



AQUAPARIAN

Environmental Consulting Ltd.



ENVIRONMENTAL IMPACT ASSESSMENT REZONING APPLICATION 3334 PORT WASHINGTON ROAD, PENDER ISLAND, BC



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Completed for:
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DISCLAIMER AND LIMITATIONS OF USE:

This report has been prepared exclusively for the 3334 Port Washington Road re-zoning application for a portion of the parcel to have permanent zoning compatibility with the established land use. The findings and recommendations documented in this report are based on information available at the time of assessment.

LIMITATIONS:

1. **Scope of Work:** This report is limited to the scope of work agreed upon between Braedon Bigham and Aquaparian Environmental Consulting Ltd (Aquaparian). This document is not to be considered the sole document required by permitting agencies for this project. Any additional investigations or assessments beyond this scope are not included. Aquaparian exercised reasonable skill, care, and diligence to assess the information acquired during the preparation of this document but makes no guarantees or warranties as to the accuracy or completeness of this information.
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1.0 INTRODUCTION

Aquaparian Environmental Consulting Ltd (Aquaparian) was retained by Braedon Bigham, owner of Big Digem Excavating Inc. (Big Digem), to complete an Environmental Impact Assessment (EIA) as supplementary documentation for a rezoning application (file No. PLRZ20240110 (Bigham)) required by the Islands Trust for continued industrial land use of the south portion of 3334 Port Washington Road, Pender Island, BC.

The subject parcel is approximately 6.1 ha in area and is legally identified as follows:

- Lot 7, Sections 18 and 22, Pender Island, Cowichan District, Plan 6294 (PID 005-837-693).

A review of the North Pender Island Land Use Bylaw No. 224, 2022 (LUB) identifies that the parcel is currently zoned Rural. The North Pender Island Official Community Plan No. 171, 2007 (OCP) identifies that the land use is split designated as Rural (R) and Industrial (I). As understood, the portion designated as Industrial is 0.56 ha and has been used as designated since 2011 under Temporary Use Permits (TUPs). Big Digem includes aggregate storage, retail sales, and associated activities and is recognized by the Islands Trust as providing important community services to Pender Island. As further understood, the business operator is planning to rezone the property to come into compliance with the North Pender Island LUB for continued industrial use of the property.

The OCP identifies that there are two Development Permit Areas (DPAs) located in the north portion of the property: DPA 1 – Woodland, and DPA 2 - Herbaceous. There are no DPAs in the industrial portion.

Site location maps of the study area have been included in this report as Figure 1a & 1b. A site plan prepared by Polaris Land Surveying Inc. identifies the industrial use area and is included as Figure 2. A selection of site photographs taken during the site surveys have been included as Appendix A.

1.1. SCOPE OF WORK

The scope of work for this assessment included the following:

- Background review of available information from government databases and maps, and documents available within the Rezoning Application online file.
- Field assessment to document environmental attributes within the site and current site conditions.
- Produce an EIA report to document findings and to identify potential impacts and



recommendations to protect environmental assets of the property if industrial use continues within the designated portion of the property.

Findings of the assessment include a review of relevant background information for the study area which included a review of mapped information within 500m of the site, site information including current land use, historical land use and surrounding land use, an inventory of environmental features identified within the parcel, current applicable Acts and Regulations, a biophysical site map showing environmental attributes, and photo documentation. The information is provided to facilitate the North Pender Island Local Trust Committee (LTC) decision on the re-zoning application. This report was reviewed by Patricia Woodruff (Islands Trust Biologist) and comments were provided. This report has been revised on November 5, 2025 to address these comments.

2.0 REGULATORY FRAMEWORK

The following is a list of federal, provincial and municipal environmental Acts, Regulations and Bylaws current at the date of preparing this report, that *may* apply to development of the subject parcel:

Federal *Species-at-Risk Act* is a key federal government commitment to prevent wildlife species from becoming extinct and secure the necessary actions for their recovery. It provides for the legal protection of wildlife species and the conservation of their biological diversity. SARA contains prohibitions against the killing, harming, harassing, capturing, taking, possessing, collecting, buying, selling or trading of individuals of endangered, threatened and extirpated species listed in Schedule 1 of the Act. The Act also contains a prohibition against the damage or destruction of their residences (e.g. nest or den). The *Species at Risk Act* (SARA) applies automatically on federal lands as well as:

- all endangered, threatened and extirpated migratory birds listed in Schedule 1 of SARA and protected by the *Migratory Birds Convention Act*, 1994, anywhere they occur, including private lands, provincial lands and lands within a territory; and
- all endangered, threatened and extirpated aquatic species as defined by the *Fisheries Act* listed in Schedule 1 of SARA, anywhere they occur, including private lands, provincial lands and lands within a territory.

In certain circumstances, SARA prohibitions may be applied to protect any other species listed in Schedule 1 of SARA when found on non-federal lands, if provincial/territorial laws do not effectively protect the species or its residence. On the recommendation of the Minister of the Environment, the Governor in Council, by Order can provide that sections 32 and 33, or either of

them, apply on non-federal lands with respect to individuals of a listed wildlife species that is not an aquatic species or protected by the *Migratory Birds Convention Act, 1994*.

Federal Migratory Birds Convention Act, 1994. Most species of birds in Canada are protected under this act. “Migratory birds” are defined by Article I of the Convention which names the families and sub-families of birds protected and provides some clarification of the species included. In general, birds not falling under federal jurisdiction within Canada include grouse, quail, pheasants, ptarmigan, hawks, owls, eagles, falcons, cormorants, pelicans, crows, jays, kingfishers, and some species of blackbirds.

Federal Migratory Birds Regulations, 2022 (MBR), provides protection to migratory bird nests when they are considered to have a high conservation value for migratory birds. The MBR prohibits the damage, destruction, removal or disturbance of nests of all migratory birds when there is a live bird or viable egg, or if the nest was built by a species that is listed in Schedule 1 of the regulation. Schedule 1 lists 18 species which are protected year-round unless they are shown to have been abandoned for a designated period of time depending on the species. In BC there are two Schedule 1 species; Great blue heron are protected for 24 months after reporting the nest is unoccupied, and Pileated woodpecker are protected for 36 months after reporting unoccupied.

Provincial Wildlife Act Section 34, states that a person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys:

- (a) a bird or its egg,
- (b) the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron or burrowing owl, or
- (c) the nest of a bird not referred to in paragraph (b) when the nest is occupied by a bird or its egg.

Provincial Heritage Conservation Act. All archaeological sites, recorded or not, are protected under the *Heritage Conservation Act* and must not be altered or damaged without a site alteration permit from the Archaeology Branch. As understood, municipalities have access to provincial records that show recorded sites and sites with high potential for archaeological resources. If a known site is located on the parcel, an archaeological consultant will need to be retained to provide advice. If the site has a high potential, it is recommended to retain and archaeological consultant to provide recommendations. Archaeology is outside the scope of this report.

3.0 SITE DESCRIPTION

The parcel is approximately 6.1 ha in area and located on the north side of Port Washington Road and primarily sloping with a southern aspect. The parcel extends north upslope to the top of a ridge and extends to the east; the parcel is shaped like an upside-down “L”. To the west is a rural parcel (3330 Port Washington Road) developed for industrial use within the south portion which is leased to Eco-Source Septic as a contractor yard for two septic pump trucks, screening equipment and a dump truck. The driveway to the residential upslope area of 3330 Port Washington Road cuts across the subject parcel as a shared driveway. To the east is a rural parcel and the Pender Island Home Building Centre (commercial/retail) with another excavation contractor east of that parcel. To the north, past the crest of the ridge are rural parcels that are sloping with a northern aspect; two of the parcels are nature reserves including the Lisa Baile Nature Reserve located 320m from the Big Digem yard (4 ha; owned by Islands Trust Land Conservancy), and Forest Wetland Nature Reserve located 300m from the Big Digem yard (4 ha; owned by Pender Island Land Conservancy). There is another 14.5 ha parcel identified as Vulture Ridge Nature Reserve that is also owned by the Pender Island Land Conservancy located 356m to the northeast from the Big Digem yard. Other surrounding parcels are developed for industrial use include the Pender Island Yard, ENCOM, and BC Hydro across the street to the south, Southridge Country store to the southeast, and other rural residential lots.

The lower/south portion of the parcel fronting Port Washington Road includes a flat gravel yard for storage of all equipment related to Big Digem operations (heavy equipment, bins etc.) on the east side of the shared gravel driveway, and the remaining portion of the Big Digem operation on the west side which is a cleared gravel work yard that is understood to include the following:

- Contractor yard, spill kits up to 200L & small kits on all heavy machines;
- Storage, handling and wholesale of aggregates, soils and mulches – maximum 460m² (550 yards). Gravels are stockpiled in the southwest corner of the yard and soils are contained in lock-block storage bins;
- Six sea cans for storage of equipment and materials;
- Small heavy equipment including compactors, a digger, and a bulldozer;
- Soil screens;
- Tarp-tent awning under which a front-loader is parked;
- Superior Propane Tank storage, drainage and sewer culvert/pipe and septic tank storage – maximum 15 tanks for island emergencies;
- Storage of 10,000L of diesel for company use on off road equipment in a double-lined fuel tank; and,
- Water wagon (500 Gal) for fire suppression/mitigation.

As understood, the only additional proposed works at the time of writing this report is the construction of a 40ft x 40ft workshop within the existing gravel yard area to replace some of the sea cans for maintaining and servicing company-owned vehicles and equipment. The workshop is proposed to include a bathroom and a kitchen. As understood, the workshop is a future plan that will depend on whether the rezoning is accepted so no design drawings were available at the time of preparing this report.

The perimeter of the work yard is mostly planted with a tall cedar hedge with a chain link fence along the inside of it. The work yard is flat and backs onto the toe of a steep slope extending north into the larger portion of the parcel. The toe of slope is cleared approximately to the limit of the industrial use area confined below the access road. The area between the edge of the work yard at the toe of the slope and the Industrial Designation Boundary is bisected by a shared driveway and to either side is vegetated with grass and invasive Himalayan blackberry (*Rubus armeniacus*), and Scotch broom (*Cytisus scoparius*). As understood, there are no plans to expand the footprint of the industrial work yard area further to the north due to the slope.

The remainder of the parcel is forested and undeveloped. The shared access driveway extends northwest across the parcel behind the work yard. The driveway is shared to access the upslope portions of the adjacent property to the west and the upper portion of the subject parcel. One flat benched area above the access road has recently been cleared (2023) and there are some dirt roads that switch back up the slope through the parcel extending to the top of the ridge. Woodland forest extends from the lower slope up to the north side of the parcel with some patches of second growth Douglas-fir (*Pseudotsuga menziesii*) habitat in the south portion of the forest. There is a sloped ridge that extends west to east across the parcel with a band of open, south-facing terrestrial herbaceous habitat below it. The ridge extends along the north property boundary and is forested with more woodland habitat. From the highest point in the northeast corner the ocean is visible to the northeast and southwest through the trees.

Aquaparian traversed the site by foot on April 16, 2025 to document site conditions. The site assessment included documentation of seven vegetation plots in representative areas throughout the parcel to further classify the habitat present. Appendix B is a detailed inventory of species identified within each plot. A Biophysical map of the property has been included as Figure 3 and identifies the ecosystem types found within the property and vegetation plot locations. Physical and biological features of the parcel are summarized in Section 4.0 below.

4.0 ENVIRONMENTAL SETTING

4.1. Physical Resources

The following section provides a general overview of biophysical attributes and land use of the site documented by government databases, crown publications and from Aquaparian's reconnaissance of the property.

4.1.1. Topography

The terrain within the study area is flat adjacent to Port Washington Road where the work yard is situated, then it slopes up to the north with steep terrain throughout. The elevation is 70m above sea level at the south side and the highest point is 170m above sea level at the northeast corner of the parcel. The overall slope of the parcel is 28% but some sections were as steep as ~50% in gradient.

4.1.2. Climate

The property is located within the Moist Maritime Coastal Douglas-fir Subzone (CDFmm). The CDFmm is restricted to low elevations along southeast Vancouver Island from Bowser to Victoria, the Gulf Islands south of Cortes Island, and a narrow strip along the Sunshine Coast near Halfmoon Bay. Elevational limits typically range from sea level to approximately 150m.

The CDFmm lies in the rain shadow of the Vancouver Island and Olympic Mountains resulting in warm, dry summers and mild, wet winters. Growing seasons are very long, and feature pronounced water deficits on zonal and drier sites. The CDFmm represents the mildest climate in Canada. (Green and Klinka).

4.1.3. Land/Soil

A review of the provincial map "Soils of the Gulf Islands of British Columbia" (1988) indicate that the parcel is dominated by the Saturna Soil Association (ST), with Rock (RO) comprising the northernmost portion of the parcel. The lower industrial portion of the parcel is mapped as MD – Made Land. Made Land refers to soils that have been "artificially altered or disturbed by the activities of man to such a degree that they cannot be identified or classified" (Kenney *et. al*, 1988).

Saturna soils are well-drained soils that have developed on shallow deposits of channery sandy loam textured colluvial and glacial drift over sandstone bedrock within 100cm of the surface. Coarse fragment content varies between 20 and 50%. These soils are

associated with gently to strongly sloping (6-30%) topography in subdued to hummocky terrain or on very strongly to steeply sloping (31-100%) side slopes of rock ridges. (Kenney *et al.* 1988). Soil phases within the study area are identified as Very Shallow Lithic. Slope classes include predominantly moderate to strong slopes (10-30% gradient) with a lesser representation of very strong slopes (31-45%). These soils are likely supporting the woodland habitat within the parcel.

The Rock portion is identified as undifferentiated bedrock exposed or covered by moss or mineral soil less than 10cm thick. Slope classes include very strong slopes (31-45%) to extreme slopes (46-70%). This classification is represented by the terrestrial herbaceous habitat within the north portion of the parcel which was observed to have very thin soils and moss over bedrock and was observed to be steeply sloping and south-facing aspect.

4.1.4. Surface Water

A review of municipal maps and the provincial Habitat Wizard did not identify any mapped watercourses or wetlands within or adjacent to the subject parcel. No watercourses or wetlands were observed within the subject parcel. The parcel is dominated by sloping woodland or terrestrial herbaceous habitat with no flat receiving environments for water to accumulate. No seeps or vernal pools were identified in the terrestrial herbaceous or woodland habitat.

There is a shallow roadside ditch fronting the property that terminates to the west fronting 3330 Port Washington Road; no culvert was identified underneath the driveway. The property does not contain any storm drains.

4.1.5. Groundwater

A review of the provincial Groundwater Wells and Aquifers mapping tool identifies that the parcel is within Aquifer 711 - North Pender (northern area), a highly vulnerable fractured sedimentary bedrock aquifer 11.3km² in size. The map identifies the presence of one well (#129423) located centrally within the parcel.

4.1.6. Land Use

The property is 6.1 ha. The site plan shows the Industrial Designation boundary is a short distance upslope of the constructed shared driveway and Right of Way Plan 2942 line for the driveway and encompasses an area of approximately 5487m² (0.55ha) (9% of parcel). However, the south, flat portion of the parcel that has been used for Big Digem operations since 2011 is approximately 3400m² in area (0.34 ha), which is 6% of

the property. Prior to that, it is understood that the land was used 50-60 years ago for gravel and sand extraction and potentially a concrete batch plant was located there at one point (*pers. comm. Braedon Bigham*). As further understood, a transfer site (waste collection, sorting, consolidation and transportation) was operated in this location prior to Big Digem being established. The two properties across the street from the subject parcel (Lot 8 & Lot 9, Plan 6294; commonly known as the highways works yard) were rezoned in the past; these properties have also been used for light industrial operations for since the 1950's with the current owners, Mainroad Properties, taking ownership in 2006 (*pers. comm. Braedon Bigham*).

4.2. Biological Resources

4.2.1. Flora

Forests on zonal sites within the CDFmm are typically dominated by Douglas fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*) and grand fir (*Abies grandis*). The understory is dominated by salal (*Gaultheria shallon*), dull Oregon grape (*Mahonia nervosa*), oceanspray (*Holodiscus discolor*) and Oregon beaked moss (*Kindbergia oregana*). Less prominent species include baldhip rose (*Rosa gymnocarpa*), snowberry (*Symphoricarpos albus*), western trumpet honeysuckle (*Lonicera ciliosa*), vanilla leaf (*Achlys triphylla*), and electrified cat's-tail moss (*Rhytidiadelphus triquetrus*). Drier sites are characterized by the presence of Garry oak (*Quercus garryana*) and arbutus (*Arbutus menziesii*) and several members of the lily family.

In general, the parcel is comprised of a small industrial zone which is completely disturbed/impacted with the remainder of the parcel comprised of woodland habitat, a band of terrestrial herbaceous habitat, and a small strip of dry second growth Douglas-fir forest. Disturbed areas also include a small, flat area off the driveway that was recently cleared and a strip of the lower slope above the work yard that was historically cleared and is now dominated by invasive species and grasses; the treeline above the clearing appears to correspond with the Industrial Designation Boundary (Fig. 2). Refer to Figure 3 for mapping of these areas and Appendix B for detailed vegetation plot inventories. Below is a summary of the canopy and understory species that were observed to comprise each habitat type within the subject parcel. This is not a detailed species study; some of the wildflowers may not have emerged or it was too early in the growing season to identify them to species. Because no development is proposed in these areas at this time, a detailed species survey is beyond the scope of this application and further studies may be required if development plans are proposed in the future.

Terrestrial herbaceous and woodland ecosystems have the potential to support rare plant species. Note that no specialized ephemeral microhabitats such as vernal pools or seeps were identified.

4.2.1.1. Industrial Zone

This area is fully developed for use as a work yard. A flat gravel pad comprises most of the industrial use area within the subject parcel. The only vegetation is an ornamental cedar hedge row (*Thuja* sp.) along most of the perimeter. The cleared slope behind the work yard is vegetated with grasses, invasive Himalayan blackberry thicket and patches of invasive Scotch broom.

4.2.1.2. Woodland Habitat

Woodland habitat comprises most of the parcel and includes a partial canopy (~30-45%) dominated by Douglas-fir with up to 50% representation of arbutus (*Arbutus menziesii*) and minor amounts of Garry oak (*Quercus garryana*) and bigleaf maple (*Acer macrophyllum*). The understory is open, dominated by grasses & mosses (mixed spp.), red columbine (*Aquilegia canadensis*), fairy slipper (*Calypso bulbosa*), little western bittercress (*Cardamine oligosperma*), miner's lettuce (*Claytonia perfoliata*), yerba buena (*Clinopodium douglasii*), fragile fern (*Cystopteris fragilis*), woodland strawberry (*Fragaria vesca*), sweet-scented bedstraw (*Galium triflorum*), dove's-foot crane's-bill (*Geranium molle*), rattlesnake plantain (*Goodyera oblongifolia*), nipplewort (*Lapsana communis*), purple peavine (*Lathyrus nevadensis*), hairy honeysuckle (*Lonicera hispidula*), western honeysuckle (*Lonicera ciliosa*), rose campion (*Lychnis coronaria*), dull Oregon-grape (*Mahonia nervosa*), Alaska oniongrass (*Melics subulata*), largeleaf sandwort (*Moehringia macrophylla*), wood forget-me-not (*Myosotis sylvatica*), frog's pelt (*Peltigera neopolydactyla*), goldback fern (*Pentagramma triangularis*), licorice fern (*Polypodium glycyrrhiza*), western buttercup (*Ranunculus occidentalis*), baldhip rose (*Rosa gymnocarpa*), Pacific sanicle (*Sanicula crassicaulis*), rein orchid (*unidentified, not flowering*), black cap raspberry (*Rubus occidentalis*), and a minor amount of sword fern (*Polystichum munitum*). The following invasive species were identified in woodland habitat throughout the parcel: common chickweed (*Stellaria media*), common

dandelion (*Taraxacum officinale*), Scotch broom (*Cytisus scoparius*), common thistle (*Cirsium arvense*), foxglove (*Digitalis purpurea*), Himalayan blackberry (*Rubus armeniacus*), and white hawkweed (*Hieracium albiflorum*). This ecosystem is represented by Site Series 03 Fd – Oniongrass within the CDFmm biogeoclimatic classification which indicates a rich to very rich soil nutrient regime and very dry soils (Green & Klinka, 1994).

4.2.1.3. Terrestrial Herbaceous Habitat

This habitat is open with minimal canopy (<10%) comprised of scattered trees including predominantly Douglas-fir, arbutus, and minor amounts (several trees) of Garry oak (*Quercus garryana*). The groundcover is carpeted by a layer of mixed moss species (~95%) with the remaining ~5% comprised of exposed bedrock. Some of the moss species identified include juniper hair cap moss (*Polytrichum juniperinum*), rough goose neck moss (*Rhytidiadelphus triquetrus*), and Wallace's spikemoss (*Selaginella wallacei*). Native grasses observed include sweet vernal grass (*Anthoxanthum odoratum*) and Alaska oniongrass.

Forbs emerging from the moss at the time of the site visit include fairy slipper, giant blue-eyed Mary, miner's lettuce, fragile fern, wingstem monkeyflower (*Erythranthe alsinoides*), sweet-scented bedstraw (*Galium triflorum*), wholeleaf saxifrage (*Micranthes integrifolia*), western saxifrage (*Micranthes occidentalis*), Pacific sanicle (*Sanicula crassicaulis*), rein orchid (*unidentified, not flowering*), and corn speedwell (*Veronica arvensis*). Invasive species include dense thickets of Scotch broom (*Cytisus scoparius*) and sheep sorrel (*Rumex acetosella*). Scotch broom commonly invades open meadow habitat and was observed to be growing in thickets with an average of 30-40% cover, but some dense patches had over 60% coverage. This ecosystem is represented by Site Series 02 FdPI – Arbutus within the CDFmm biogeoclimatic classification which indicates a very poor to medium soil nutrient regime and very dry soils (Green & Klinka, 1994).

4.2.1.4. Dry Second Growth Douglas-fir Forest Habitat

Second growth Douglas-fir forest comprises a small portion of the

parcel near the inside elbow of the 90° bend of the property boundaries. The forest habitat is bisected by an upper section of the shared access road. The canopy is mostly closed and comprised of 90% young Douglas-fir trees ranging between 20 and 40cm diameter-at-breast-height (dbh), 5% arbutus ranging between 20 and 25cm dbh, and 5% western redcedar (*Thuja plicata*) ranging between 20 and 25cm dbh. The understory is nearly fully shrubbed, dominated by dull Oregon-grape with lesser amounts of salal (*Gaultheria shallon*). Other species include cleavers (*Galium aparine*), western honeysuckle, moss (mixed spp.), bracken fern (*Pteridium aquilinum*), trailing blackberry (*Rubus ursinus*), Pacific sanicle, and starflower (*Trientalis borealis*). This ecosystem is represented by Site Series 01 Fd – salal within the CDFmm biogeoclimatic classification which indicates a very poor to medium soil nutrient regime and medium soil moisture (Green & Klinka, 1994).

4.2.2. Fauna

No records were found indicating that large carnivorous mammals including black bear (*Ursus americanus*), cougar (*Puma concolor*), and wolf (*Canis lupis*) are present on Pender Island, though occasionally individuals are known to swim over to southern gulf islands from adjacent lands. Black-tailed deer (*Odocoileus hemionus*) are abundant and expected to utilize the parcel. Raccoon (*Procyon lotor*) and rodents such as mice may also be found in the study area. There have been occasional reports of Roosevelt elk (*Cervus canadensis roosevelti*) sightings on Pender Island (*Country Life in BC*). It is unknown if elk would be found within the subject property; there does not appear to be an established population on Pender Island. It does not appear that rabbits or squirrels are found on Pender Island. Though semi-aquatic mammals such as beaver (*Castor canadensis*), river otter (*Lontra canadensis*), American mink (*Neogale vison*), and muskrat (*Ondatra zibethicus*) are found on Pender Island, no aquatic habitat was identified within the subject parcel to support them. Snags were observed and may provide cavity roosting habitat for a variety of bat species.

The terrestrial herbaceous ecosystems within the site have rocky outcrops and sunny forest openings providing good habitat for reptiles including northern alligator lizards (*Elgaria coerulea*), garter snakes (*Thamnophis elegans*), and potentially sharp-tailed snakes (*Contia tenuis*). One northern alligator lizard was observed under a bedrock overhang in the terrestrial herbaceous habitat. A letter to the Islands Trust from the Pender Island Conservancy (Nov 25, 2024) regarding the proposed rezoning application included an anecdotal visual siting of a sharp-tailed snake (provincially red-listed, SARA

1-Endangered 2003) on 3330 Port Washington Road; this is the parcel developed for industrial use immediately next the Big Digem yard. No further documentation was provided to verify this species sighting or locate the sighting within the parcel.

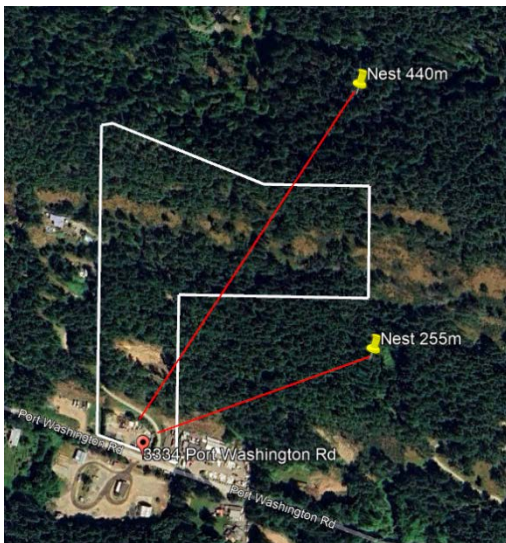
A comprehensive list of amphibian species confirmed on Pender Island was not available. Semi-terrestrial amphibians such as Pacific tree frog (*Pseudacris regilla*), rough-skinned newt (*Taricha granulosa*) and northern red-legged frog (*Rana aurora*) have been documented through iNaturalist recorded sightings and may be found within the parcel, but no aquatic breeding habitat is available to support their lifecycles. Two Pacific tree frog were observed during the site visit sheltered from the sun in rock crevices within the terrestrial herbaceous habitat. Some woody debris was observed on the woodland forest floor, but the parcel does not have shaded, moist forest habitat or abundant large, rotted logs for fully terrestrial salamanders to use for breeding, cover and forage. A detailed survey to confirm wildlife species presence was not completed as part of this assessment.

4.2.3. Birds

A variety of resident and migratory bird species are likely to inhabit and utilize the study area. Intact woodland canopy within the property is continuous with surrounding forests to the north, west and east of the subject parcel. The site offers excellent forage (acorns, berries, seeds, cones, insects etc.) and a layered canopy of mature trees for nesting. Forest-meadow interfaces provide suitable habitat for songbirds. Dead standing (wildlife) trees and snags throughout the site provide insect forage and cavity nesting opportunity for birds. Woodpeckers were heard excavating deadwood during the survey. As understood, there are bird nesting boxes throughout the Lisa Baile Nature Reserve that are part of an Avian Bioindicator Monitoring Project on the Pender Islands that examines violet-green swallows (*Tachycineta thalassina*) and chestnut-backed chickadees (*Poecile rufescens*) as bioindicators of ecosystem health (Schaefer, 2022). One bird nest box was observed just outside of the northern boundary of the subject parcel and many violet-green swallows were observed feeding on insects above the work yard during the site visit. The Pender Island Conservancy included anecdotal observations of olive-sided flycatchers (BC Yellow list; SARA1-Special Concern 2023) and common nighthawks (BC Blue-list; SARA 1-Special Concern 2023) within the adjacent nature reserve parcels.

A review of the provincial Wildlife Tree Stewardship Atlas (WiTS) identifies that the nearest mapped bald eagle (*Haliaeetus leucocephalus*) nest (BAEA-101-104 Clam Bay Road) is located approximately 150m northeast of the subject parcel and approximately 570m away from the industrial portion of the lot. The nest tree was recorded as Tree

Standing in 2022. No eagle nests were identified during site reconnaissance of the property, but some large trees capable of supporting a bald eagle nest are present throughout the site. The WiTS eagle nest map is included as Figure 4. A letter from the Pender Islands Conservancy dated November 25, 2024 regarding the subject rezoning application reports that there are two newly identified bald eagle nests, one located more than 200m away from the industrial portion of the subject parcel with a dense forest



stand between the yard and the nest. The nest to the north is on the other side of the ridge and downslope over 400m away from the Big Digem yard. Eagles are well known to adapt to regular activities and sounds within their chosen nest tree locations. As the land use has not changed, the eagles are apparently adapted to local land uses. The following figure shows the approximate location of the eagle nests reported by the Pender Island Conservancy in relation to the parcel boundaries and the industrial use area. No GPS coordinates or photographs were provided in the letter. Note, the north parcel boundary runs along the top of the ridge.

A review of the Great Blue Heron Atlas identified that there are no mapped great blue heron (*Ardea Herodias fannini*) nest trees located within or nearby the study area. No heron nests were identified within or nearby the subject parcel during the site assessment.

No raptor nests, whitewash against trees, feathers, prey remains or plucking stations were detected during the site assessment. However, observations of forest habitat within the site identified that the site has abundant suitable nesting habitat for several smaller raptors such as hawks and owls.

Bird species observations were recorded during the site survey and are listed in Table 1 below:

Table 1: Incidental bird species observed at 3334 Port Washington Rd (April 16, 2025)

Common name	Scientific name
Anna's hummingbird	<i>Calypte anna</i>
Song sparrow	<i>Melospiza melodia</i>
Turkey vulture	<i>Cathartes aura</i>
Purple finch	<i>Haemorhous purpureus</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>
Dark-eyed junco	<i>Junco hyemalis</i>
Common raven	<i>Corvus corax</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Orange-crowned warbler	<i>Leiothlypis celata</i>
Yellow-rumped warbler	<i>Setophaga coronata</i>
Chestnut-backed chickadee	<i>Poecile rufescens</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Northern flicker	<i>Colaptes auratus</i>
Brown creeper	<i>Certhia americana</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Violet-green swallow	<i>Tachycineta thalassina</i>

A detailed bird survey was not conducted as part of this assessment. Species presence will change seasonally throughout the year.

Federal guidelines indicate the songbird nesting season in this area extends from March 1st to August 15th of a given year. Raptors tend to begin nesting earlier in the year, as early as February. Bald eagle nesting season generally starts in January and extends until August 15th of a given year. Great blue heron nesting seasons occurs between April and May with chicks fledging the nest late August and sometimes into September. Nesting habitat within the industrial portion of the parcel is limited to the cedar perimeter hedge which may support small songbird nests such as hummingbirds. It would be expected that birds choosing to nest in this location would be adapted to the noise and activities occurring from the daily operation of the Big Digem work yard and surrounding industrial operations. Certain species such as barn swallows (*Hirundo rustica*) or dark-eyed juncos (*Junco hyemalis*) may choose to nest in man-made structures. If nesting is observed amongst the industrial operation or on equipment, the nest is to be left undisturbed until fledging is confirmed by a Qualified Environmental Professional (QEP). As understood, no clearing of vegetation is proposed as part of the rezoning application.

4.2.4. Fisheries

A review of the Provincial database Habitat Wizard and municipal mapping does not

identify any mapped watercourses or wetlands within or adjacent to the subject parcel. No fish habitat or fish habitat supportive watercourses were identified during the assessment.

4.2.5. Sensitive Ecosystems Inventory Mapping

The Sensitive Ecosystem Inventory of southeast Vancouver Island and the Gulf Islands (SEI) 1993-1997 systematically identified and mapped specific rare and fragile ecosystems. The purpose of the SEI project was to identify remnants of rare and fragile terrestrial ecosystems and to encourage land-use decisions that will ensure the continued integrity of these ecosystems.

Seven sensitive ecosystem types were described and mapped in the east coast of Vancouver Island study area as follows: Wetland, Woodland, Riparian, Older Forest (>100yrs), Terrestrial Herbaceous, Sparsely Vegetated and Coastal Bluff. Two other important ecosystems were mapped for their general biodiversity and wildlife habitat values: Older Second Growth Forest (60-100yrs) and Seasonally Flooded Agricultural Fields.

A review of the 2004 SEI map covering the study site (092B.084) identified that there are three mapped polygons within the study area identified as follows:

1. T0802/WD (Woodland). Located along the central north portion of the parcel. Aquaparian's site reconnaissance verified woodland habitat over a larger portion of the parcel than indicated.
2. T0804/HT:ro (Terrestrial Herbaceous: rocky outcrop). A narrow band located in the north central portion of the parcel within the woodland polygon. Site reconnaissance confirmed that the mapping is accurate.
3. T0801*/SG:mx (Second Growth: mixed conifer and deciduous). Mapped at the northern extent potentially just outside of the parcel boundaries. This may be accurate north of the parcel. Woodland habitat was observed to extend to the northern limits of the parcel which is the crest of the slope then the topography slopes down to the north. Deeper soils downslope may result in a transition to second growth forest. Second growth forest observed elsewhere within the parcel appeared to be conifer-dominant.

The SEI map is included with this report as Figure 5. The Sensitive Ecosystems of North Pender map (2004), which is available through the Islands Trust and included with

this report as Figure 6, shows similar mapping with a wide woodland ecosystem polygon along the north side of the parcel that overlaps with a terrestrial herbaceous band in the north central region of the property. Terrestrial herbaceous habitat was verified within the parcel and includes a sloping, south-facing open meadow but no special microhabitat features such as vernal pools or seeps were observed.

4.2.6. Species At Risk

4.2.6.1. Species at Risk Act

The Species at Risk Act (SARA), Schedule 1 lists species that are legally protected due to their risk status. Sections 32 and 33 contains prohibitions against the killing, harming, harassing, capturing, taking, possessing, collecting, buying, selling or trading of individuals of endangered, threatened and extirpated species listed in Schedule 1 of the *Act*. (Note, this *Act* does not include Special Concern listed species). This *Act* applies to:

- all endangered, threatened and extirpated migratory birds listed in Schedule 1 of SARA and protected by the *Migratory Birds Convention Act*, 1994, anywhere they occur, including private lands, provincial lands and lands within a territory.
- all endangered, threatened and extirpated aquatic species as defined by the *Fisheries Act* listed in Schedule 1 of SARA, anywhere they occur, including private lands, provincial lands and lands within a territory.
- With respect to individuals of a listed wildlife species that is not an aquatic species or a species of birds that are migratory birds protected by the MBCA, sections 32 and 33 of SARA do not apply in lands in a province that are not federal lands unless an Order is made under subsection (2) to provide that they apply.
- The Governor in Council may, on the recommendation of the Minister, by Order, provide that sections 32 and 33, or either of them, apply in lands in a province that are not federal lands with respect to individuals of a listed wildlife species that is not an aquatic species or a species of birds that are migratory birds protected by the *Migratory Birds Convention Act*, 1994.

When a Recovery Strategy or Action Plan is created for specific species listed on the SARA Public Registry, critical habitat is identified which is the habitat necessary for the survival or recovery of a listed species. Sometimes critical habitat is identified for groups of species occurring in specific habitat. Critical habitat identification alone is not an automatic protection designation. Federal or non-federal laws or bylaws may be in place to provide protection. At the provincial level, BC does not have specific

legislation in place for the protection of vascular plants at risk. The province of BC considers recovery planning documents, including the identification of critical habitat by the federal government, science advice only. The intent of the *Act* is to “protect critical habitat as much as possible through “voluntary actions and stewardship measures” and “prohibitions against the destruction of that particular critical habitat may come into play” (Government of Canada). If the critical habitat of a listed species is identified on private land, landowners may be required to take measures to protect it such as modifying land use to avoid habitat destruction.

4.2.6.2. *Provincial Species Ranking*

The British Columbia Conservation Data Centre (BC CDC) assists in conservation of biodiversity in the province by collecting and sharing information about wildlife, plants and ecosystems in the province. Species and ecosystems are placed on a Red, Blue or Yellow list to rank them according to their provincial conservation status. Provincially Red-Listed species includes any native species or ecological communities that have, or are candidates for, Extirpated, Endangered, or Threatened status in British Columbia. Extirpated species no longer exist in the wild in British Columbia but do occur elsewhere. Endangered species and ecological communities are facing imminent extirpation or extinction. Threatened species and ecological communities are likely to become endangered if limiting factors are not reversed. Blue-Listed species includes any native species or ecological community considered to be of Special Concern (formerly Vulnerable) in British Columbia. Species or ecological communities of Special Concern have characteristics that make them particularly sensitive or vulnerable to human activities or natural events. Yellow-Listed Species includes species or ecological communities that are apparently secure and not at risk of extinction. Yellow-listed species may have red- or blue-listed subspecies. The BC CDC also identifies ecological communities at risk based on species composition and habitat condition.

4.2.6.3. *At-risk Species Screening*

A review of BC CDC iMap identified that there is a mapped occurrence of a Red-listed Douglas-fir / Alaska oniongrass ecosystem (CDC Occurrence #65752). This ecosystem occurs on southeastern Vancouver Island and the Southwestern Gulf Islands on dry sites with shallow (<1m) soils over bedrock, typically south-facing. It is characterized by a moderately open canopy of Douglas-fir with interspersed Garry oak and occasionally arbutus, a sparse to absent shrub layer and a diverse and well-developed herb layer often dominated by Alaska oniongrass and may also include long-stoloned sedge (*Carex inops*), Pacific sanicle and yerba Buena, as well as

some other associated forbs. (BC CDC). Within the CDFmm subzone, this ecosystem is identified as site series 03 Fd – Oniongrass and is associated with a Very Dry soil moisture regime and Rich to Very Rich soil nutrient regime (Green & Klinka, 1994). Species and conditions identified in the northern portion of the parcel appear consistent with this site series classification. Appendix C includes a copy of the BC CDC iMap and the mapped ecosystem occurrence report. In addition, the BC CDC identifies masked occurrences over the study area. The BC CDC was contacted, and it has been determined that details regarding the masked occurrence are not relevant for the project due to distance from the occurrence. Notable mapped occurrences nearby include historical (1951) observations of sharp-tailed snake (*Contia tenuis*; #4054) located approximately 700m to the southeast, and more recent (2002, 2007 & 2021) observations of Western screech-owl, *kennicottii* subspecies (*Megascops kennicottii kennicottii*; #134959) located approximately 815m to the southeast. The BC CDC reports for these occurrences are included in Appendix C.

There are a number of “at-risk” species listed by the BC CDC Ecosystems Explorer search tool which are considered to have some potential to occur at the study area. The search parameters used include animals or plants; BC Conservation Status Red or Blue; North Pender Island Local Trust Area; Habitat subtypes Conifer Forest – Dry, Conifer Forest – Mesic, Garry Oak Woodland, Rock/Sparsely Vegetated Rock; BGC Zone, Subzone CDFmm. A list of 34 Blue-listed and 40 Red-listed species were generated and summarized into a table which has been included with this report in Appendix C. The list was assessed and species that have no potential to be found within the parcel were removed from the list. In consideration of the habitat characteristics observed in the site including intact second growth forest, south-facing terrestrial herbaceous meadow, and woodland habitat, the overall site has the potential to support a number of the listed species. Aquaparian rated the potential for the remaining species listed to be found within the subject parcel as Low, Moderate or High. Species were rated as having a Low potential because many key habitat elements were absent within the study site. A Moderate potential ranking was designated for species where many of the habitat elements were present including some key elements but not all of them. A High potential ranking was given to species where most of or all of the habitat elements identified in the species descriptions were present within the site including key elements, or because the species was previously documented in similar habitats nearby.

A detailed species-at-risk survey was not completed as part of this assessment because no development is planned within the second growth forest habitat,

woodland habitat or the terrestrial herbaceous habitat. There are no plans to expand the work yard or extend the area of the proposed industrial zone. None of the species listed have a high likelihood of finding suitable habitat within the industrial portion of the parcel which has been completely impacted and actively used for light industrial use for over a decade. The species-at-risk considered have potential to be found within the remaining rural portion of the parcel. However, highly specialized micro-habitats that support niche-dependent rare species, such as vernal pools, vernal seeps, vernal swales, or seasonally wetted wetland margins that are considered to be critical habitat for many rare plant species, were not identified within the study area. A review of the databases iMap BC and Esri Canada did not identify any mapped SARA critical habitat within the parcel.

5.0 IMPACT ASSESSMENT

In general, the subject parcel contains sensitive woodland and terrestrial herbaceous habitat within the rural zoned northern portion of the parcel north of the shared driveway which comprises 5.54 ha (90%) of the parcel area. Thin, dry soils with varying nutrient regimes have the potential to support a number of flowering plants, amphibians, reptiles, insects, birds and some mammal species within the site. The site also has the potential to support a number of species-at-risk that have been listed within this report and ranked as having a Low, Moderate, or High potential to be found within the site, including sharp-tailed snake. The site assessment included an inventory of species observed but detailed species presence surveys were outside of the scope of this study.

Approximately 2/3rds (0.34 ha) of the 0.56 ha area of the parcel that is shown on the site plan as Designated for Industrial use has been used as such for the past decade. It is consistent with other industrial activities along this section of Port Washington Road including industrial use of Lots 8 and 9 directly across the street. The Islands Trust Staff Report No. PLRZ20240110 (Bigham) identifies that Big Digem is recognized as providing important community services and appears to be well operated. The industrial operation is confined to a small flat gravel area that is adjacent to Port Washington Road and there are no plans to expand the industrial area north which is limited by a steep slope. There are no watercourses or wetlands within the parcel and the roadside ditch is a grassy swale that was observed to terminate without connectivity to any natural watercourses downstream. All of the sensitive ecological features that were identified within the parcel are located upslope from the industrial use portion of the parcel which precludes the potential for hydrocarbon or sediment contamination of soils from runoff or rainfall.

The industrial portion of the parcel does not appear to pose any risk to the integrity of adjacent

land reserves due to the steep topography and intact forest which is expected to provide a buffer for sound and a barrier for visual disturbance to wildlife that is using the upper portion of the parcel or the adjacent land reserves. Intact mature forest habitat is continuous with adjacent forest habitat including nature reserves on the north side of the ridge. There will be no fragmentation of the intact forested habitat that occupies most of the parcel and it will maintain its function as a wildlife corridor for a variety of species, notably migratory birds.

At the time of writing this report, it is understood that there are no development plans within the rural portion of the parcel so no impact over existing conditions is expected. The rural portion of the parcel includes approximately 200m of forested buffer between high-value potential sharp-tailed snake habitat comprised of south-facing rocky outcrops and exposed fractured bedrock (terrestrial herbaceous habitat). The forested buffer provides connectivity to other valuable potential sharp-tailed snake habitat on adjacent sites including nature reserve lands and provides leaf litter and decaying logs which are identified as important habitat features found in wooded areas that may be used by the snakes (Ministry of Environment and Climate Change Strategy, 2014). Recommendations provided in the document “Guidelines for Amphibian and Reptile Conservation” include preserving these important features and removing invasive species, in particular, Scotch broom and Himalayan blackberry (Ministry of Environment and Climate Change Strategy, 2014). Removal of invasive species which are densely established adjacent to the work yard will reduce the potential for them to spread into the sensitive rocky meadow habitat upslope that may support sharp-tailed snakes, while removal of invasive species from meadow and woodland habitat will directly improve the integrity of these areas. Expansion of the footprint of the industrial work yard is not proposed for the future so there is no reduction in viable sharp-tailed snake habitat or the habitat buffer.

Exclusion fencing was proposed in the review comments as a potential mechanism to keep sharp-tailed snakes from incidentally entering the work yard; however, fencing poses the risk of directing wildlife towards driveways crossing the site or towards the road. Exclusion fencing has not been incorporated in the measures because the site does not appear to be a major travel or migration corridor for this species; the woodland forest and meadow habitat upslope would be more likely to be used as a dispersal corridor. The Guidelines for Amphibian and Reptile Conservation During Road Building and Management Activities in British Columbia states that reptile fencing should be limited to mortality hotspots and areas between key habitats (Ministry of Environment and Climate Change Strategy, 2020, p. 54). Fencing also poses the risk of having detrimental effects on non-target species and should only be installed if these risks are outweighed by potential benefit to the target species.

Additionally, sharp-tailed snake activity is restricted to evenings and night when the work yard is not active, reducing potential for harm to this species from movement of equipment if snakes

are passing through the site. Their seasonal activity is highest in spring (February to June) and fall (September to October) so timing invasive plant management outside of these periods may help to reduce the chance of encounters (Ministry of Environment and Climate Change Strategy, 2014). It should also be considered that there are no features attracting the snakes to the work yard such as prey availability (primarily slugs), basking sites, leaf litter and/or decaying wood.

Other species-at-risk identified in adjacent nature reserve lands (e.g. common nighthawk) are not expected to be negatively impacted by rezoning for continued use of the industrial portion for the same reasons as sharp-tailed snake, namely because no expansion of the work yard into higher-value habitat upslope is proposed and because there is an ample forested buffer to provide visual and noise barriers and maintain connectivity between adjacent habitat.

Eagle or heron nests were not observed within or adjacent to the parcel. One eagle nest is mapped by WiTS to be nearby but is approximately 570m from the industrial area (Fig 4). The Pender Island Conservancy has reported a new eagle nest located approximately 200m from the industrial portion of the subject property and has expressed concerns regarding potential impacts to the nest from operation of the business during the bald eagle nesting season. Eagles are considered to have a “moderate-high” tolerance to activity near the nest site (BC Ministry of Environment, 2013). The provincial Guidelines for Raptor Conservation (2013) recommend a 100m nest tree buffer in a rural setting with an additional 100m ‘quiet’ buffer during the breeding season (see below):

Ability to co-exist*	Undeveloped	Rural	Urban	Breeding season ‘quiet’ buffer (additional)
“High” and “moderate-high”	200 m	100 m	1.5 tree lengths or 50 m from cliff	100 m
“Moderate”	500 m	200 m	1.5 tree lengths or 50 m from cliff	100 m
“Low-moderate” and “low”	500m	As advised by Professional Biologist**	As advised by Professional Biologist**	As advised by Professional Biologist**

A breeding season quiet buffer is recommended for sudden and unusual activities such as land contouring, tree falling, chain saws, large trucks, whistles, fireworks or banging devices (BC Ministry of Environment, 2013). It should be noted that the industrial operation at 3334 Port Washington Road is continuous through the year and includes regular operation of heavy

machinery. If a new nest has been constructed at this location it indicates that the eagles have accepted the location as suitable despite regular noise from the work yard. It is also important to consider sight lines between eagles and disturbances as they have high visual acuity; it is assumed that the visual activities of the work yard are not perceived as threatening by the eagles if they are within sight of the operations, or else there is a sufficient visual barrier between the nest and the work yard. Note that the buffer measurements stated above are recommendations and each situation may be unique based on ambient noise, visual barriers, and nest location. If eagles are noted to be flushing from the nest during the nesting season, a biologist may need to be retained to assess if the industrial works appear to be negatively impacting the nesting eagles. No nests have been identified within 200m of the Big Digem yard.

Future development within the industrial portion of the parcel, if rezoning is approved, may include construction of a workshop which will introduce a new area of impermeable surface. A hydrogeological report was prepared by MSR Solutions Inc. (3334 Port Washington Road – Industrial Wastewater/Stormwater Management Plan; July 23, 2025) to support the proposed rezoning application. The report confirms that stormwater runoff from the roof of the workshop can be captured in roof leaders and directed to a catch basin with stormwater storage capacity, overflow, and a restrictive outlet. The stormwater would be directed through a perforated pipe to the south end of the parcel. The report confirmed that post-development flows will not exceed pre-development flows. As no significant changes to the operation of the Big Digem work yard are expected, rezoning is expected have little to no impact over existing and historical conditions.

The provincial Cumulative Effects Framework defines Cumulative Effects (CE) as: “changes to environmental, social, and economic values caused by the combined effect of past, present and future human activities and natural processes” (Government of British Columbia, 2021). The CE Framework includes an assessment of ‘values’ which are defined as: “the things that the people and government of British Columbia care about and see as important for assuring the integrity and well-being of the province’s people and communities, economies and ecological systems, defined in policy, legislation or agreements with First Nations.” Values found within the site may include woodland forest, terrestrial herbaceous meadows, species-at-risk and their associated habitat features, air quality, and water quality. The site has been used the same way for many years, and the proposed rezoning is not expected to significantly change the land use. No increase of emissions, stormwater discharge, or noise are anticipated over existing and past land use that would be expected to have a significant cumulative effect on values identified within the parcel. As discussed in this report, the rural-zoned portion of the parcel contains high-value ecological resources and is not proposed to be developed because of the rezoning. The parcel is zoned for residential use, and if future plans include residential development (outside of the scope of the rezoning application), it is highly recommended that

measures are in place to maintain the ecological integrity and connectivity of the sensitive habitat located at the north portion of the property while planning changes to this portion of the parcel and to prevent cumulative effects that would be expected from combined industrial and residential use of the property. The Rural-zoned portion of the property has ample viable building space to be developed for residential use without encroaching into sensitive habitat or creating significant pressure on ecologically sensitive habitats within or adjacent to the property. If high-value ecological habitat is maintained and protected for its connectivity between habitat, then there is not expected to be any significant impacts on adjacent nature reserve lands if residential development is proposed in the future. At the time of writing this report, there are no plans to develop the Rural portion of the property.

6.0 RECOMMENDATIONS

The following are recommendations to preserve the identified ecological values of the property if the rezoning for the southern portion is accepted.

- The slope above the work yard and the terrestrial herbaceous habitat were observed to have an abundance of Scotch broom. Scotch broom spreads rapidly and can dominate and outcompete sensitive terrestrial herbaceous meadows. It has been identified as a major contributor to the decline of rare and endangered plant species. Removal of invasive vegetation, in particular, Scotch broom and Himalayan blackberry, has also been identified as instrumental in sharp-tailed snake conservation. It is recommended that a management plan to reduce and control this species is implemented to protect the integrity of the terrestrial herbaceous meadow in the north portion of the parcel. The following recommendations for eradication of Scotch broom is based on the *Invasive Species Council of BC: Scotch Broom Tips*:

Scotch broom

- Minimize soil disturbance adjacent to infestations to contain seed spread;
- Cut plants below soil before flowering and seeds set (late winter, early spring). To minimize potential for impacts to sharp-tailed snake, if present, and to avoid the bird nesting season, concentrate removal efforts in the winter when they are inactive;
- Due to enormous seed banking and regenerating, mechanical control needs to be repeated over a 3-5 yr period;
- Burning is ineffective as seeds germinate following a burn;

- After mechanical treatment, promptly re-vegetate with an appropriate seed mix (e.g. Garry Oak Ecosystem seed blend from Satinflower Nurseries), followed by an application of phosphorus-rich fertilizer and wood mulch; and, Along the slope above the industrial portion (but not the terrestrial herbaceous meadow), promptly establish competitive shrubbery, including snowberry, thimbleberry, and dull Oregon-grape to reduce broom growth.
- The slope above the work yard also has an abundance of Himalayan blackberry that should also be managed. The Invasive Species Council of BC factsheets for Scotch broom and Himalayan blackberry are included with this report as Appendix D. The following recommendations for eradication of Himalayan blackberry are based on the *Invasive Species Council of BC: Himalayan Blackberry Fact Sheet*.

Himalayan blackberry:

- Plan for blackberry removal in late August/September when the plants are stressed and when the migratory bird nesting season (March 15-August 15) is over;
 - Removal is only successful if all parts of the plant are removed. This includes canes, roots and root crowns;
 - Cut canes down to ~30cm before digging/grubbing to remove thickets while easily locating root crowns;
 - Hand pulling is recommended for small seedlings or young plants or shade-suppressed canes. Pull when plants are large enough to grasp but have not produced seeds;
 - Dig/grub more established plants, avoid leaving root fragments behind as they may resprout. Claw mattocks or Pulaskis have been proven to be effective tools;
 - If machines will be used, dig deep and carefully to get all of the root crown; and,
 - Bag or tarp all plant parts and seeds before transporting to a designated disposal facility such as a landfill or destroy by incineration.
-
- There is a low potential for some bird species such as barn swallows or dark-eyed juncos to nest in anthropogenic spaces or on equipment. Works within the yard must abide by the *Migratory Bird Convention Act* and the *Wildlife Act*. If birds are found to be nesting in or on equipment they must be left alone and not removed or disturbed until their eggs have hatched and the chicks have fledged.
 - There is potential for sharp-tailed snakes to be found within the property. Use of the industrial portion of the property for habitat is considered unlikely due to lack of key habitat elements and continuous disturbance, and because of the 200m forested buffer

between high-value potential sharp-tailed snake habitat and the work yard. They are most likely to find suitable habitat in the terrestrial herbaceous or woodland ecosystems identified to the north of the parcel as several key habitat elements were identified. The northern portion of the parcel should be preserved in the future to maintain connectivity between like habitat and the adjacent nature reserves. Documented sightings of this elusive species are very limited. If it is suspected that this species has been spotted in the subject parcel, document the sighting including photographs, if possible, and report the sighting to the BC Conservation Data Centre and wait for further guidance. If a sharp-tailed snake is identified in the active work yard and imminently at risk of harm, carefully move it to a safe location where it is not in danger of injury or mortality and report it to BC CDC.

- If future residential development is planned for the rural zoned upper portion of the parcel, it is highly recommended to avoid construction in the northern portion of the property due to its connectivity with adjacent nature reserve lands, its high-ecological value, its potential for a wildlife corridor, and its potential to support species-at-risk.
- Trucks and heavy machinery are to be washed down at a certified vehicle washing facility rather than onsite.
- Dust / air quality – dust should be managed by use of water on the site. Idling equipment should be limited as far as possible. Machines are to be kept in good repair to limit air emissions.
- Ensure no track out onto the paved road occurs. If track out occurs, it is to be swept off immediately.
- As understood, there are plans for construction of a new workshop. Ensure standard mitigation measures for construction are in place to prevent negative impacts to the environment including management of sediment laden water to prevent migration off-site, management of hydrocarbons in the case of a spill or leak to prevent soil and groundwater contamination, control of dust, etc.

7.0 CONCLUSIONS

It is Aquaparian's opinion that continued use of the southern portion of the subject parcel for industrial use is consistent with the adjacent industrial parcels along both sides of Port Washington Road frontage in this area and that concentrating similar industrial operations to one small area of the island is preferable to spreading industrial uses throughout the island or to other areas that may cause habitat fragmentation or have existing sensitive environmental attributes that may be lost to new development. There is currently no plan to expand the work yard of the site which is limited to a very small portion of the property (6%). The work yard is separated and downslope of the environmentally sensitive portion of the parcel. The conservation lands identified in the report are located over 300m away from the Big Digem work yard and two of the three parcels are on the opposite side of the ridge from the subject parcel. The nearest known eagle nest tree is over 200m away from the works yard, one of which is on the opposite side of the ridge and the other is separated by a forest stand. It is Aquaparian's opinion that the current proposed rezoning is appropriate for the site and it is not expected to result in further environmental impacts over the existing conditions. If other parcels in this area are rezoned for additional industrial use in the future, increased heavy equipment traffic would be expected to occur along Port Washington Road over current use.

8.0 CLOSURE

Aquaparian Environmental Consulting Ltd was retained to complete an Environmental Assessment to support a re-zoning application to the Islands Trust for continued industrial land use of the south portion of 3334 Port Washington Road, Pender Island, BC. Currently this portion of land is being used for light industrial operations under a Temporary Use Permit since 2011. The remaining area of the parcel is currently undeveloped and forested. The rezoning application is to allow the proponent to come into compliance with the North Pender Island Land Use Bylaw for continued industrial use of the property. This report has been prepared at the rezoning stage. At the time of writing this report, Aquaparian understands that no further expansion of the industrial footprint is proposed and that the activities within this portion of the property will remain more or less the same.

This report was completed to identify general habitat conditions and features within the subject property and to document and map environmentally sensitive areas located within the parcel. No detailed species presence assessments were completed for this study. This assessment includes recommendations for protection of sensitive ecological features including management of invasive species identified within the property.



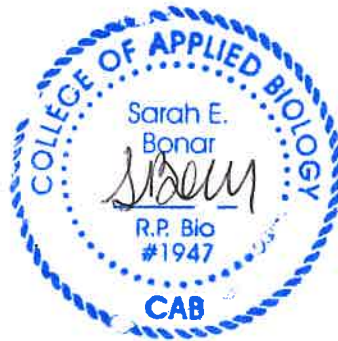
3334 Port Washington Road, Pender Island, BC
Environmental Impact Assessment – Rezoning
July 2025; Rev. Nov. 2025

31

This report has been completed in accordance with generally accepted biological practices. No other warranty is made, either expressed or implied. Aquaparian trusts that the information provided in this report meets your requirements. Any questions regarding information provided in this document, please contact the undersigned at (250) 591-2258.

Respectfully submitted,

AQUAPARIAN ENVIRONMENTAL CONSULTING LTD.



Jeni Rowell, B.Sc.
Biologist-in-Training

Sarah Bonar, R.P.Bio.
Senior Biologist/Principal

[HTTPS://NETORG5387218.SHAREPOINT.COM/SITES/SHARED/SHARED DOCUMENTS/DOCUMENTS/PROJECTS/PROJECTS/N1262 3334 PORT WASHINGTON RD PENDER EIA/REPORT AND ATTACHMENTS/3334 PORT WASHINGTON EIA REV NOV 2025.DOCX](https://netorg5387218.sharepoint.com/sites/SHARED/SHARED%20DOCUMENTS/DOCUMENTS/PROJECTS/PROJECTS/N1262%203334%20PORT%20WASHINGTON%20RD%20PENDER%20EIA/REPORT%20AND%20ATTACHMENTS/3334%20PORT%20WASHINGTON%20EIA%20REV%20NOV%202025.DOCX)



203- 321 Wallace Street, Nanaimo, BC V9R 5B6
SARAH BONAR 250-714-8446 CHRIS ZAMORA 250-714-8864

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FIGURE 1A & 1B
SITE LOCATION MAP

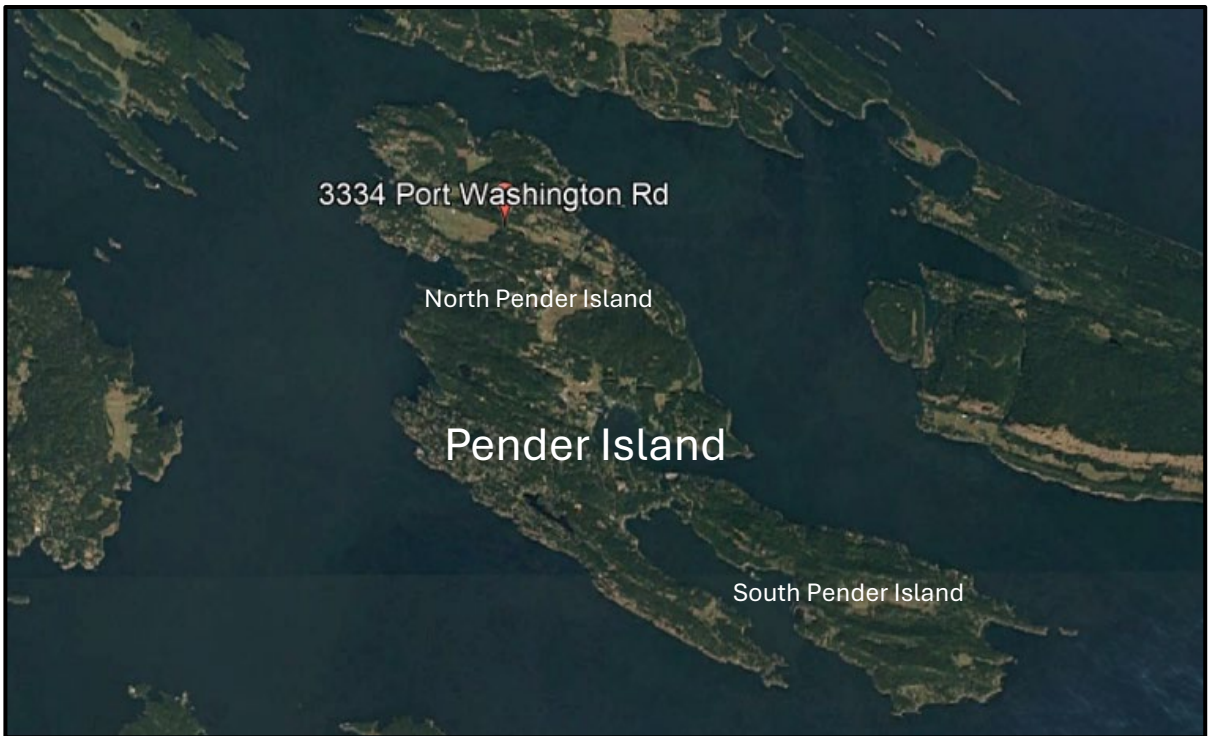


FIGURE 1a & 1b – SITE LOCATION MAPS



FIGURE 2
SITE PLAN (POLARIS LAND SURVEYING INC.)

FIGURE 2 – SITE PLAN (3334 PORT WASHINGTON RD)

SITE PLAN OF PART OF LOT 7, SECTIONS 18 AND 22,
PENDER ISLAND, COWICHAN DISTRICT, PLAN 6294

PID 005-837-693

The intended plot size of this plan is 960mm in width by 684mm in height (D-S16) when plotted at a scale of 1:2000.
All distances are in metres and decimals thereof, unless otherwise noted.

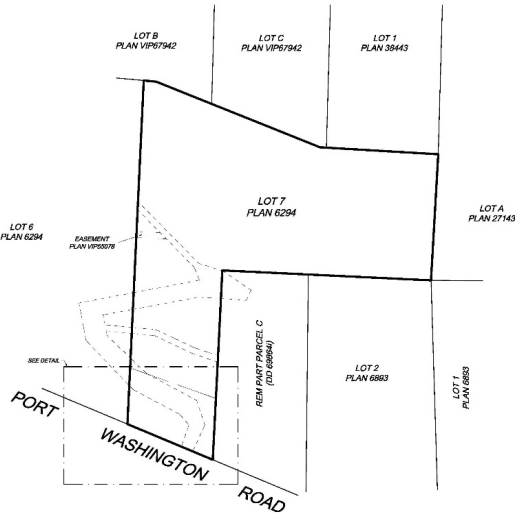
LEGEND

- denotes Standard Iron Post found
- denotes Non-Standard Post found
- denotes Transverse Hub found
- denotes Utility Hole
- denotes Anchor
- denotes Well
- denotes Sign Post
- denotes Fenceline
- denotes Top of Bank
- denotes Bottom of Bank
- denotes Top of Road
- denotes Edge of Road
- denotes Edge of Gravel
- denotes DPA 1 - Woodland
- denotes Ditch Bottom
- denotes Culvert
- denotes Remainder

The site address is:
3334 Port Washington, Pender Island, BC.

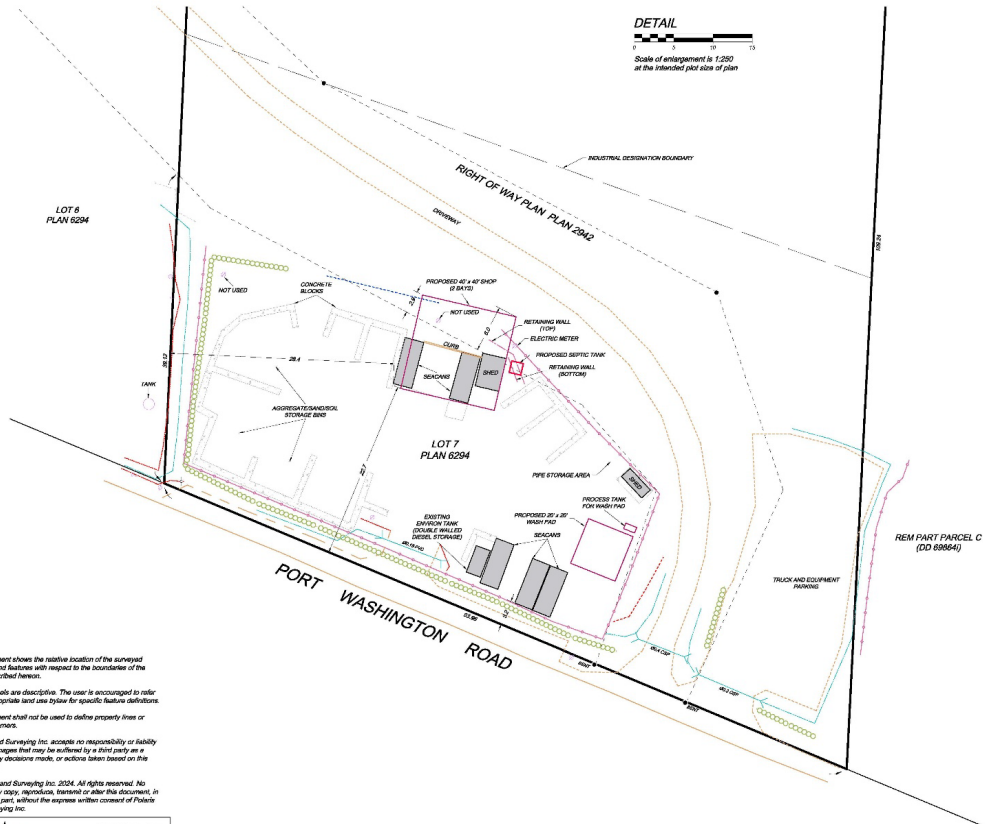
The following non-branchal charges are shown on the current
Certificate of Title and may affect the property:

- ET0306 - EASEMENT
- ET0307 - EASEMENT
- ET0308 - EASEMENT
- ET18862 - EASEMENT
- ET18866 - EASEMENT



DETAIL

Scale of enlargement is 1:250
at the intended plot size of plan



This document shows the relative location of the surveyed
buildings and features with respect to the boundaries of the
parcel described herein.

Feature labels are descriptive. The user is encouraged to refer
to the appropriate land use bylaws for specific feature definitions.

This document shall not be used to define property lines or
property corners.

Potter's Land Surveying Inc. accepts no responsibility or liability
for any damages that may be suffered by a third party as a
result of any decisions made, or actions taken based on this
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www.plsi.ca



Dwg: 3024-04-22
File: 3414-01
Drawing: 3414-01-0178.dwg
Layout: D-S16

FIGURE 3
BIOPHYSICAL MAP

FIGURE 3 – BIOPHYSICAL MAP (3334 PORT WASHINGTON ROAD)



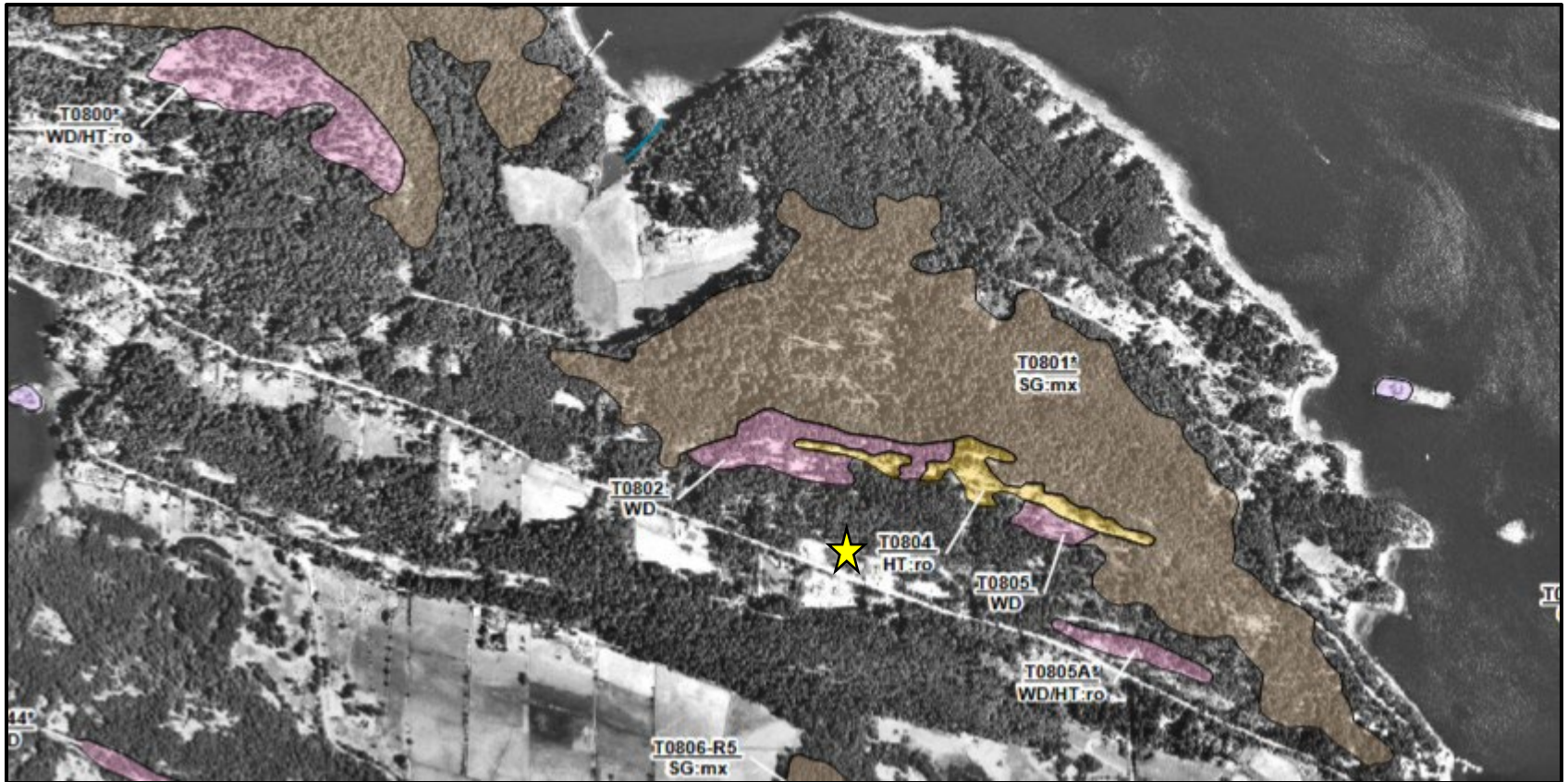
FIGURE 4
WILDLIFE TREE STEWARDSHIP MAP

**FIGURE 4 – WILDLIFE TREE STEWARDSHIP MAP
(EAGLE NEST TREES)**



FIGURE 5
SENSITIVE ECOSYSTEM INVENTORY MAP

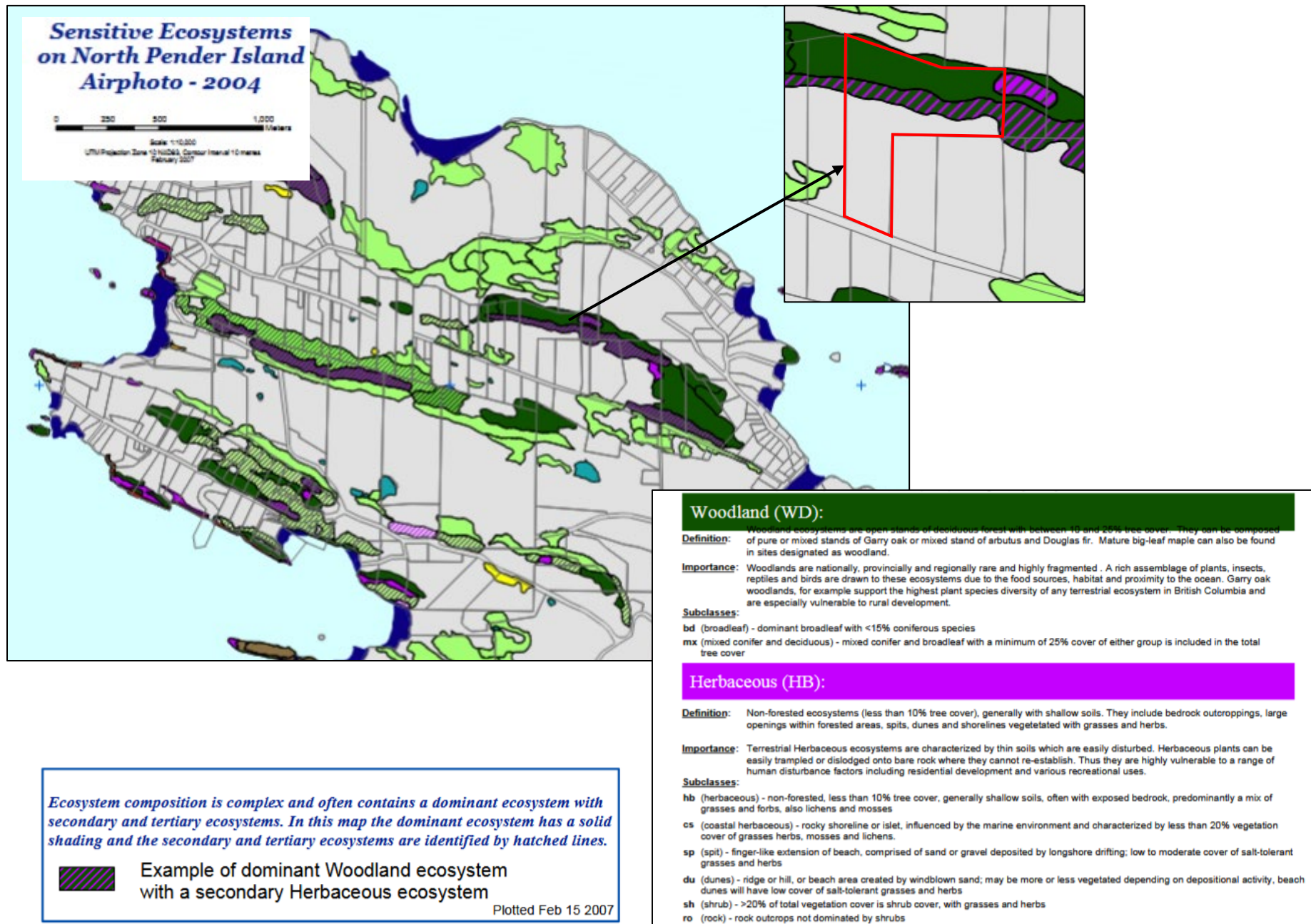
FIGURE 5 – SENSITIVE ECOSYSTEMS INVENTORY (SEI)



★ Subject Parcel

FIGURE 6
NORTH PENDER ISLAND SENSITIVE ECOSYSTEMS MAP

FIGURE 6 – SENSITIVE ECOSYSTEMS OF NORTH PENDER MAP



APPENDIX A

SITE PHOTOGRAPHS

APPENDIX A – SITE PHOTOGRAPHS



Photo 1: East side of industrial area used to store vehicles.



Photo 2: West side of industrial area used as Big Digem work yard. Photo shows piles of aggregates.



Photo 3: Soils are contained in lock block bins.



Photo 4: Showing two sea cans. New workshop planned to replace them.



Photo 5: Diesel storage in double walled container with full sized spill kit next to it.



Photo 6: Overlooking the west portion of the industrial area that comprises the Big Digem work yard. Photo facing southeast from slope behind work yard.



Photo 7: Looking northeast at slope behind work yard. The cleared slope is within the industrial designation.



Photo 8: Cleared slope has been overgrown with Himalayan blackberry and Scotch broom – invasive species.



Photo 9: Small cleared bench at top of driveway.



Photo 10: Above the cleared bench is a woodland slope.



Photo 11: Looking east across terrestrial herbaceous meadow in north portion of parcel.



Photo 12: Looking west across terrestrial herbaceous meadow in north portion of parcel.



Photo 13: Showing a thicket of invasive Scotch broom that has established in the terrestrial herbaceous meadow.



Photo 14: Woodland ridge along the north side of the parcel above the band of terrestrial herbaceous meadow.



Photo 15: The topography slopes steeply down beyond the north parcel boundary.

Photos 16-22: Photos of some of the species identified during the survey in woodland or terrestrial herbaceous habitat. In order: Pacific treefrog, fairy slipper, western saxifrage, wingstem monkeyflower, small-flowered woodland star, wholeleaf saxifrage, and giant blue-eyed Mary.





Photo 23: Clearing in south area above industrial portion looking east.



Photo 24: Clearing in south area above industrial portion looking north toward woodland habitat.



Photo 25: Dry second growth Douglas-fir forest habitat.

APPENDIX B

SITE ASSESSMENT VEGETATION PLOT DATA

Appendix B
3334 Port Washington Drive, Pender Island BC
Summary of Vegetation Plots

Plot 1

Location: Northeast corner of parcel.

Coordinates: 48° 48' 34" N / 123° 17' 29" W

Description: Forested ridge peak, 30% canopy cover.

Environmentally Sensitive Area (ESA) Classification: Woodland.

Canopy species:			
Species	Scientific name	Proportion of canopy	Stem diameter range (diameter-at-breast-height (dbh))
Douglas-fir	<i>Pseudotsuga menziesii</i>	75%	18-50cm
Arbutus	<i>Arbutus menziesii</i>	25%	Up to 70cm
Understory species:			
Species		Scientific name	
Grasses & mosses (dominant)		Mixed spp.	
Red columbine		<i>Aquilegia canadensis</i>	
Fairy slipper		<i>Calypso bulbosa</i>	
Little western bittercress		<i>Cardamine oligosperma</i>	
Miner's lettuce		<i>Claytonia perfoliata</i>	
Fragile fern		<i>Cystopteris fragilis</i>	
Scotch broom (invasive)		<i>Cytisus scoparius</i>	
Sweet-scented bedstraw		<i>Galium triflorum</i>	
Dove's-foot crane's-bill		<i>Geranium molle</i>	
Rattlesnake plantain		<i>Goodyera oblongifolia</i>	
White hawkweed (invasive)		<i>Hieracium albiflorum</i>	
Nipplewort		<i>Lapsana communis</i>	
Small flowered woodland star		<i>Lithophragma parviflorum</i>	
Hairy honeysuckle		<i>Lonicera hispidula</i>	
Rose campion		<i>Lychnis coronaria</i>	
Dull Oregon-grape		<i>Mahonia nervosa</i>	
Wood forget-me-not		<i>Myosotis sylvatica</i>	
Frog's pelt		<i>Peltigera neopolydactyla</i>	
Goldback fern		<i>Pentagramma triangularis</i>	
Licorice fern		<i>Polypodium glycyrrhiza</i>	
Western buttercup		<i>Ranunculus occidentalis</i>	
Baldhip rose		<i>Rosa gymnocarpa</i>	
Pacific sanicle		<i>Sanicula crassicaulis</i>	
Common chickweed		<i>Stellaria media</i>	
Common dandelion (invasive)		<i>Taraxacum officinale</i>	
Rein orchid		Unidentified (not flowering)	

Plot 2

Location: Northwest corner of parcel

Coordinates: 48° 48' 36" N / 123° 17' 40" W

Description: Forested ridge peak, partial canopy opening, small meadow within forest

Environmentally Sensitive Area (ESA) Classification: Woodland / terrestrial herbaceous overlap

Canopy species:			
Species	Scientific name	Proportion of canopy	Avg stem diameter range (diameter-at-breast-height (dbh))
Douglas-fir	<i>Pseudotsuga menziesii</i>	78%	20-30cm
Arbutus	<i>Arbutus menziesii</i>	20%	30cm
Garry oak	<i>Quercus garryana</i>	2%	20-45cm
Understory species:			
Species	Scientific name		
Grasses	Mixed spp.		
Fairy slipper	<i>Calypso bulbosa</i>		
Miner's lettuce	<i>Claytonia perfoliata</i>		
Fragile fern	<i>Cystopteris fragilis</i>		
Sweet-scented bedstraw	<i>Galium triflorum</i>		
Alaska oniongrass	<i>Melics subulata</i>		
Juniper hair cap moss	<i>Polytrichum juniperinum</i>		
Rough goose neck moss	<i>Rhytidiadelphus triquetrus</i>		
Sheep sorrel	<i>Rumex acetosella</i>		
Pacific sanicle	<i>Sanicula crassicaulis</i>		
Rein orchid	Unidentified (not flowering)		

Plot 3

Location: West side of slope below ridge in northern portion of parcel

Coordinates: 48° 48' 34" N / 123° 17' 40" W

Description: Open terrestrial herbaceous meadow with thin soils over bedrock; 35% slope gradient; south-facing aspect; 5% exposed bedrock & 95% moss groundcover; dense patches of invasive Scotch broom (30-40% cover avg. up to >60%); many dead standing trees in canopy upslope of meadow.

Environmentally Sensitive Area (ESA) Classification: Terrestrial herbaceous

Terrestrial wildlife spotted: Pacific treefrog (*Pseudacris regilla*), northern alligator lizard (*Elgaria coerulea*)

Canopy species:			
Species	Scientific name	Proportion of canopy	Avg stem diameter range (diameter-at-breast-height (dbh))
Douglas-fir	<i>Pseudotsuga menziesii</i>	Edges only: 75%	20-30cm
Arbutus	<i>Arbutus menziesii</i>	Edges only: 25%	20-30cm
Understory species:			
Species	Scientific name		
Moss	Mixed spp.		
Sweet vernal grass	<i>Anthoxanthum odoratum</i>		
Giant blue-eyed Mary	<i>Collinsia grandiflora</i>		
Scotch broom (invasive)	<i>Cytisus scoparius</i>		
Wingstem monkeyflower	<i>Erythranthe alsinoides</i>		
Alaska oniongrass	<i>Melics subulata</i>		
Wholeleaf saxifrage	<i>Micranthes integrifolia</i>		
Western saxifrage	<i>Micranthes occidentalis</i>		

Sheep sorrel	<i>Rumex acetosella</i>
Wallace's spikemoss	<i>Selaginella wallacei</i>
Corn speedwell	<i>Veronica arvensis</i>

Plot 4

Location: Approx. centre of parcel

Coordinates: 48° 48' 32" N / 123° 17' 35" W

Description: Woodland band below terrestrial herbaceous meadow band

Environmentally Sensitive Area (ESA) Classification: Woodland

Canopy species:			
Species	Scientific name	Proportion of canopy	Stem diameter range (diameter-at-breast-height (dbh))
Douglas-fir	<i>Pseudotsuga menziesii</i>	85%	15-50cm
Arbutus	<i>Arbutus menziesii</i>	10%	20-50cm
Bigleaf maple	<i>Acer macrophyllum</i>	5%	20-30cm
Understory species:			
Species	Scientific name		
Red columbine	<i>Aquilegia canadensis</i>		
Yerba buena	<i>Clinopodium douglasii</i>		
Woodland strawberry	<i>Fragaria vesca</i>		
Rattlesnake plantain	<i>Goodyera oblongifolia</i>		
Nipplewort	<i>Lapsana communis</i>		
Purple peavine	<i>Lathyrus nevadensis</i>		
Western honeysuckle	<i>Lonicera ciliosa</i>		
Hairy honeysuckle	<i>Lonicera hispidula</i>		
Grasses & mosses	Mixed spp.		
Largeleaf sandwort	<i>Moehringia macrophylla</i>		
Sword fern	<i>Polystichum munitum</i>		
Baldhip rose	<i>Rosa gymnocarpa</i>		
Pacific sanicle	<i>Sanicula crassicaulis</i>		
Common chickweed (invasive)	<i>Stellaria media</i>		

Plot 5

Location: Inside elbow of property boundaries.

Coordinates: 48° 48' 31" N / 123° 17' 38" W

Description: Second growth dry Douglas-fir forest bisected by access road shared with 3330 Port Washington Rd; understory has 99% shrub cover.

Environmentally Sensitive Area (ESA) Classification: Second growth dry Douglas-fir forest

Canopy species:			
Species	Scientific name	Proportion of canopy	Stem diameter range (diameter-at-breast-height (dbh))
Douglas-fir	<i>Pseudotsuga menziesii</i>	90%	20-40cm
Arbutus	<i>Arbutus menziesii</i>	5%	20-25cm
Western redcedar	<i>Thuja plicata</i>	5%	20-25cm
Understory species:			
Species	Scientific name		
Dull Oregon-grape (89% cover)	<i>Mahonia nervosa</i>		
Salal (10% cover)	<i>Gaultheria shallon</i>		

Cleavers	<i>Galium aparine</i>
Western honeysuckle	<i>Lonicera ciliosa</i>
Moss	Mixed spp.
Bracken fern	<i>Pteridium aquilinum</i>
Trailing blackberry	<i>Rubus ursinus</i>
Pacific sanicle	<i>Sanicula crassicaulis</i>
Starflower	<i>Trientalis borealis</i>

Plot 6

Location: Upslope from work yard and downslope from a recently cleared, flat, forested area in the central south end of the property.

Coordinates: 48° 48' 28" N / 123° 17' 40" W

Description: Woodland band below terrestrial herbaceous meadow band along moderate to steep slope.

Environmentally Sensitive Area (ESA) Classification: Woodland

Canopy species:			
Species	Scientific name	Proportion of canopy	Stem diameter range (diameter-at-breast-height (dbh))
Douglas-fir	<i>Pseudotsuga menziesii</i>	60%	20-40cm
Arbutus	<i>Arbutus menziesii</i>	40%	20-30cm
Understory species:			
Species	Scientific name		
Canada thistle (invasive)	<i>Cirsium arvense</i>		
Scotch broom (invasive)	<i>Cytisus scoparius</i>		
Foxglove (invasive)	<i>Digitalis purpurea</i>		
Western honeysuckle	<i>Lonicera ciliosa</i>		
Grasses	Mixed spp.		
Himalayan blackberry (invasive)	<i>Rubus armeniacus</i>		
Black cap raspberry	<i>Rubus occidentalis</i>		
Common dandelion (invasive)	<i>Taraxacum officinale</i>		

Plot 7

Location: Southernmost end of parcel adjacent to Port Washington Road extending up a cleared slope to the extent of the industrial use apportion of the parcel.

Coordinates: 48° 48' 26" N / 123° 17' 41" W

Description: Work yard used for Big Digem industrial activity.

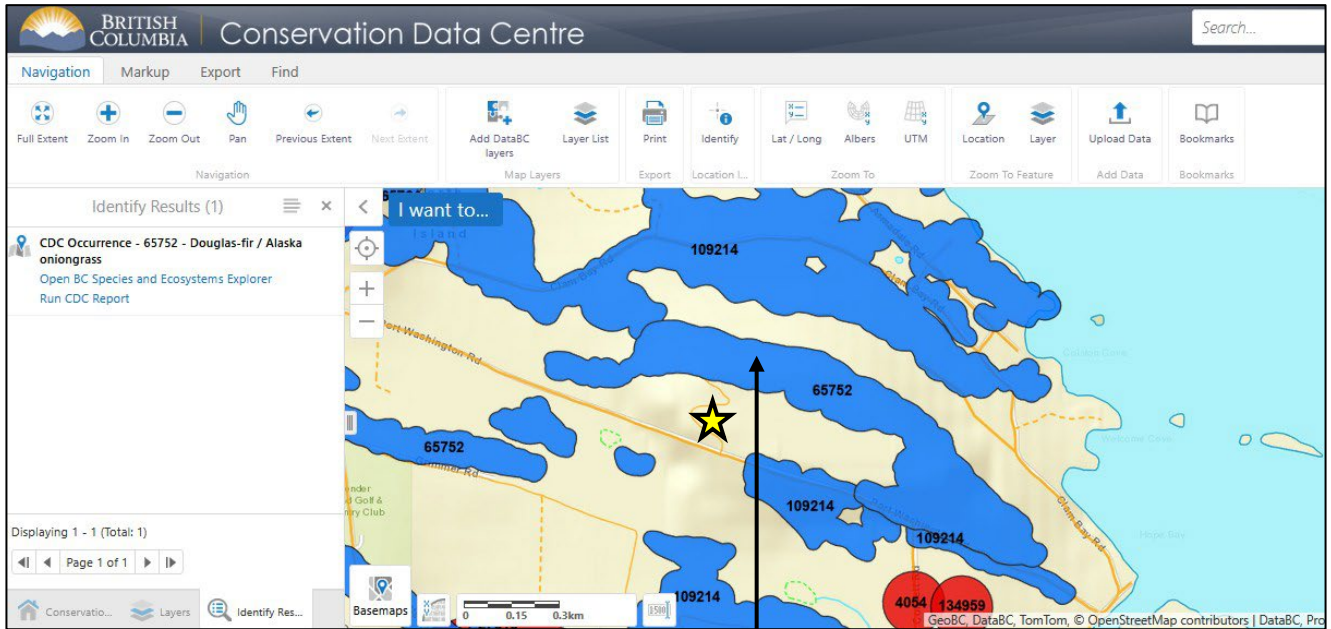
Environmentally Sensitive Area (ESA) Classification: Disturbed Areas

Understory species:	
Species	Scientific name
Scotch broom (invasive)	<i>Cytisus scoparius</i>
Grasses	Mixed spp.
Himalayan blackberry (invasive)	<i>Rubus armeniacus</i>
Ornamental cedar perimeter hedge	<i>Thuja</i> sp.

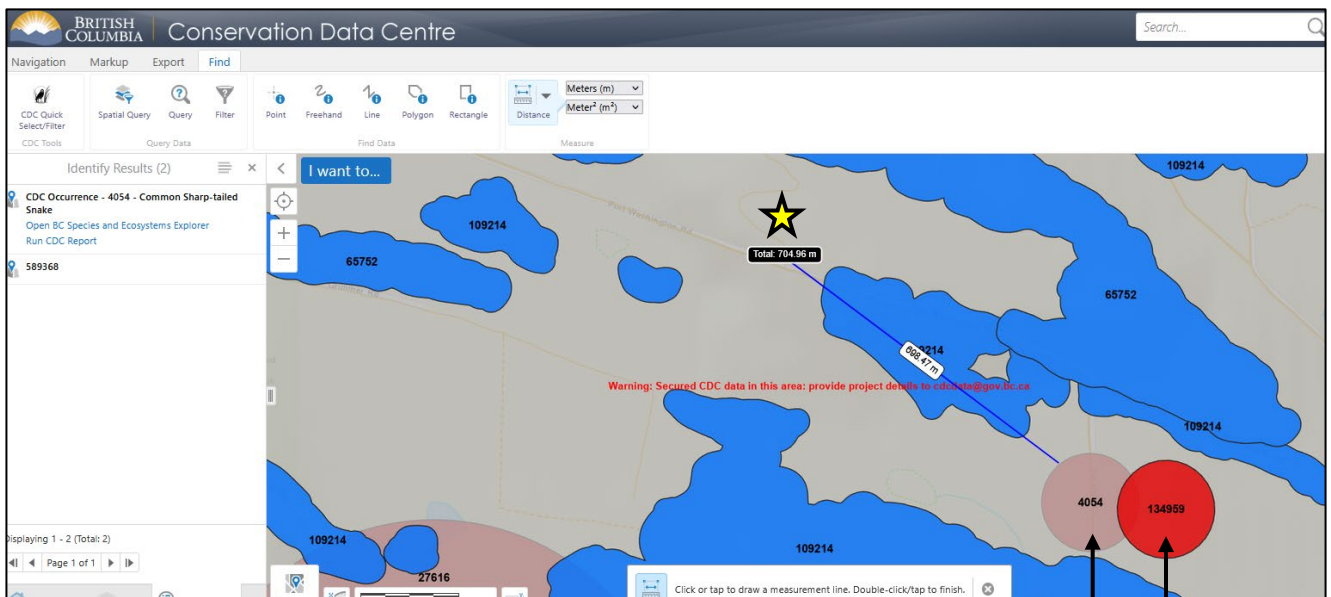
APPENDIX C

BC CDC SEARCH RESULTS
(IMAP, SPECIES/ECOSYSTEM SUMMARY REPORTS & ECOSYSTEM
EXPLORER RESULTS)

BC CDC iMAP



Douglas-fir / Alaska Oniongrass ecological community



Western screech-owl,
kennicottii subsp.

Sharp-tailed snake

★ = Subject Parcel

Species Potential Ranking (Low/Moderate/ High)	Justification for Species Potential Ranking	Scientific Name	English Name	BC List	SARA Schedu le	SARA Status	SARA Date	Habitats (Type / Subtype / Dependence)	Global Habitat Comments	Provincial Habitat Comments
High	habitat features present	<i>Cercyonis pegala incana</i>	Common Wood-nymph, <i>incana</i> subspecies	Red				Agriculture / Pasture/Old Field / Facultative - frequent use ; Forest / Conifer Forest - Dry / Facultative - frequent use ; Grassland/Shrub / Grassland / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Cliff / Facultative - occasional use		Habitat keywords copied from species record.
High	haitat features present	<i>Platanthera ephemerantha</i>	white-lip rein orchid	Blue				Forest / Conifer Forest - Dry / Facultative - frequent use ; Forest / Garry Oak Woodland / Facultative - frequent use	This species is found in chaparral, as well as conifer and mixed evergreen forests, occasionally on serpentine soils, within 150 kilometers of the coast, at elevations ranging from 0 to 1,500 meters (Ackerman and Morgan, 2020).	
High	habitat features present	<i>Sericocarpus rigidus</i>	white-top aster	Blue	1	Special Concern	Jun-03	Forest / Garry Oak Woodland / Facultative - frequent use ; Forest / Mixed Forest (deciduous/coniferous mix) / Facultative - frequent use ; Grassland/Shrub / Meadow / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use	Sericocarpus rigidus occurs in open grassland habitats in the Willamette-Puget Trough. A majority of the occurrences occur in gravelly, glacial outwash soils. However, in the southern and northern portions of its range, it occurs in the clayey and exposed bedrock habitats, respectively. The general requirement appears to be open, non-forested habitats that are seasonally mesic but somewhat moisture stressed during late summer. Trees such as <i>Quercus garryana</i> and <i>Arbutus menziesii</i> are often present, but do not form a closed overstory. Possible associates of the understory of shrubs are <i>Cytisus scoparius</i> , <i>Holodiscus discolor</i> , and <i>Symphoricarpos albus</i> . Dense thickets are not formed by these shrubs because soils are too shallow. The ground tends to be dominated by a mixture of introduced grasses including <i>Aira praecox</i> , <i>Dactylis glomerata</i> , <i>Poa</i> spp., <i>Cynosurus echinatus</i> , and <i>Anthoxanthum odoratum</i> (Douglas and Illingworth 1994).	In British Columbia, <i>Aster curtus</i> occupies level to sloping, seasonally xeric microsites with shallow soil over bedrock. Exposure is full sun to partial shade. Rock outcrops are frequently present. Habitat is open <i>Quercus garryana</i> - <i>Arbutus menziesii</i> - <i>Pseudotsuga menziesii</i> forest or woodland, or open shrub stands of <i>Cytisus scoparius</i> , <i>Holodiscus discolor</i> , <i>Mahonia aquifolium</i> , <i>Symphoricarpos albus</i> , <i>Lonicera hispidula</i> , <i>Arctostaphylos uva-ursi</i> , <i>Rosa gymnocarpa</i> , <i>Daphne laureola</i> , and <i>Pachistima myrsinites</i> . Native species in the herb layer include <i>Camassia leichtlinii</i> , <i>Elymus glaucus</i> , <i>Erythronium oregonum</i> , <i>Polystichum munitum</i> , <i>Triteleia hyacinthina</i> , <i>Danthonia californica</i> , <i>Sanicula crassicaulis</i> , <i>Fragaria virginiana</i> , <i>Carex inops</i> , <i>Melica subulata</i> , <i>Dodecatheon pulchellum</i> , <i>Zygadenus venenosus</i> , <i>Eriophyllum lanatum</i> , and <i>Luzula multiflora</i> . Exotic species often dominate the herb layer and include <i>Aira praecox</i> , <i>Dactylis glomerata</i> , <i>Poa pratensis</i> , <i>Cynosurus echinatus</i> , and <i>Anthoxanthum odoratum</i> , with <i>Anthoxanthum</i> typically the dominant in sites with <i>Aster curtus</i> . Soils vary from shallow dark brown brunisols to brownish-

Low	site lacks old growth features	<i>Accipiter atricapillus laingi</i>	American Goshawk, <i>laingi</i> subspecies	Red	1	Threatened	Jun-03	Agriculture / Cultivated Field / Facultative - occasional use ; Agriculture / Hedgerow / Facultative - occasional use ; Agriculture / Pasture/Old Field / Facultative - occasional use ; Alpine/Tundra / Krummholtz / Facultative - occasional use ; Forest / Conifer Forest - Dry / Facultative - occasional use ; Forest / Conifer Forest - Mesic (average) / Facultative - frequent use ; Forest / Conifer Forest - Moist/wet / Facultative - frequent use ; Forest / Mixed Forest (deciduous/coniferous mix) / Facultative - frequent use ; Grassland/Shrub / Meadow / Facultative - occasional use ; Other Unique Habitats / Estuary / Facultative - occasional use ; Riparian / Riparian Forest / Facultative - frequent use	Extensive forests with large stands of mature trees and dense canopies, but with an open understory. Large trees are important in providing nesting and perching platforms, in allowing ample flight space between the trunks for the goshawks to maneuver while hunting, and in providing for greater productivity of preferred prey. Closed forest canopy is believed to provide an optimal microclimate for nesting and also possibly may inhibit open-forest and forest-edge raptor predators (Crocker-Bedford 1992). BREEDING: Closely associated with mature and old-growth forests (Crocker-Bedford 1990, 1991, 1992; ADF&G 1996; McClaren 1999; Chytyk and Cooper 1999; Chytyk et al. 1999; Cooper and Chytyk 2000). On Vancouver Island, 62 per cent of 56 nests were in contiguous old-growth forests, 25 per cent in contiguous second-growth forests over 50 years old, and 13 per cent in fragmented old-growth forests (McClaren 1999). On the Queen Charlotte Islands, four active nests were found in contiguous old-growth forest, while a fifth was found in an old-growth forest bordered by mature forest that	Queen Charlotte Goshawks tend to nest in maturing-to-old mesic, coniferous stands (Manning et al. 2004). On Vancouver Island, these stands are typically dominated by Douglas-fir (<i>Pseudotsuga menziesii</i>) and western hemlock (<i>Tsuga heterophylla</i>) (McClaren 2003), while on the Queen Charlotte Islands, western hemlock is dominant (Chytyk and Dhanwant 1999b). In general, nest stands are characterized by: 1) >45 years old (structural stages 5-7); 2) multi-layered canopies; 3) structurally diverse; 4) canopy closure 50-85%; 5) in areas of larger sized trees; 6) on the lower 2/3 of slopes; 7) on slopes with gradients <40 degrees; 8) where snags and coarse woody debris are present; 9) typically not along "hard edges"; and 10) not near urban areas (Iverson et al. 1996; Daw et al. 1998; McClaren 2003; BC Minist. of Water, Land and Air Protection 2004; Manning et al. 2004).
Low	site lacks stonecrop (obligate host)	<i>Callophrys mossii mossii</i>	Moss' Elfín, <i>mossii</i> subspecies	Red				Forest / Deciduous/Broadleaf Forest / Facultative - frequent use ; Grassland/Shrub / Grassland / Facultative - frequent use ; Grassland/Shrub / Shrub - Natural / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Cliff / Obligate ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Obligate ; Rock/Sparsely Vegetated Rock / Talus / Obligate		Habitat keywords copied from species record.

Low	site lacks vernal pools and seeps	<i>Epilobium torreyi</i>	brook spike-primrose	Red	1	Endangered	Dec-07	Forest / Conifer Forest - Dry / Facultative - occasional use ; Forest / Garry Oak Woodland / Facultative - occasional use ; Other Unique Habitats / Garry Oak Vernal Pool / Facultative - frequent use		In BC, <i>Epilobium torreyi</i> occurs in vernal pools in moist grassland and open slopes associated with <i>Quercus garryana</i> ecosystems in the lowland Coastal Douglas-fir biogeoclimatic zone. Habitat is clay-rich sediments in pools that are flooded in winter and dry in summer. Associated native species include <i>Epilobium densiflorum</i> , <i>Lotus unifoliolatus</i> , <i>Madia</i> spp., and <i>Navarretia intertexta</i> . Fluctuations in hydroperiod suppress establishment of competing woody plants and herbs from uplands, maintaining open vegetation at both sites. There are no records of vegetation composition at the McTavish Road site, but prior to its extirpation the occurrence at Craigflower Meadow was dominated by a mix of native and exotic herbs along with a sparse cover of invasive species such as <i>Agrostis capillaris</i> , <i>Anthoxanthum odoratum</i> , <i>Cytisus scoparius</i> , <i>Crataegus monogyna</i> , <i>Hypochaeris radicata</i> , and <i>Rubus armeniacus</i> . Historically, the oak habitat surrounding the vernal pools was probably maintained by periodic fire (COSEWIC 2006d; Klinkenberg and Klinkenberg 2006).
Low	site lacks cliff faces, bluffs, fissures, slight seepages, but has some associated species	<i>Lomatium papilioniferum</i>	butterfly bearing lomatium	Red	1	Threatened	Feb-11	Forest / Conifer Forest - Dry / Facultative - occasional use ; Forest / Garry Oak Woodland / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Cliff / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Talus / Facultative - frequent use		
Low	site lacks vernal seeps	<i>Meconella oregana</i>	white meconella	Red	1	Endangered	Aug-06	Forest / Deciduous/Broadleaf Forest / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Garry Oak Coastal Bluffs / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use	This is a species of open ground at low elevations, usually in places that are wet in the spring, including Coastal Prairie and Coastal Scrub. Associated species include Narcissus Shooting Star (<i>Dodecatheon poeticum</i>), Bulbiferous Fringecup (<i>Lithophragma bulbifera</i>), and Grass-widows (<i>Sisyrinchium douglasii</i>).	Note Palustrine: 'temporary pool' was selected for habitat in the list provided, since it was the only available choice, whereas 'seepage' is more appropriate. In British Columbia, <i>Meconella oregana</i> occurs mainly on open, south-facing slopes of rocky hillsides. Soils are extremely shallow, sometimes to the extent that they support fewer vascular plants than bryophytes. Sites occur on volcanic, metamorphic and sedimentary (conglomerate) bedrock types. Nearly all stands of <i>Meconella</i> were found on or adjacent to early-season seepage sites. However, plants were observed to do poorly without adequate drainage. Its habit of growing close to seepage sites may be related to survival strategy for exceptionally dry years. Sites were either fully exposed to the sun or, rarely, in dappled shade of <i>Quercus garryana</i> or deciduous shrubs. Based on 17 stands of <i>Meconella</i> , the ten most frequently associated vascular plants were <i>Aira praecox</i> , <i>Aphanes occidentalis</i> , <i>Saxifraga integrifolia</i> , <i>Triteleia hyacinthina</i> , <i>Bromus hordeaceus</i> , <i>Selaginella wallacei</i> , <i>Silene gallica</i> , <i>Brodiaea coronaria</i> , <i>Montia</i>

Low	site too dry and not a ravine	<i>Pristiloma johnsoni</i>	Broadwhorl Tightcoil	Blue				Forest / Conifer Forest - Dry / Unknown ; Forest / Conifer Forest - Mesic (average) / Unknown ; Forest / Conifer Forest - Moist/wet / Unknown ; Forest / Deciduous/Broadleaf Forest / Unknown ; Forest / Mixed Forest (deciduous/coniferous mix) / Unknown ; Rock/Sparsely Vegetated Rock / Talus / Unknown	This species is found in lower elevation coniferous forests with moist riparian ravines, valleys, or talus sites, and under fallen wood, ferns, bushes, and leaf litter (Foltz Jordan, 2010).	In leaf litter of deciduous, coniferous and mixed-wood forests to an elevation of over 1300 m in the subalpine (Cameron 1986, cited by Forsyth 2004; Branson and Branson 1984, cited by Forsyth 2004). It has also been reported from vegetated rockslide habitats (Forsyth 2004).
Low	steep slopes and lacks moisture	<i>Silene scouleri</i> ssp. <i>scouleri</i>	coastal Scouler's catchfly	Red	1	Endangered	Jan-05	Forest / Garry Oak Woodland / Unknown ; Grassland/Shrub / Garry Oak Maritime Meadow / Unknown ; Rock/Sparsely Vegetated Rock / Garry Oak Coastal Bluffs / Unknown	This subspecies is found on grassy, rocky slopes, coastal bluffs, dry prairies, and woodlands at elevations ranging from 0 to 3,800 meters (Morton, 2020).	<i>Silene scouleri</i> ssp. <i>grandis</i> is found in dry to mesic maritime meadows and mesic, open, deciduous woodlands in the sub-Mediterranean climate caused by the rain shadow of the Olympic and Vancouver Island mountains. Habitat occurs on nearly level to gentle slopes with various aspects. Meso-slope position is usually level but may include upper and middle slopes. Sites are well to rapidly drained, and are dry in summer and moist in winter. Habitat occurs on shallow soils to bedrock, or in locations with severe exposure to wind and/or salt spray. There may be no root restricting layer. Trees are generally not present. Shrubs, including <i>Rosa nutkana</i> or <i>Symphoricarpos albus</i> , are occasionally present. A mix of native and introduced plant species dominate the herbaceous layer.
Low	site lacks vernal pools and seeps	<i>Trifolium depauperatum</i> var. <i>depauperatum</i>	poverty clover	Blue				Grassland/Shrub / Grassland / Facultative - frequent use ; Grassland/Shrub / Meadow / Facultative - frequent use ; Other Unique Habitats / Garry Oak Vernal Pool / Facultative - frequent use ; Other Unique Habitats / Vernal Pools/Seasonal Seeps / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use		
High	south-facing site, rock piles for hide	<i>Contia tenuis</i>	Common Sharp-tailed Snake	Red	1	Endangered	Jun-03	Forest / Conifer Forest - Dry / Facultative - frequent use ; Grassland/Shrub / Meadow / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Garry Oak Coastal Bluffs / Unknown ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Talus / Facultative - frequent use ; Subterranean / Caves / Obligate ; Subterranean / Sub-soil / Obligate	Habitat includes moist situations in pastures, meadows, oak woodlands, broken chaparral, and the edges of coniferous or hardwood forests (Stebbins 2003); also shrubby rabbitbrush-sagebrush (Weaver, 2004, Herpetol. Rev. 35:176). This snake generally is found under logs, rocks, fallen branches, or other cover. It retreats underground during dry periods.	There is no unifying description of Sharp-tailed Snake habitat. They seem to occur in a variety of habitats from relatively open Garry Oak meadows to relatively open Douglas-fir stands. Egg-laying sites are thought be on protected south facing slopes. The size of the slope can vary from the base of a stump to larger talus slopes. It appears that the snakes are moving into the forest in the winter (Engelstoft and Ovaska 1999), but little else is known about their winter habitat.

High	habitat features present	<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	Blue				Anthropogenic / Industrial / Facultative - frequent use ; Anthropogenic / Urban/Suburban / Facultative - frequent use ; Forest / Conifer Forest - Dry / Facultative - frequent use ; Forest / Conifer Forest - Mesic (average) / Facultative - frequent use ; Forest / Conifer Forest - Moist/wet / Facultative - frequent use ; Forest / Deciduous/Broadleaf Forest / Facultative - frequent use ; Forest / Mixed Forest (deciduous/coniferous mix) / Facultative - frequent use ; Grassland/Shrub / Grassland / Facultative - occasional use ; Grassland/Shrub / Shrub - Logged / Facultative - occasional use ; Grassland/Shrub / Shrub - Natural / Facultative - occasional use ; Riparian / Riparian Forest / Facultative - occasional use ; Subterranean / Caves / Obligate	Throughout much of the known range, these bats commonly occur in mesic habitats characterized by coniferous and deciduous forests (Kunz and Martin 1982), but they occupy a broad range of habitats (e.g., see Handley 1959). Generally they are uncommon in prairies and extreme desert, although they occur in the lower elevations of the arid plateau and desert ranges of northcentral Mexico and the arid valleys south of the transverse volcanic belt. They are known in Mexico mostly from relatively arid regions (e.g., grassy hills with nearby pine-oak woodland) but also from more humid localities with oak, pine, juniper, cypress, madrone, and manzanita (Handley 1959). Ozark and Appalachian populations inhabit caves mostly in oak-hickory forest (Handley 1959). On the West Coast, Townsend's big-eared bats are found regularly in forested regions and buildings, and in areas with a mosaic of woodland, grassland, and/or shrubland. In California and Washington, they are known from limestone caves, lava tubes, and human-made structures in coastal lowlands,	
High	habitat features present	<i>Eurybia radulina</i>	rough-leaved aster	Red				Forest / Conifer Forest - Dry / Facultative - frequent use ; Forest / Garry Oak Woodland / Facultative - occasional use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use	Roughleaf Aster (<i>Eurybia radulina</i>) occurs in "dry rock outcrops, edges of forests, open forests, mostly on slopes, foothill oak woodlands, oak, oak-fir, yellow pine forests" (Flora of North America Editorial Committee 2006).	
High	habitat features present	<i>Plagiobothrys tenellus</i>	slender popcornflower	Red	1	Threatened	Feb-11	Forest / Conifer Forest - Dry / Facultative - occasional use ; Forest / Garry Oak Woodland / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Garry Oak Coastal Bluffs / Facultative - frequent use		Across its North American range, <i>Plagiobothrys tenellus</i> is found on dry slopes in grassland, scrub, woodland, or forest. British Columbia populations are found in, or near, Garry oak and associated ecosystems in the dry Coastal Douglas-fir zone of southeastern Vancouver Island and adjacent Gulf Islands. Here it is found on dry, grassy slopes and coastal bluffs. Sites are generally steep, south- or southwest-facing, open and often with exposed gravelly soils or rocks (COSEWIC 2008). Associated species include <i>Cerastium arvense</i> , <i>Lotus micranthus</i> , <i>Poa secunda</i> , <i>Stipa lemmonii</i> , <i>Trifolium microcephalum</i> , <i>T. oliganthum</i> , <i>T. microdon</i> , <i>Thysanocarpus curvipes</i> , <i>Aphanes occidentalis</i> , and <i>Vulpia microstachys</i> . Associated non-native species include <i>Aira caryophyllea</i> , <i>A. praecox</i> , <i>Athysanus pusillus</i> , <i>Bromus sterilis</i> , <i>B. rigidus</i> , <i>Silene gallica</i> , <i>Torilis japonica</i> , <i>Veronica arvensis</i> , <i>Cynosurus echinatus</i> , <i>Vulpia bromoides</i> , <i>Erodium cicutarium</i> , and <i>Hypochaeris radicata</i> .

Low	no vernal seeps/pools	<i>Allium amplexans</i>	slimleaf onion	Blue				Forest / Garry Oak Woodland / Facultative - frequent use ; Grassland/Shrub / Meadow / Facultative - frequent use ; Other Unique Habitats / Vernal Pools/Seasonal Seeps / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Garry Oak Coastal Bluffs / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use		
Low	site lacks limestone, old forest, cedar trees and shell middens	<i>Cephalanthera austini</i>	phantom orchid	Red	1	Endangered	Feb-19	Forest / Conifer Forest - Mesic (average) / Facultative - frequent use ; Forest / Mixed Forest (deciduous/coniferous mix) / Facultative - frequent use ; Forest / Old Forest / Facultative - frequent use	Dense moist coniferous forests especially in the mountains.	In our region in BC, <i>Cephalanthera austini</i> occurs naturally in mature mixed woods, or woods with strong deciduous or coniferous components. In most locations, although not all, the orchids occur in sites with little to no ground cover. Occurrence also appears to be strongly correlated with limestone (Klinkenberg 2005). Residual populations persist in areas of human habitation, presumably in areas where no serious disturbance to the ground surface has occurred.
Low	site lacks bluffs	<i>Falco peregrinus anatum</i>	Peregrine Falcon, <i>anatum</i> subspecies	Red				Agriculture / Cultivated Field / Facultative - frequent use ; Agriculture / Hedgerow / Facultative - frequent use ; Agriculture / Pasture/Old Field / Facultative - frequent use ; Anthropogenic / Urban/Suburban / Facultative - occasional use ; Grassland/Shrub / Antelope-brush Steppe / Facultative - frequent use ; Grassland/Shrub / Grassland / Facultative - frequent use ; Grassland/Shrub / Meadow / Facultative - frequent use ; Grassland/Shrub / Sagebrush Steppe / Facultative - frequent use ; Grassland/Shrub / Shrub - Natural / Facultative - occasional use ; Lakes / Lake / Facultative - frequent use ; Lakes / Pond/Open Water / Facultative - frequent use ; Other Unique Habitats / Alkali Ponds/Salt Flats / Facultative - occasional use ; Other Unique Habitats / Beach / Facultative - occasional use ; Riparian / Gravel Bar / Facultative - occasional use ; Riparian / Riparian Herbaceous / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Cliff / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Talus /	See files for FALCO PEREGRINUS.	Anatum Peregrine Falcons typically nest on rock cliffs above lakes or river valleys where abundant prey is nearby. Interior populations are typically associated with wetland habitats that support a sufficient prey base. In the Okanagan valley, aeries have been reported as low as 6 m above a lake and high on cliffs that towered >260 m above the valley floor (Cannings et al. 1987). In the Lower Mainland, nests are on rock cliffs well back but above the Fraser River. In the Gulf Islands, nests are found on seaside cliffs (Cooper and Beauchesne 2003b).

Low	site lacks bluffs	<i>Falco peregrinus pealei</i>	Peregrine Falcon, <i>pealei</i> subspecies	Blue	1	Special Concern	Jun-03	Agriculture / Cultivated Field / Facultative - occasional use ; Agriculture / Hedgerow / Facultative - occasional use ; Agriculture / Pasture/Old Field / Facultative - occasional use ; Anthropogenic / Urban/Suburban / Facultative - occasional use ; Grassland/Shrub / Meadow / Unknown ; Lakes / Lake / Facultative - occasional use ; Lakes / Pond/Open Water / Facultative - occasional use ; Ocean / Intertidal Marine / Facultative - frequent use ; Ocean / Marine Island / Facultative - frequent use ; Ocean / Sheltered Waters - Marine / Unknown ; Other Unique Habitats / Beach / Unknown ; Other Unique Habitats / Estuary / Unknown ; Other Unique Habitats / Mudflats - Intertidal / Facultative - frequent use ; Riparian / Gravel Bar / Unknown ; Riparian / Riparian Herbaceous / Unknown ; Rock/Sparsely Vegetated Rock / Cliff / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Unknown ; Stream/River / Stream/River / Facultative - occasional use ; Wetland / Marsh / Facultative - occasional use	Coastal beaches, tidal flats, reefs, islands, marshes, estuaries and lagoons. Nests mostly found on ledges of vertical rocky cliffs in the vicinity of seabird colonies; some nests on grassy benches of rocky bluffs. Heights of nests range from 12 to 366 meters. Many nests sheltered by overhanging grass, sods, rocks, tree roots, salal or mosses (Beebe 1960, Campbell et al. 1990, Nelson 1990).	Peale's Peregrine Falcon typically nests on ledges of rocky island cliffs, usually near seabird colonies. Occasionally, nests occur on mainland headland cliffs. A few nests occurred on grassy ledges on rock bluffs. More rarely, old nests of Pelagic Cormorants (<i>Phalacrocorax pelagicus</i>), Bald Eagles and Common Ravens have been used (Campbell et al. 1990).
Low	site lacks moisture	<i>Marah oregana</i>	coast manroot	Red				Agriculture / Hedgerow / Facultative - occasional use ; Agriculture / Pasture/Old Field / Facultative - frequent use ; Forest / Garry Oak Woodland / Facultative - frequent use ; Grassland/Shrub / Meadow / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use		
Low	site lacks several of the habitat features	<i>Nuttallanthus texanus</i>	Texas toadflax	Blue				Other Unique Habitats / Sand Dune / Facultative - occasional use ; Other Unique Habitats / Vernal Pools/Seasonal Seeps / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Cliff / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Garry Oak Coastal Bluffs / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use		On steep rock with seepage, rocky ledges, coastal bluffs, grassy slopes.
Low	site may be too dry	<i>Ranunculus californicus</i>	California buttercup	Red	1	Endangered	Feb-11	Grassland/Shrub / Garry Oak Maritime Meadow / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Garry Oak Coastal Bluffs / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use		In British Columbia, <i>Ranunculus californicus</i> is associated with Garry oak ecosystems, and it has been described as an indicator species for coastal prairies, which typically occur on islands and adjacent coastlines along the Pacific coast from California northwards (Denton 1978; Klinkenberg and Klinkenberg 2002). Typical habit is "open, south- to southwest-facing grassy bluffs or rocky slopes just above the seacoast at elevations up to 150 feet" (Klinkenberg and Klinkenberg 2002).

Low	site lacks vernal pools and seeps	<i>Tonella tenella</i>	small-flowered tonella	Blue	1	Endangered	Jul-05	Forest / Conifer Forest - Dry / Facultative - frequent use ; Forest / Garry Oak Woodland / Facultative - frequent use ; Other Unique Habitats / Vernal Pools/Seasonal Seeps / Obligate ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Talus / Facultative - frequent use		<i>Tonella tenella</i> occurs on west-facing slopes on thin soils over gravelly rock outcrops or stable talus. At the single known locality on Saltspring Island, it occurs in a narrow band extending up the mountainside for approximately 425 m (Douglas and Penny 2003). The talus slope occurs in open <i>Acer macrophyllum</i> - <i>Arbutus menziesii</i> - <i>Quercus garryana</i> forest in the dry coastal Douglas-fir zone. Associated species include <i>Galium aparine</i> , <i>Cardamine oligosperma</i> , <i>Claytonia perfoliata</i> , <i>Bromus sterilis</i> , <i>Collinsia grandiflora</i> , <i>Melica harfordii</i> , and <i>Torilis japonica</i> . Conspicuous mosses include <i>Eurhynchium oreganum</i> and <i>Dicranum</i> species.
Low	site lacks shale slopes	<i>Trifolium dichotomum</i>	branched clover	Red				Grassland/Shrub / Meadow / Facultative - occasional use ; Rock/Sparsely Vegetated Rock / Cliff / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Garry Oak Coastal Bluffs / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Talus / Facultative - frequent use	Dry rocky or sandy slopes and fields, coastal prairie, mixed evergreen forest below 3500 feet (Munz 1959).	
Low	site lacks vernal pools and seeps	<i>Triphysaria versicolor</i> ssp. <i>versicolor</i>	bearded owl-clover	Red	1	Endangered	Jun-03	Grassland/Shrub / Meadow / Facultative - frequent use ; Other Unique Habitats / Garry Oak Vernal Pool / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - frequent use		<i>Triphysaria versicolor</i> ssp. <i>versicolor</i> is found in wet meadows and vernal pool margins within 30 m of the shoreline in the sub-Mediterranean climate caused by the rain shadow of the Olympic and Vancouver Island mountains. Habitat occurs on nearly level sites with a range of aspects (most sites have a southern aspect but a few have eastern or northeastern aspects). Meso-slope position is a depression. Sites are imperfectly to poorly drained and remain wet through the winter months but dry up by mid summer. Habitat occurs on shallow soils to bedrock. Trees are absent. Shrubs, including <i>Cytisus scoparius</i> or <i>Ulex europaeus</i> , are occasionally present at the edges of habitat. A mix of native and introduced plant species dominate the herbaceous layer (M. Fairbarns, pers. comm. 2005).

Low	site lacks vernal pools or seeps	<i>Zeltnera muehlenbergii</i>	Muhlenberg's centaury	Red	1	Endangered	Feb-10	Forest / Garry Oak Woodland / Facultative - frequent use ; Grassland/Shrub / Garry Oak Maritime Meadow / Facultative - frequent use ; Grassland/Shrub / Meadow / Facultative - frequent use ; Other Unique Habitats / Vernal Pools/Seasonal Seeps / Facultative - frequent use	Moist, open forest;	<i>Centaurium muhlenbergii</i> is currently found in two distinct habitat types in B.C.: a vernal pool within a large meadow in a Garry oak woodland, and along the margins of a tidal saltgrass marsh (Miller and Miles 2003; B.C. CDC Element Occurrence Data 2005). Both habitat types are characterized by a sub-Mediterranean-like climate with dry, warm summers and mild, wet winters, and in which most precipitation falls during the winter months. Both habitat types also experience seasonal flooding by rainwater or by the ocean. Vernal pools and depressions in B.C. typically form on relatively level sites underlain by bedrock or by an impervious hardpan soil layer, and they experience winter and spring inundations followed by complete drying in late spring (Miller 2003). Salt marshes are the upper vegetated portions of intertidal mudflats, often in sheltered locations, which undergo varying frequency of inundation. <i>C. muhlenbergii</i> occurs in a drier part of a saltmarsh, which likely only occasionally experiences tidal inundation. The species occurs in patches of open, bare, moist soil within the habitat types. The habitats of <i>C. muhlenbergii</i> occur
Low	not old growth	<i>Brachyramphus marmoratus</i>	Marbled Murrelet	Blue	1	Threatened	Jun-03	Forest / Conifer Forest - Mesic (average) / Facultative - occasional use ; Forest / Conifer Forest - Moist/wet / Facultative - frequent use ; Lakes / Lake / Facultative - occasional use ; Ocean / Kelp Bed / Facultative - frequent use ; Ocean / Sheltered Waters - Marine / Facultative - frequent use ; Ocean / Subtidal Marine / Facultative - frequent use ; Riparian / Riparian Forest / Facultative - frequent use ; Rock/Sparsely Vegetated Rock / Rock/Sparsely Vegetated Rock / Facultative - occasional use ; Stream/River / Stream/River / Facultative - occasional use	Coastal areas, mainly in salt water within 2 km of shore (Marshall 1988), including bays and sounds; not uncommon up to 5 km offshore; occasionally also on rivers and lakes usually within 20 km of ocean (but up to 75 km), especially during breeding season (Carter and Sealy 1986). In Alaska, marine habitats mostly are offshore of large tracts of old-growth coastal coniferous forest, especially Sitka spruce and hemlock (Piatt and Ford 1993). In central California, visited old-growth forest nesting areas (8-9 km from ocean) year-round; fall and winter visitation of nesting areas occurs regularly in other areas of North America as well; perhaps attendance in nonbreeding season is important in maintenance of pair bonds and nest sites (Naslund 1993). Nests often are in mature/old growth coniferous forest near the coast: on large mossy horizontal branch, mistletoe infection, witches broom, or other structure providing a platform high in mature conifer (e.g., Douglas-fir, mountain hemlock). Most nesting occurs in large stands of old growth. Nest sites generally have good	



BC Conservation Data Centre: Species Occurrence Report

Shape ID: 134959

Scientific Name: *Megascops kennicottii kennicottii*
English Name: Western Screech-Owl, *kennicottii* subspecies

Identifiers

Occurrence ID: 16897
Shape ID: 134959
Taxonomic Class: birds
Element Group: Vertebrate Animal

Status

Provincial Rank: S2S3
BC List: Blue
Global Rank: G4G5T4
COSEWIC: T (MAY 2012)
SARA Schedule: 1

Locators

Survey Site: PENDER ISLAND
Directions: North Pender Island, South Pender Island and Greenburn Park.
Biogeoclimatic Zone:
Ecosection: SGI;SOG

Area Description

General Description:

Vegetation Zone:

Min. Elevation (m): **Max. Elevation (m):**

Habitat: TERRESTRIAL: Cropland/Hedgerow, Roadside, Forest Mixed

Occurrence Information

First Observation Date: 2002-02-22

Last Observation Date: 2021-03-12

Occurrence Data:

A nesting pair of Western Screech-owls, including their nest in an arbutus tree, were detected in 2021 (J. Hobbs, pers. comm. 2021). In 2007, a Western Screech-owl was heard during the Great Backyard Bird Count (via Hobbs 2017b) and another in 2002 as part of the Nocturnal Owl Survey (via Hobbs 2017b).

Occurrence Rank and Occurrence Rank Factors

Rank:	E : Verified extant (viability not assessed)
Rank Date:	2021-03-12
Rank Comments:	Few data to provide a rank. Seemingly persistent over time, though uncertain if there are years in which the species is not present.
Condition of Occurrence:	
Size of Occurrence:	
Landscape Context:	

Version

Version Date:	2021-03-14
Version Author:	Davis, H.

Mapping Information

Estimated Representation Accuracy:	Medium
Estimated Representation Accuracy Comments:	
Confident that full extent is represented by Occurrence:	N
Confidence Extent Definition:	Confident full extent of EO is NOT known
Additional Inventory Needed:	Y
Inventory Comments:	First detection of breeding was in 2021.

Documentation

References:

Hobbs, J. 2017b. Electronic databases of Western Screech-owl (*kennicottii*) detections in British Columbia.

Hobbs, J. Personal communication.

Specimen:

Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary, Shape ID: 134959, Western Screech-Owl, *kennicottii* subspecies. B.C. Ministry of Environment. Available: <http://maps.gov.bc.ca/ess/hm/cdc>, (accessed May 26, 2025).



BC Conservation Data Centre: Species Occurrence Report

Shape ID: 4054

Scientific Name: Contia tenuis
English Name: Common Sharp-tailed Snake

Identifiers

Occurrence ID: 3120
Shape ID: 4054
Taxonomic Class: reptiles
Element Group: Vertebrate Animal

Status

Provincial Rank: S1S2
BC List: Red
Global Rank: G5
COSEWIC: E/T (DEC 2021)
SARA Schedule: 1

Locators

Survey Site: NORTH PENDER ISLAND
Directions: "North Pender Island": On Corbet Road, about halfway between Hope Bay and Port Washington and "Port Washington": end of Upper Terrace Road, very north tip of North Pender Island.
Biogeoclimatic Zone:
Ecosection: SGI;SOG

Area Description

General Description:

Areas at the base of dry, south-facing, rocky slopes characterized by open stands of Douglas-fir, arbutus and Garry oak.

Vegetation Zone:

Min. Elevation (m): 12
Max. Elevation (m):
Habitat: TERRESTRIAL: Suburban/Orchard, Woodland Mixed

Occurrence Information

First Observation Date: 1949-07-05

Last Observation Date: 1951-05-15

Occurrence Data:

Five historical observations of Sharp-tailed Snakes reported from Port Washington (Spalding 1991; Species Inventory Database 2012).

Occurrence Rank and Occurrence Rank Factors

Rank: H : Historical

Rank Date: 1951-05-15

Rank Comments:

Condition of Occurrence:

Size of Occurrence:

5 historical sightings of Sharp-tailed Snakes from 1949-1951 (Spalding 1991; Species Inventory Database 2012).

Landscape Context:

Version

Version Date: 2012-09-24

Version Author: Davis, H.

Mapping Information

Estimated Representation Accuracy: Low

Estimated Representation Accuracy Comments:

Confident that full extent is represented by Occurrence: N

Confidence Extent Definition: Confident full extent of EO is NOT known

Additional Inventory Needed: Y

Inventory Comments:

Documentation

References:

Brown, G. Personal communication. Volunteer warden for Chilliwack River ER (#98).

Royal British Columbia Museum. 675 Belleville Street, Victoria, BC. V8V 1X4.

SPI database - incidental sightings. Extract from Ministry of Environment's Species Inventory database, Incidental Sightings table. Project 0. Ecosystems Information Section, Victoria, BC. Available from <http://a100.gov.bc.ca/pub/siwe/details.do?id=0>

Spalding, D.J. 1991. The sharptail snake (*Contia tenuis*) in British Columbia: a status report. Unpubl. rep. submitted to B.C. Environ., Wildl. Branch, Victoria.

Spalding, D.J. 1993. Status of the Sharp-tailed Snake in British Columbia. B.C. Minist. Environ., Lands and Parks, Wildl. Branch. Working Rep. WR-57. 15pp.

Specimen: Brooks, M. 1949. PMV.; Brooks, M. 1950. PMV.; McGusty, B.J. 1949. PMV.

Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary, Shape ID: 4054, Common Sharp-tailed Snake. B.C. Ministry of Environment. Available: <http://maps.gov.bc.ca/ess/hm/cdc>, (accessed May 26, 2025).



BC Conservation Data Centre: Ecological Community Summary

Pseudotsuga menziesii / *Melica subulata* Douglas-fir / Alaska oniongrass

Scientific Name:	<i>Pseudotsuga menziesii</i> / <i>Melica subulata</i>
English Name:	Douglas-fir / Alaska oniongrass
Scientific Name - Concept Reference:	Meidinger, D. 1992. Vegetation classification hierarchy: DBASE September 1992. B.C. Minist. For. Res. Branch, Victoria.
Ecosystem Group:	Terrestrial Realm - Forest: Coniferous - dry

Conservation Status / Legal Designation

Global Status:	G1
Provincial Status:	S1 (Feb 2018)
BC List:	Red
Provincial FRPA list:	Y (Jun 2006)
Notable Species:	

Ecology & Dynamics

Environmental Summary: This ecological community occurs on dry sites, from 0 to 150 m elevation, which typically have a southerly aspect. These sites are rapidly- to well-drained and are often composed of inactive colluvial and sometimes morainal parent materials. They occur on middle to upper slopes on all aspects. Slopes are gentle to steep, and are often adjacent to rock outcrops. The soils are classified as Sombric or Dystric Brunisols and are often shallow to bedrock (<1 metre), mostly with a sandy loam texture with moderate coarse fragment content. The soil nutrient regime is rich to very rich and the soil moisture is rated as very dry (Roemer 1972, Flynn and Cadrin 2004, Reid and Cadrin 2012, NatureServe 2005).

Vegetation Summary: This mixed coniferous and deciduous ecosystem occurs on southeastern Vancouver Island and the southern Gulf Islands. It is characterized by a moderately open canopy of *Pseudotsuga menziesii* (Douglasfir) with some interspersed *Quercus garryana* (Garry oak), especially in canopy gaps. *Arbutus menziesii* (Arbutus) is occasionally present, but other conifer species are absent. The shrub layer is sparse to absent, and consists of *Lonicera hispidula* (hairy honeysuckle), *Symphoricarpos albus* (common snowberry) and *Mahonia aquifolium* (tall Oregon-grape). Other shrubs that are occasionally present may include *Amelanchier alnifolia* (Saskatoon), *Gaultheria shallon* (salal), *Holodiscus discolor* (oceanspray) and *Rosa gymnocarpa* (balldrop rose). The diverse and well-developed herb layer is often dominated by *Melica subulata* (Alaska oniongrass) and may also include *Carex inops* (long-stolonized sedge) and *Sanicula crassicaulis* (Pacific sanicle) and usually with *Satureja douglasii* (yerba buena). Other herbs usually present in small amounts include *Elymus glaucus* (blue wildrye), *Festuca occidentalis* (western fescue), *Moehringia macrophylla* (big-leaved sandwort), *Dodecatheon hendersonii* (broad-leaved shootingstar) and *Galium aparine* (cleavers). The moss layer is characterized by *Rhytidiadelphus triquetrus* (electrified cats-tail moss) with a minor component of *Eurhynchium oregonum* (Oregon beaked moss) (Roemer 1972, Green and Klinka 1994, Reid and Cadrin 2012, NatureServe 2005).

Dynamic Processes Summary: This is a late-successional (mature and climax) climatic forest ecosystem. The natural disturbance regime is described as infrequent stand-initiating events, through medium to high-intensity crown fires every 150 to 200 years and covering 5 to 50 ha (Biodiversity Guidebook 1995). Occasionally windthrow was the stand-initiating event, with regeneration occurring in the resulting canopy gaps. Stand-maintaining surface fires helped maintain an open forest canopy by killing understory regeneration. Death of individual or small groups of trees may be caused by root rot, drought, defoliating insects and windthrow. Succession rates are very slow, and it takes a long time to develop large, old trees, snags and coarse woody debris (Pojar 2004, NatureServe 2005).

Spatial Pattern: Small patch

Distribution

Endemic: Y

Authors / Contributors

Author: de Groot, A., Cadrin, C.M., H.K. Yearsley, I. Ronalds and D.S. McLennan
Last updated: Feb 22, 2012

References and Related Literature

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Please visit the website [Conservation Status Ranks](#) for definitions of the data fields used in this summary report.

Suggested Citation:

B.C. Conservation Data Centre. 2012. Ecological Community Summary: *Pseudotsuga menziesii* / *Melica subulata*. B.C. Minist. of Environment. Available: <https://a100.gov.bc.ca/pub/eswp/> (accessed Feb 4, 2025).

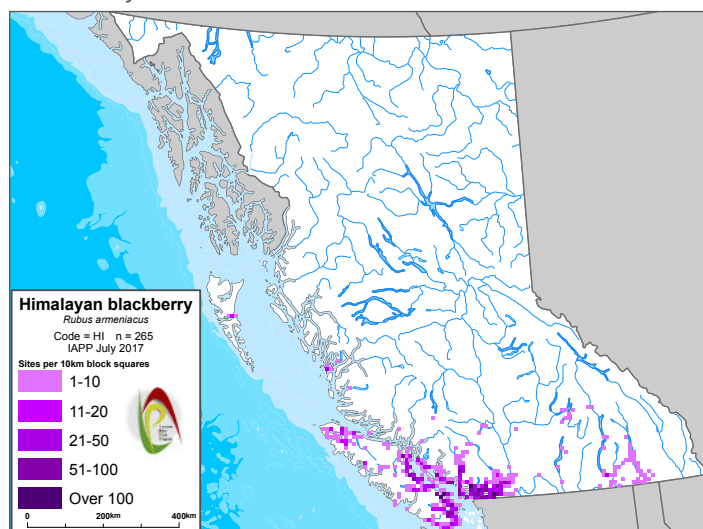
APPENDIX D

INVASIVE SPECIES COUNCIL OF BC FACT SHEETS SCOTCH BROOM & HIMALAYAN BLACKBERRY

Himalayan Blackberry *Rubus armeniacus*

Legal Status

Community Charter



Distribution

Currently in BC in the Lower Mainland, Sunshine Coast, Fraser Valley, Gulf Islands, Central to Southern Vancouver Island.

Identification

Flowers: Small (2.5 cm diameter), white to pinkish, stalked, 5-petalled, arranged in clusters of 5-20; flower stalks are wooly and prickly.

Stems: Robust, stiff, 5-angled stems (canes) that support large, flattened, and hooked or straight prickles. Canes grow to 3 m in height and up to 12 m in length.

First year canes produce leaves only and can root at the tips, producing daughter plants. Second year canes grow from the axils of first year canes and produce flowers and fruits.

Leaves: Evergreen, predominantly large, rounded or oblong, toothed leaflets radiate from the end of the leaf stem. Leaves are generally grouped in fives on first-year canes and threes on flowering (second-year) canes.



Fruits: Fruits (drupelets) are up to 2 cm in diameter, oblong to spherical, black and shiny, and hairless. They form on second year canes and ripen from mid-summer to fall. Each berry produces numerous seeds that have a hard, impermeable coat.

Similar Native Species: (i) Trailing blackberry (*Rubus ursinus*) is a smaller and less robust trailing plant with a smaller stem size (0.5 cm), white waxy stem coating, deciduous leaves found in groups of three, and a tendency to lie on the ground; (ii) salmonberry (*Rubus spectabilis*) has smaller zigzagged stems, red-pink flowers, and reddish or yellowish edible berries.

Similar Non-Native Species: Cut-leaf or evergreen blackberry (*Rubus laciniatus*) has deeply incised leaflets. Note: Himalayan blackberry is a variable species with several cultivars, thus making identification difficult.

Ecological Characteristics

Habitat: Found on disturbed sites, along roadsides and right-of-ways, in pastures, along river and stream banks, freshwater wetlands, riparian areas, forest edges, and wooded ravines. Prefers rich, well-drained soils, but can grow well on a variety of barren, infertile soil types, a wide range of soil pH and textures, and is tolerant of periodic flooding by brackish or fresh water. Prefers full sunlight, but can survive in varied light conditions.



Rubus discolor
© The Illustrated Flora of BC

Reproduction: Reproduces by seed and vegetatively by rooting at stem tips to form daughter plants, and sprouts from root buds. Plants begin flowering in spring with fruit ripening in midsummer to late August. Thickets can produce 7,000-13,000 seeds per square meter, and seeds can remain viable in the soil for several years. Fruiting stems generally die back at the end of the season, but non-fruiting stems may persist for several years before producing fruit.

Dispersal: Primarily dispersed by root and stem fragments. Birds and omnivorous mammals, such as foxes, bears, and coyotes can consume berries and disperse seeds. Humans also contribute to blackberry spread by purposefully planting canes.

Impacts

Ecological: Outcompetes low growing native vegetation through shading and build-up of leaf litter and dead stems. Can prevent the establishment of shade intolerant trees such as Garry oak and ponderosa pine. Himalayan blackberry forms large, dense, impenetrable thickets that limit the movement of large animals, takes over stream channels and stream banks, and reduces sight lines along right-of-ways. Thickets increase flooding and erosion potential by preventing the establishment of deep-rooted native shrubs that would otherwise provide bank stability.

Integrated Pest Management

IPM is a decision-making process that includes identification and inventory of invasive plant populations, assessment of the risks that they pose, development of well-informed control options that may include a number of methods, site treatment, and monitoring.

Prevention

- » Monitor for Himalayan blackberry on both disturbed and undisturbed areas.
- » Do not purchase, trade, or grow Himalayan blackberry. Instead, grow regional native plants as they are naturally adapted to the local environment and are non-invasive.
- » Ensure soil, gravel, and other fill material are not contaminated.
- » Avoid unloading, parking, or storing equipment and vehicles in infested areas.
- » Remove plants, plant parts, and seeds from personal gear, clothing, pets, vehicles, and equipment. Wash vehicles, including tires and undercarriage, and equipment at designated cleaning sites before leaving infested areas.
- » Bag or tarp plants, plant parts, and seeds before transporting to a designated disposal site (e.g. landfill).
- » Take special care when controlling Himalayan blackberry near streams or ditch lines, to prevent the movement of plant parts downstream.
- » Maintain or establish healthy plant communities that are resistant to invasion by invasive plants.

Mechanical Control

- » Mowing, including the use of riding mowers and tractor-mounted mowers, can be very effective, but can also harm desirable species. If roots are not manually removed, mowing several times per year over several years is necessary to exhaust root reserves. If mowing or cutting is only done once per year, it should be done when the plants begin to flower. Do not mow where soil is highly susceptible to compaction or erosion, or where soil is very wet.

- » Persistent cultivation (tillage) or cutting in combination with mowing can be very effective. Because mechanical control can stimulate strong regrowth, follow-up with either spot applications of herbicide or hand digging to remove the entire root system.
- » Grazing by goats has proven effective.
- » Monitor controlled infestations during growing season.
- » Disposal: If plants are cut, all plant material must be collected in bags or tarps and incinerated or bagged and deeply buried at a landfill. Care should be taken to ensure that plant parts are not distributed during transport.

Biocontrol

- » There are no biocontrol agents for Himalayan blackberry. The release of herbivorous insects has not been undertaken due to the risk these insects may pose to closely related, commercially important *Rubus* species.

Chemical Control

Herbicide recommendations and use must consider site characteristics and be prescribed based on site goals and objectives. Herbicide labels and other sources of information must be reviewed before selecting and applying herbicides.

- » Ensure that chemical treatments do not injure or kill susceptible, non-target vegetation.
- » The following herbicides provide effective control for Himalayan blackberry: dicamba, glyphosate, triclopyr or metsulfuron methyl alone. Triclopyr + aminopyralid is also effective.
- » Application of pesticides on Crown land must be carried out following a confirmed Pest Management Plan (Integrated Pest Management Act) and under the supervision of a certified pesticide applicator. <https://www2.gov.bc.ca/gov/content/environment/pesticides-pest-management/managing-pests>

References/Links

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Thank you to the BC Ministry of Environment and the BC Ministry of Transportation and Infrastructure for providing project funding, and to those who advised the development of these management recommendations

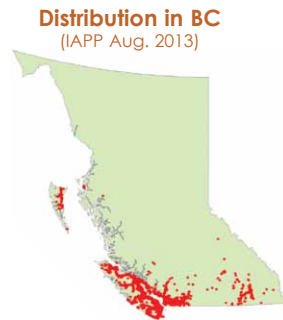
Updated July 2014

Legal Status

Invasive Plants Regulation,
Forest and Range Practices Act.

Distribution

Currently distributed on the Pacific and Atlantic coasts of North America. It is common west of the Coast-Cascade Mountains in southwest BC and is concentrated at the southern end of Vancouver Island. It has also been reported on the Queen Charlotte Islands and in parts of the Kootenays and North Okanagan-Shuswap areas.



Identification

Flowers: Yellow and pea-like; may have a red marking in the middle.

Stems: Woody and 5-angled; 1–3 m tall shrub.

Leaves: Stalked lower leaves are composed of three leaflets; un-stalked upper leaves are simple.

Fruits: Flat, hairy seedpods that are initially green, turn brown to black in color.

Similar Species: Spanish broom flowers grow at the tips of stems (crowning the plant), whereas Scotch broom flowers grow along stems.



Ecological Characteristics

Habitat: This escaped garden ornamental invades exposed, well-drained mineral soil, and is shade-intolerant.

Reproduction: Perennial species that reproduces by seed and lateral bud growth. Mature plants can produce up to 3500 pods, each containing 5–12 seeds.

Dispersal: As seedpods dry they split and spiral, expelling the contained seeds up to 5 metres. The plant can also spread to new disturbed areas through seed transport by vehicles and machinery. Due to its affinity for light-dominated, disturbed areas, any disturbance activity, such as road construction near infested areas, can enhance spread.



Impacts

Economic: Invades rangeland, replacing forage plants, and can be a serious competitor to conifer seedlings. Douglas fir plantation failures in Oregon and Washington have been credited to infestations by this plant. High density infestations can: (i) increase wildfire fuel loads, thereby escalating wildfire intensity; and (ii) obstruct sight lines on roads, resulting in increased maintenance costs for removal.

Ecological: Can produce dense, impenetrable thickets that may be impacting Garry oak woodlands in southwestern BC and limiting the movement of large animals, wild or domestic. Possesses photosynthetic stems to enable year-round growth, leading to displacement of native plant species.



Integrated Pest Management

IPM is a decision-making process that includes identification and inventory of invasive plant populations, assessment of the risks that they pose, development of well-informed control options that may include a number of methods, site treatment, and monitoring.

Prevention

- Minimize soil disturbance in areas directly adjacent to existing infestations and contain or localize seed spread.
- Remove broom before it flowers (late winter, early spring) to prevent seed maturation.
- After mechanical treatment, promptly re-vegetate with an appropriate seed mix, followed by an application of phosphorous-rich fertilizer and wood mulch. Contact local seed suppliers to determine an appropriate seed mix.
- Promptly establish competitive shrubbery, including snowberry, salmonberry, thimbleberry, and Oregon grape, as well as red alder trees for shading and competition for nitrogen, to reduce broom growth.

Mechanical Control

- Minimizing soil disturbance, cut larger plants below ground level before flowering and seed set. Plants with stems less than 1.5 cm in diameter may be hand pulled, preferably in late spring when the plant is directing its energy into flower and seed production.
- Due to enormous 'seed banking' and re-sprouting potential (stumps and roots), mechanical treatments may need to be repeated over a 3 to 5 year period.
- Mechanical control is most effective if all of the plant is removed, no seeds are dropped and soil disturbance is minimized.
- Hand pulling may encourage broom growth due to the high level of soil disturbance. If pulling will result in soil disturbance, plants can be cut as close to the ground as possible.
- Burning is not an effective control method as broom seeds germinate following a burn.

Biocontrol

- There are currently no approved biocontrol agents for BC; however, seed-feeding beetles released in Washington State have moved north adventitiously, and two other agents released in the US are close to our border and suspected to have arrived in BC. Further surveys will seek to confirm their existence.
- Grazing by goats and consumption of seeds by chickens have been shown to reduce broom infestations.

Chemical Control

Herbicide recommendations and use must consider site characteristics and be prescribed based on site goals and objectives. Herbicide labels and other sources of information must be reviewed before selecting and applying herbicides.

- Herbicides containing 2,4-D, triclopyr, picloram, glyphosate, and hexazinone have some success of control, but long seed viability in the soil requires repeated treatments over many years.
- Selective spot spraying, basal stem injection, or cut surface application methods are recommended to minimize non-target damage.
- Application of pesticides on Crown land must be carried out following a confirmed Pest Management Plan (*Integrated Pest Management Act*) and under the supervision of a certified pesticide applicator.
www.env.gov.bc.ca/epd/ipmp/

References/Links

- BC Ministry of Forests, Lands, and Natural Resource Operations, Invasive Alien Plant Program (IAPP).
www.for.gov.bc.ca/hra/Plants/application.htm
- E-Flora BC, an Electronic Atlas of the Plants of BC.
www.eflora.bc.ca/
- *Field Guide to Noxious and Other Selected Weeds of British Columbia*. 2002.
www.agf.gov.bc.ca/cropprot/weedguid/scotchbroom.htm
- Garry Oak Ecosystem Recovery Team. Best Practices for Invasive Species Management in Garry Oak and Associated Ecosystems: Scotch Broom (*Cytisus scoparius*).
www.goert.ca/documents/Best_Practices_for_Broom_revised.pdf
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