown	--	--	--	--
Common chickweed	*Stellaria media*	Exotic	--	--	--	--
Common foxglove	*Digitalis purpurea ssp. Purpurea*	Exotic	--	--	--	--
Common horsetail	*Equisetum arvense*	Yellow	--	--	--	--
Common rush	*Juncus hesperius*	Yellow	--	--	--	--
Common snowberry	*Symphoricarpos albus var. albus*	Yellow	--	--	--	--
Creeping bentgrass	*Agrostis stolonifera*	Exotic	--	--	--	--
Creeping buttercup	*Ranunculus repens*	Exotic	--	--	--	--
Crevice alumroot	*Mahonia aquifolium*	--	--	--	--	--
Cutleaf everygreen blackberry	*Rubus laciniatus*	Exotic	--	--	--	--
Dagger-leaf rush	*Juncus ensifolius*	Yellow	--	--	--	--
Deer fern	*Struthiopteris spicant*	Yellow	--	--	--	--
Dendroalsia moss	*Dendroalsia abietina*	Yellow	--	--	--	--
Douglas fir	*Pseudotsuga menziesii var. menziesii*	Yellow	--	--	--	--
Dovefoot geranium	*Geranium molle*	Exotic	--	--	--	--
Dull Oregon-grape	*Mahonia nervosa*	Yellow	--	--	--	--
Electrified cat's-tail moss	*Hylocomiadelphus triquetrus*	Blue	--	--	--	--
English holly	*Ilex aquifolium*	Exotic	--	Management	--	Control
Garry oak	*Quercus garryana var. garryana*	Yellow	--	--	--	--
Ghost pipe	*Monotropa uniflora*	Yellow	--	--	--	--
Grand fir	*Abies grandis*	Yellow	--	--	--	--
Haircut moss	*Polytrichum*	--	--	--	--	--
Hairy cat's-ear	*Hypochaeris radicata*	Exotic	--	--	--	--
Hairy honeysuckle	*Lonicera hispidula*	Yellow	--	--	--	--

Common Name	Scientific Name	BC Provincial Status[a]	*SARA* Schedule 1 Status[b]	Provincial Priority Invasive Species[c]	CVRD Priority Invasive Plants[d]	Coastal Invasive Species Committee[e]
Hardhack	*Spiraea douglasii var. douglasii*	Yellow	--	--	--	--
Himalayan blackberry	*Rubus armeniacus*	Exotic	--	Reg. Containment / Control	--	Control
Kinnikinnick	*Arctostaphylos uva-ursi*	Yellow	--	--	--	--
Licorice fern	*Polypodium glycyrrhiza*	Yellow	--	--	--	--
Menzies' metaneckera moss	*Neckera menziesii*	--	--	--	--	--
Menzies tree moss	*Leucolepis acanthoneura*	--	--	--	--	--
Northern bedstraw	*Galium boreale*	Yellow	--	--	--	--
Oceanspray	*Holodiscus discolor var. discolor*	Yellow	--	--	--	--
Oregon beaked-moss	*Kindbergia oregana*	Yellow	--	--	--	--
Pacific ninebark	*Physocarpus capitatus*	Yellow	--	--	--	--
Pacific sanicle	*Sanicula crassicaulis*	Yellow	--	--	--	--
Red alder	*Alnus rubra*	Yellow	--	--	--	--
Red huckleberry	*Vaccinium parvifolium*	Yellow	--	--	--	--
Red-osier dogwood	*Cornus sericea*	Yellow	--	--	--	--
Reed canarygrass	*Phalaris arundinacea var. arundinacea*	Exotic	--	--	--	--
Robert's geranium	*Geranium robertianum*	Exotic	--	--	--	--
Salal	*Gaultheria shallon*	Yellow	--	--	--	--
Salmonberry	*Rubus spectabilis*	Yellow	--	--	--	--
Scotch broom	*Cytisus scoparius*	Exotic	--	Reg. Containment / Control	Control	Control
Sea blush	*Plectritis congesta*	Yellow	--	--	--	--
Sedge sp.	*Carex sp.*	--	--	--	--	--
Sheep sorrel	*Rumex acetosella*	Exotic	--	--	--	--
Shootingstar sp.	*Primula sp.*	Yellow	--	--	--	--
Skunk cabbage	*Lysichiton americanus*	Yellow	--	--	--	--
Slough sedge	*Carex obnupta*	Yellow	--	--	--	--
Small bedstraw	*Galium trifidum*	Yellow	--	--	--	--
Small-flowered nemophila	*Nemophila parviflora var. parviflora*	Yellow	--	--	--	--
Small-leaved montia	*Montia parvifolia*	Yellow	--	--	--	--
Springbeauty	*Claytonia sp.*	Yellow	--	--	--	--
Spurge-laurel	*Daphne laureola*	Exotic	--	Management	Management	Control
Step moss	*Hylocomium splendens*	Yellow	--	--	--	--
Sweet vernalgrass	*Anthoxanthum odoratum*	Exotic	--	--	--	--
Sword fern	*Polystichum munitum*	Yellow	--	--	--	--
Tall Oregon-grape	*Mahonia aquifolium*	Yellow	--	--	--	--
Tiny mousetail	*Myosurus minimus*	Yellow	--	--	--	--
Trailing blackberry	*Rubus ursinus*	Yellow	--	--	--	--
Twinflower	*Linnaea borealis sp.*	Unknown	--	--	--	--
Western redcedar	*Thuja plicata*	Yellow	--	--	--	--
Western yew	*Taxus brevifolia*	Yellow	--	--	--	--

Common Name	Scientific Name	BC Provincial Status[a]	*SARA* Schedule 1 Status[b]	Provincial Priority Invasive Species[c]	CVRD Priority Invasive Plants[d]	Coastal Invasive Species Committee[e]
Willow sp.	*Salix sp.*	--	--	--	--	--
Woodland strawberry	*Fragaria vesca*	--	--	--	--	--
Yerba buena	*Clinopodium douglasii*	Yellow	--	--	--	--

[a] BC CDC 2026

[b] *Red listed: native species or ecological communities that are extirpated, endangered, or threatened status in B.C| Blue listed: native species or ecological communities that are that are of special concern (formerly vulnerable) in B.C. | Yellow listed: species or ecological communities that are apparently secure and not at risk of extinction.*Gov. B.C. 2023.

[c] BC. Provincial Priority Invasive Species BC Inter-Ministry Invasive Species Working Group. January 2026

[d] Capitol Regional District. Invasive Species. 2019.

[e] Coastal Invasive Species Committee. Priority Invasive Plants. 2026.

Table 7. Wildlife species observed on the Property during field surveys on in December and January of 2025/2026

Common name	Scientific name	Observation	BC Provincial Status[a]	SARA[b]	COSEWIC[c]
American crow	*Corvus brachyrhynchos*	Flyover	Yellow	--	--
Belted kingfisher	*Megaceryle alcyon*	Visual	Yellow	--	--
Common raven	*Corvus corax*	Visual/Audible	Yellow	--	--
Downy woodpecker	*Dryobates pubescens*	Visual	Yellow	--	--
European rabbit	*Oryctolagus cuniculus*	Scat	Exotic	--	--
Golden-crowned kinglet	*Regulus satrapa*	Audible	Yellow	--	--
Hairy woodpecker	*Dryobates villosus*	Audible	Yellow	--	--
Northern flicker	*Colaptes auratus*	Flyover	Yellow	--	--
Pacific chorus frog	*Pseudacris regilla*	Audible	Yellow	--	--
Pacific wren	*Troglodytes pacificus*	Visual/Audible	Yellow	--	--
Ruby-crowned kinglet	*Corthylio calendula*	Audible	Yellow	--	--
Sharp-shinned hawk	*Accipiter striatus*	Visual	Yellow	--	--
Spotted towhee	*Pipilo maculatus*	Audible	Yellow	--	--
Steller's jay	*Cyanocitta stelleri*	Audible	Yellow	--	--
Varied thrush	*Ixoreus naevius*	Visual	Yellow	--	--

[a] BC CDC 2026

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[C] COSEWIC.2026