

# Environmental Impact Study and Riparian Area Assessment for 804 Latoria Road, Langford, BC

Submitted to:

Mr. Mike Weir  
16209 Morgan Creek Crescent  
Surrey, B.C. V3Z 0J2

Submitted by:

**CORVIDAE**  
ENVIRONMENTAL CONSULTING INC.

[www.corvidaeenv.com](http://www.corvidaeenv.com)

6526 Water St, Sooke, V9Z 0X1  
250-642-0078

[julieb@corvid.pro](mailto:julieb@corvid.pro)

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## 1 Introduction

Corvidae Environmental Consulting Inc. (Corvidae) was contracted to provide an Environmental Impact Study (EIS) and Riparian Areas Regulation (RAR) Assessment by Qualified Environmental Professionals (QEPs) of a property at 804 Latoria Road, Langford, BC. McElhanney Consulting Services Ltd. contacted Corvidae on behalf of Mike Weir, landowner of 804 Latoria Road (the project).

The project site is a 29.6 hectare (ha) plot of land located at 804 Latoria Road, beside 950 Worrall Drive, with the centre of the project being located at 10U 461341N, 5362899E (Figure 1). The City has zoned this area as Rural Residential (RR2) in addition, parts of the property fall under the following Development Permit Areas (DPAs):

1. Areas with Potential Habitat and Biodiversity Values,
2. Moderate and High Interface Fire Zones and
3. Riparian Development Permit Area.

The project area borders the 200 Year Flood Plain to the south and the Steep Slope Development Area to the east the City of Langford (City of Langford Website July 31, 2017).

Corvidae's role in this project is to address DPAs listed as 1 and 3 above. Corvidae assessed the environmental features, and reviewed the planned development and how it will impact the environment. Following the assessment and review, this document provides mitigations to protect key, sensitive habitat and environmental features – addressing DPAs 1 and 3 above.

## 2 Objective

The purpose of this EIS is to assess the current terrestrial and riparian environment identifying terrestrial and aquatic habitat, sensitive ecosystems and features including wildlife trees, and animal burrows. This EIS also identifies the presence of threatened or endangered species in the project area. This includes a 200 m buffer around the project area. As part of the EIS, Corvidae completed a detailed field assessment to document biophysical features, habitat and verify the City's ecosystem inventory data from 2007. From this information potential impacts have been determined and mitigations provided to protect the natural environment, its ecosystems and associated biological diversity. This report and planning meet the environment requirements in the City of Langford Official Community Plan and zoning by-laws. Following final submittal of this report, Corvidae will complete the Riparian Areas Regulation (RAR) reporting requirements (FrontCounter BC online submittal).

This EIS also addresses applicable provincial and federal environmental legislation. The City of Langford Moderate and High Interface Fire Zones are outside of project scope and it is recommended that a qualified professional assesses the area as required by the Director of Planning. The Steep Slope Development and 200 Year Flood Plain Areas have been addressed in the mitigations measures regarding erosion and water; however, it is recommended that these development areas are assessed by the appropriate Professionals (for example a professional



engineer) depending on the proposed development footprint and/or as required by the Director of Planning.

## 2.1 Environmental Assessment Scope

The EIS has addressed all ecological features in the project area. Background information was reviewed, including applicable databases. During the site assessments the following features were assessed and documented in this report:

- Areas of sensitivity, habitat and biodiversity values.
- Plant communities and a list of plant species on site.
- Wildlife presence and wildlife habitat, including species with specific habitat needs that have potential to be affected by development.
- Adjacent land use (which could impact the ecosystems).
- Soil types and properties.
- Slope aspect and slope materials; providing site stability (or instability) in all areas to help determine areas to develop.
- The riparian areas (Streamside Protection and Enhancement Area (SPEA) of the two streams using RAR.
- Surface water flow patterns.

Following the field assessments, the biophysical features were mapped and areas to be avoided during development have been identified (see Figure 3). Mitigations to minimize development impacts on the environment and potentially improve the habitat in the area have been provided in Section 6.

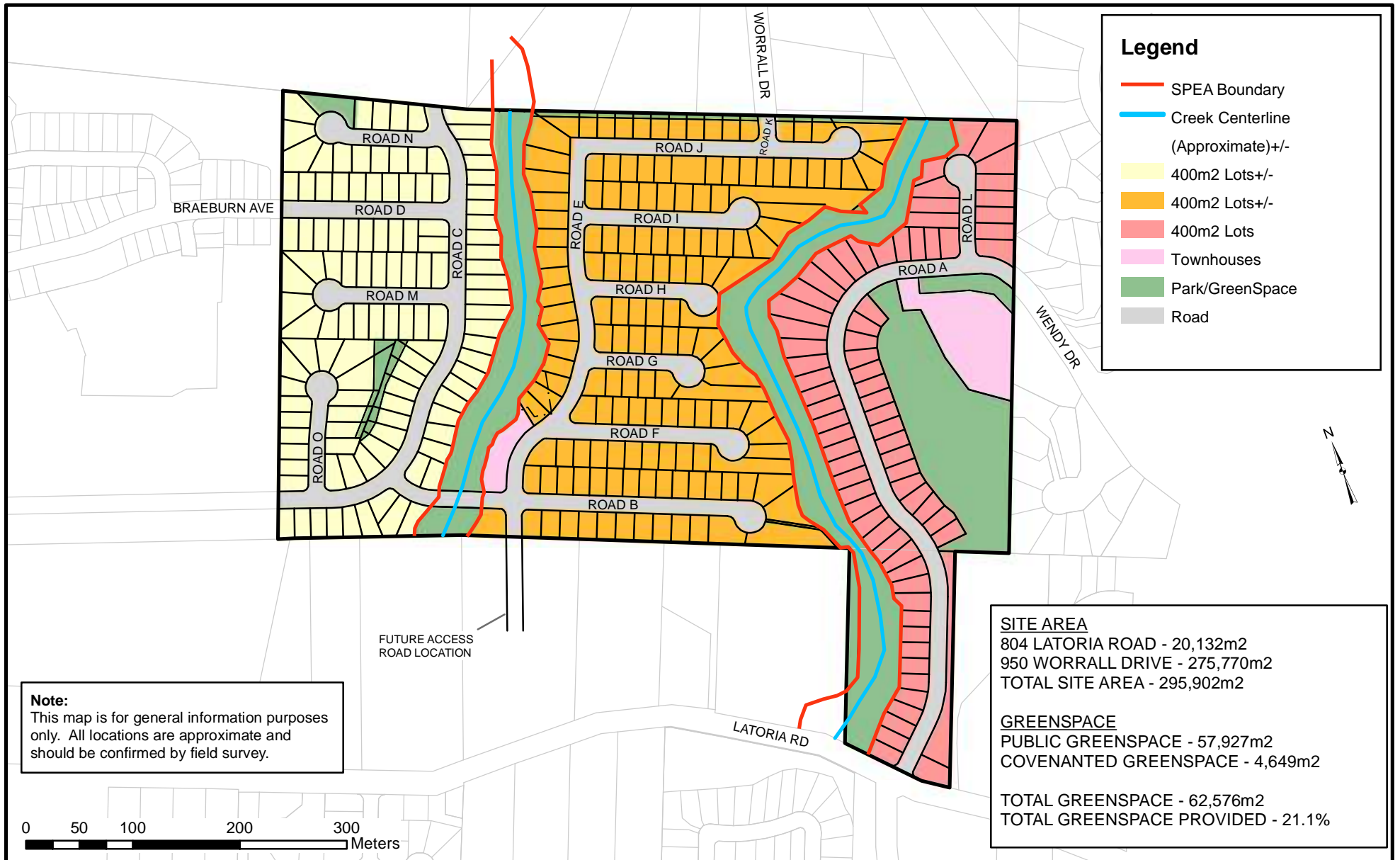
## 2.2 Riparian Areas Regulation Assessment

The Riparian Areas Regulation (RAR), enacted through the BC *Fish Protection Act* (succeeded by the *Riparian Areas Protection Act*), enables the City of Langford to regulate development within riparian areas through the Riparian Development Permit Area. The objective of the Riparian Development Permit Area designation is to preserve and enhance sensitive riparian ecosystems, the area biodiversity and existing vegetation. There are two streams identified on the property (Figure 1). Assessment of the riparian areas of each of these streams, and the entire property, was completed. Following final project layout and submittal of this EIS, a RAR assessment report will be submitted to Ministry of Forests, Lands, Natural Resource Operations and Rural Development – Riparian Areas Regulation Biologist.

Corvidae has mapped the Stream Protection Enhancement Areas (SPEA) (Figures 2 and 3) to ensure development is setback far enough, and mitigations in place, to protect the fish habitat in accordance with the *Riparian Areas Protection Act*.

For the City of Langford, the Riparian Development Permit Area has been designated at 43 m (141 ft) (City of Langford Official Community Plan, 2016, pp. 118). The 43 m setback is in place to ensure that erosion and sediment control plans and environmental mitigations are in place and ensure the riparian areas are protected during development. This report provides the environmental mitigations to protect the riparian area from the project impacts.





**Figure 1. Project Area**

Client: Mike Weir  
 Project: Environmental Assessment and Riparian Area Assessment for 804 Latoria Road, Langford, BC

Original drawing and .dwg files from McElhanney Consulting Services Ltd. Drawing No. 17-057LAYOUT 9.0



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Drawing No. COR-17-58-1

### 3 Methods

#### 3.1 Desktop Review

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

- Searches of the B.C. Conservation Data Centre for instances of rare or at-risk wildlife and plant occurrences in the region (BC CDC 2017a), and for rare or at risk species that may be present in the Project Area (BC CDC 2017b);
- Ortho-imagery and aerial photos of the Project Area (Google Earth 2017); and
- The Official Community Plan for the City of Langford (City of Langford 2016).
- Procedures for Mitigating Impacts on Environmental Values (Environmental Mitigation Procedures) Version 1.0. (MOE 2014).
- Staff Report to Planning and Zoning Standing Committee. District of Langford (June 12, 2000).

Lists of rare or at risk wildlife and plant occurrences from the CDC database have been provided in Appendices B and C. List of wildlife species detected in the project area have been listed in Table 1.

#### 3.2 Field Assessment

A field assessment of the Project Area was completed on August 1, 3 and 7, 2017 by two Qualified Environmental Professionals (QEP) from Corvidae. The assessment included characterization of habitat types, wildlife sign and species observations, wildlife habitat, and identification of natural drainages and riparian areas and assessed the current condition and availability habitat.

The project area was stratified into dominant habitat types based on available forest cover information and the identification of dominant vegetation associations in the field. Each of these areas were mapped. In addition wildlife habitat, wildlife trees and riparian areas were identified and mapped.

#### 3.3 Selection of Valued Environmental Components

Valued Environmental Components (VECs) were selected based on the Procedures for Mitigating Impacts on Environmental Values (Environmental Mitigation Procedures) Version 1.0 (MOE 2014). VECs were defined as an element of the natural environment that the people and other stakeholders of British Columbia care about and see as important for assuring the integrity and well-being of the province's ecological systems over time (MOE 2014).



## **4 Biophysical Assessment**

### **4.1 Climate and Biogeoclimatic Zone**

The site is located in the Coastal Douglas-fir moist maritime (CDF-mm) biogeoclimatic zone (BC Conservation Data Centre 2017). It is a unique habitat that occurs on the southeastern section of Vancouver Island. The average rainfall is 635 mm/annually. The elevation of the area ranges from 75 to 130 m above sea level (Google Earth July 2017).

### **4.2 Local Land Use**

The City has zoned the project area as Rural Residential (RR2). The DPAs have been identified in Section 1. The project area is surrounded by dense residential housing to the north, east and west. North of the project area are Glen and Langford Lakes, where there is high recreational use, and the City of Colwood. South of the project area is forested amongst the Olympic View Golf Course, the Coastline Challenges Camp and various farm lands.

### **4.3 Soils and Terrain**

The soils on site were generally a silty-sandy loam with some gravel, typical of an orthic dystric brunisol. The site is characterized by sloped terrain that is mostly forested with pockets of bedrock outcroppings. The general site aspect is southern. Two prominent ravines are present; there are high and low areas (small hills and gullies) throughout, carved by fluvial drainage as part of the area landform.

### **4.4 Water Resources**

A search of the provincial database (IMAP BC 2017), shows that two creeks run through the project site from north to south (Figure 2). The streams are unnamed, but are tributaries to named streams. For discussion purposes within this report the two unnamed streams onsite will be referred to as 'Stream 1' on the western side of the site and 'Stream 2' on the eastern side of the site. Both streams on site are first order, ephemeral streams with natural overland drainage feeding into them. The drainage concentrates in some areas (identified in Figure 2). These tributaries are not fish bearing, do not qualify for protection under RAR, and are formed from the fluvial topography. The loss of the contributory overland flow will be compensated by re-introducing stormwater overland into the two riparian areas (see Section 6.1.2).

Both Stream 1 and Stream 2 drain into Pritchard Creek downstream of the site. The BC Water Resources Atlas indicates that Pritchard Creek has been assigned watershed code 920-025700-63000-23400. Pritchard Creek drains into Bilston Creek, which then ultimately drains into the tidal waters of Witty's Lagoon, see Figure 2.

During the site visit Stream 1 was mostly dry, with some muddy areas and small pools to the south end of the project area. Sections of Stream 2 had some surficial flow with some shallow





pools while other sections were dry or had subsurface flow. The lower reach of Stream 2 has a floodplain area. The floodplain area is where the future stormwater pond is proposed.

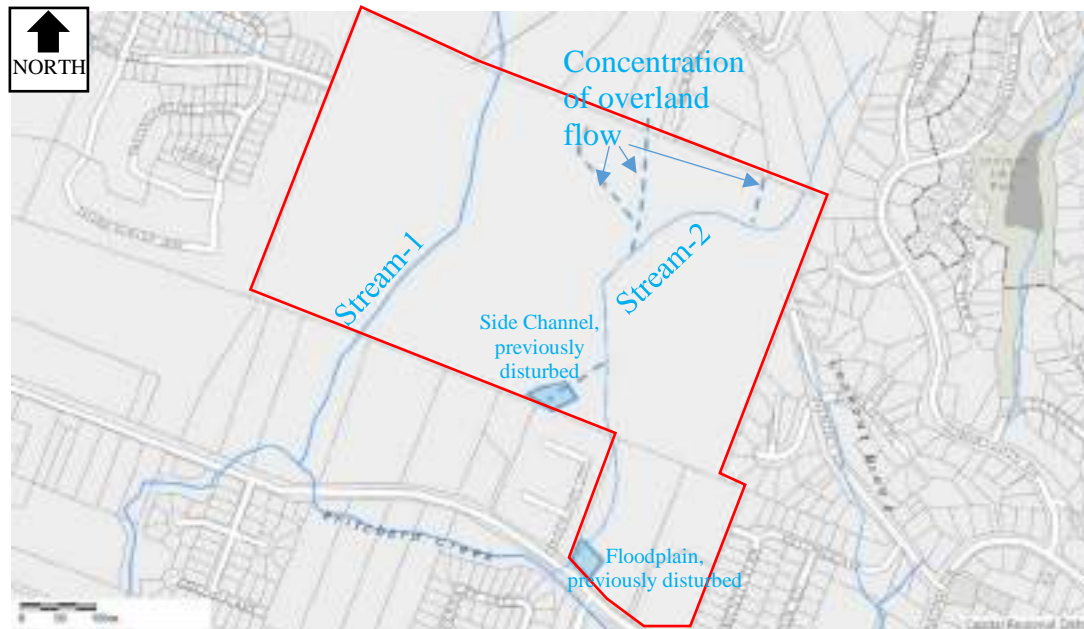


Figure 2. Surface Hydrology

#### 4.5 Fish and Fish Habitat

During the desktop review no fish species were recorded to occur on the project site (BC CDC 2017a&b). The two ephemeral creeks located on the project site, Stream 1 and Stream 2, did not contain fish during the site visit. The online iMap BC provided fish observation records along Pritchard Creek, 280 m south of the site (see Figure 3). Fish observation record 17602, dated March 31, 2013, and record 17615 dated July 31, 2017, both detailed cutthroat trout (*Oncorhynchus clarkii clarkii*) and three spine stickleback (*Gasterosteus aculeatus*) at the Pritchard Creek location.

Stream 1 is ephemeral with notable fish barriers of coarse woody debris. The areas within the top of bank (high water mark) have vegetation characteristics of a wetland with skunk cabbage and deep sediment typical of marsh areas.

Stream 2 levels out to a wide floodplain with debris (previous, collapsed dwelling and garbage) and thick vegetation. During the site assessment there were no notable fish barriers on site between the site and downstream fish bearing streams. There is surficial connectivity through twin embedded culverts under Latoria Road to the fish bearing Pritchard Creek. The southern reaches of Stream 2 on site have a gentle gradient ranging between 2-10% with some fine gravel bed areas suitable for fish spawning. The gradient increases in the northern upstream headwater reaches to between 11-25%. While some shallow pools were present intermittently throughout the length of Stream 2 on site, none provided suitable over wintering fish habitat.



## 4.6 Ecological Communities and Vegetation

The site assessment was conducted in early August during dry summer conditions well after the general spring time flowering season for most plants in the region. The plant species found (listed in Table 1) are not rare or listed federally or provincially.

This forest community is typical within a CDFmm BEC zone. The site is predominately forested with a mix of Douglas-fir (*Pseudotsuga menziesii*), western red-cedar (*Thuja plicata*), bigleaf maple (*Acer macrophyllum*), and limited occurrences of grand fir (*Abies grandis*), and western hemlock (*Tsuga heterophylla*). Those species form the overstory of a maturing second growth forest present on site throughout the ravines, gullies and benches where deeper soils exist. The understory of the second growth forest community is listed in Table 1. The site's rocky outcrops are dominated by a terrestrial upland herbaceous community listed in Table 1, with pockets of open mixed grasslands. Various stonecrop and moss species were present throughout the rocky outcrops.

Table 1. Plant species found in the project area.

COMMON NAME	SCIENTIFIC NAME	Area
Douglas-fir	<i>Pseudotsuga menziesii</i>	Throughout, overstory
western red-cedar	<i>Thuja plicata</i>	Throughout, overstory
bigleaf maple	<i>Acer macrophyllum</i>	Throughout, overstory
grand fir	<i>Abies grandis</i>	Throughout, overstory
western hemlock	<i>Tsuga heterophylla</i>	Throughout, overstory
		Understory
Indian plum	<i>Oemleria cerasiformis</i>	Riparian area
herb-Robert	<i>Geranium robertianum</i>	Riparian area
lady fern	<i>Athyrium filix-femina</i>	Riparian area
stinging nettle	<i>Urtica dioica</i>	Riparian area
skunk cabbage	<i>Lysichiton americanus</i>	
red-osier dogwood	<i>Cornus stolonifera</i>	Riparian area
red elderberry	<i>Sambucus racemose</i>	Riparian area
Indian pipe	<i>Monotropa uniflora</i>	Riparian area
striped coralroot	<i>Orchidaceae striata</i> )	Riparian area
rattlesnake plantain	<i>Goodyera oblongifolia</i>	Open areas
yarrow	<i>Achillea millefolium</i>	Open areas
common snowberry	<i>Symphoricarpos albus</i>	understory
baldhip rose	<i>Rosa gymnocarpa</i>	Understory
red huckleberry	<i>Vaccinium scoparium</i>	Understory
salmon berry	<i>Rubus spectabilis</i>	Understory
bracken fern	<i>Pteridium aquilinum</i>	Understory



COMMON NAME	SCIENTIFIC NAME	Area
sword fern	<i>Polystichum munitums</i>	Riparian area & understory
trailing blackberry	<i>Rubus ursinus</i>	Understory
oceanspray	<i>Holodiscus discolor</i>	Understory and open areas
arbutus	<i>Arbutus menziesii</i>	rocky outcrops
Garry oak	<i>Quercus garryana</i>	rocky outcrops
licorice fern	<i>Polypodium glycyrrhiza</i>	rocky outcrops
stonecrop	<i>Sedum</i>	rocky outcrops
dull Oregon-grape	<i>Mahonia nervosa</i>	Understory and open areas
salal	<i>Gaultheria shallon</i>	Understory and open areas
poisonous hemlock (noxious)	<i>Conium maculatum</i>	Southeast area
bull thistle (noxious)	<i>Cirsium vulgare</i>	Southeast area
Cleavers (invasive)	<i>Galium aparine</i>	Southeast area
creeping buttercup (invasive)	<i>Ranunculus repens</i>	Southeast area and western border
spurge daphne (invasive)	<i>Daphne laureola</i>	Southeast area and east and western border

#### 4.6.1 Ecological Communities Plant Species at Risk

Based on a search of the BC Conservation Database the project area is situated within a region known to be occupied by the Provincially Red listed Douglas-fir / dull Oregon-grape (*Pseudotsuga menziesii* / *Mahonia nervosa*) plant community. During the field assessment an expression of this plant community was confirmed to be present on site throughout the maturing second growth forest areas.

The project site has two Garry Oak, identified in Figure 3. This area will be avoided. During the site assessment there were no signs of great camas (*Cammassia leichtlinii*), however it would be dormant at this time of year. There were open meadow areas. An additional search using the BC Conservation Database returned 91 species at risk which have the potential to occur on site (BCCDC 2017a; Appendix C) with five of these species being found within a one kilometre radius of the center of the project area (Table 2). There were no rare or listed plant species found, however it was late in the year. From the database list of rare (red/blue listed) plants that may occur in the area, they are species that will generally grow in the riparian area, which is to be preserved.



Table 2. Plant species found within a 1 km radius of the centre of the project area.

COMMON NAME	SCIENTIFIC NAME	BC LIST	COSEWIC	SARA
Common bluecup	<i>Githopsis specularioides</i>	Red	NA	NA
Slimleaf onion	<i>Allium amplexans</i>	Blue	NA	NA
Nuttall's quillwort	<i>Isoetes nuttallii</i>	Blue	NA	NA
Heterocodon	<i>Heterocodon rariflorus</i>	Blue	NA	NA
Batwing vinyl	<i>Leptogium platynum</i>	Red	Endangered (May 2011)	NA

#### 4.6.2 Invasive Species in the Project Area

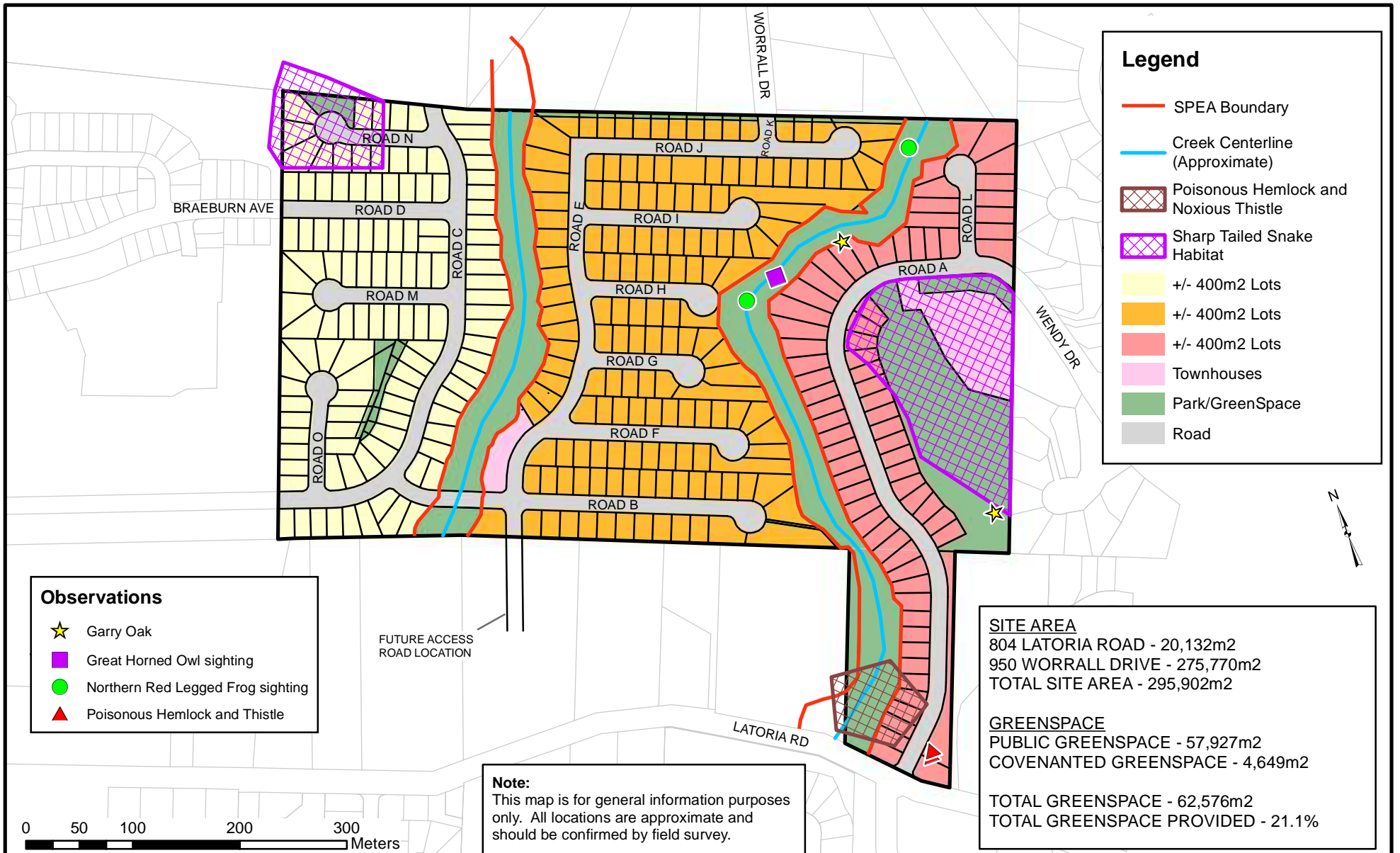
In the project area there were signs of invasive (weed) species invading from the development to the west. These include poisonous hemlock and bull thistle. The poisonous hemlock is highly poisonous, is native to temperate regions of Europe, North Africa and Western Asia. There were approximately 6 plants on site, up to 8 feet tall (see Photo 9). They were in one area (see Figure 3), however there were poisonous hemlock plants on the adjacent site that have risk of seeding on the project area border and encroaching on other areas of the site during development.

The bull thistle is not commonly found in the area (compared to Canada thistle). The 5 to 10 plants found on site were over 6 feet tall (see Photo 10). They are directly next to the poisonous hemlock.

In addition to the two highly invasive and noxious weeds, there were weeds in the lower south east area where there had previously been a dwelling. This is in the same general area as the poisonous hemlock. These include creeping buttercup, spurge daphne and cleavers. These weeds were also found on the western border and the daphne was also found on the eastern border.

For methods to eliminate invasive plant species refer to Section 6.





**Legend**

- SPEA Boundary
- Creek Centerline (Approximate)
- Poisonous Hemlock and Noxious Thistle
- Sharp Tailed Snake Habitat
- +/- 400m2 Lots
- +/- 400m2 Lots
- +/- 400m2 Lots
- Townhouses
- Park/GreenSpace
- Road

**Observations**

- ★ Garry Oak
- Great Horned Owl sighting
- Northern Red Legged Frog sighting
- ▲ Poisonous Hemlock and Thistle

**SITE AREA**  
 804 LATORIA ROAD - 20,132m<sup>2</sup>  
 950 WORRALL DRIVE - 275,770m<sup>2</sup>  
 TOTAL SITE AREA - 295,902m<sup>2</sup>

**GREENSPACE**  
 PUBLIC GREENSPACE - 57,927m<sup>2</sup>  
 COVENANTED GREENSPACE - 4,649m<sup>2</sup>

TOTAL GREENSPACE - 62,576m<sup>2</sup>  
 TOTAL GREENSPACE PROVIDED - 21.1%

**Note:**  
 This map is for general information purposes only. All locations are approximate and should be confirmed by field survey.



**Figure 3. Ecological communities and wildlife habitat in the Project Area**

Client: Mike Weir  
 Project: Environmental Assessment and Riparian Area Assessment for 804 Latoria Road, Langford, BC

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## 4.7 Wildlife and Wildlife Habitat

Breeding birds that were observed on site include the pileated woodpecker (*Dryocopus pileatus*), hairy woodpecker (*Leuconotopicus villosus*), Steller's jay (*Cyanocitta stelleri*), raven (*Corvus corax*), chestnut-backed chickadee (*Poecile rufescens*), Townsend's warbler (*Setophaga townsendi*), dark-eyed junco (*Junco hyemalis*), brown creeper (*Certhia americana*), winter wren (*Troglodytes hiemalis*), and common robin (*Turdus migratoriu*). Birds of prey observed onsite included bald eagles (*Haliaeetus leucocephalus*), hawks, and owls such as the great horned owl (*Bubo virginianus*). Great horned owls are found in a variety of habitats including immature forests that are either deciduous or coniferous, swamps, orchards, suburbs, cities and parks (Cornell University 2015). During one of Corvidae site visits (August 3, 2017) a great horned owl was observed perched in a Douglas fir tree in upland terrestrial herbaceous vegetation type. The location of the siting has been identified in Figure 3. These birds of prey are seen on a regular basis as observed by a site neighbour (K. Losie pers. Comm 2017).

In the project area no active nests were observed. Two inactive/abandoned nests were observed during the site visit along Stream 2. These nests are located in the riparian area that will be preserved as green space and will remain intact.

The rocky outcrops can be home to small mammals such as mice or shrews and reptiles such as the endangered sharp tailed snake (*Contia tenuis*), or the introduced European wall lizard (*Podarcis muralis*), which has been detected along Worrall Drive (HAT 2017). During the site assessment no sharp tailed snakes were observed. During the heat of the summer they are inactive, and may estivate (stop eating and reduce their activity) underground during July and August, therefore they would not be detected during a summer site assessment. The areas identified as potential sharp tailed snake habitat have been identified as green space to be preserved (see Figure 3), details provided in Section 6 and further details on sharp tailed snakes is provided in Section 4.7.1.

During the site visits western skinks (*Plestiodon skiltonianus*), northern alligator lizard (*Elgaria coerulea*), and European wall lizards (*Podarcis muralis*) were all observed throughout the site, with higher abundance of sightings in the rocky outcrop areas. Mule deer (*Odocoileus hemionus*) and racoon (*Procyon lotor*) were also observed on site.

### 4.7.1 Wildlife Species at Risk

Based on a search using the BC Conservation Database, 61 animal species at risk have the potential to occur in the area (BCCDC 2017a; Appendix B). Of these, only one species, the northern red-legged frog (*Rana aurora*) has been observed to occur within 1 km of the project area. This observation was made south of the project area within the Pritchard Creek watershed at the intersection of Latoria Road and Kelly Dawn Place in Langford, east of Happy Valley Road (BCCDC 2017b). The northern red-legged frog is federally listed as Special Concern on Schedule 1



of the *Species at Risk Act* (SARA)<sup>1</sup>. Provincially it is listed as Blue<sup>2</sup>. Northern red-legged frogs utilize both permanent and ephemeral water bodies breeding in cool ponds or lake margins, slow-moving streams, marshes, bogs, or swamps at least 50 cm deep with suitable cover. There can be little to no flow to allow the metamorphosis of the tadpoles. Adults and juveniles can be found in terrestrial habitat far from water during moist conditions and adequate cover from the elements. Mature forests with coarse woody debris and leaf litter are preferred habitats as they move along the forest streams, creeks and rivers (COSEWIC 2002).

During the field assessment northern red-legged frog habitat was found in the project area and red-legged frogs were observed during the site visits throughout all reaches of Streams 1 and 2 and associated riparian areas. Threats to this frog species include degradation and loss of habitat, and predation and competition from bullfrogs (*Rana catesbeiana*). Changes in the environment that increase water temperature and introduction of exotic fish species such as vegetation clearing and habitat fragmentation could provide a competitive advantage for bullfrogs over native northern red-legged frogs (COSEWIC 2002) while altering the water temperature and habitat.

The rocky outcrops and open-canopy woodlands Douglas-fir, Arbutus, and/or Garry Oak within the Coastal Douglas-fir Biogeoclimatic Zone may be home to sharp tailed snakes (COSEWIC 2009; ECCC 2017). Sharp-tailed snakes are listed on Schedule 1 of SARA as Endangered. Preferred habitat includes small openings on rocky outcrops and hillsides with a southern exposure, which may be necessary for egg laying and thermoregulation. Little is known about hibernaculum of these species. It is thought that the snakes are most active outside of the hibernaculum and subterranean habitat during the rainy seasons when their general prey, slugs and worms, are most abundant and accessible, then they retreat to cool subterranean shelter during the dry summer and autumn seasons but are also thought to be present in these areas-year around because there is no evidence of migratory behaviour (COSEWIC 2009). During the site visit potential snake habitat was assessed and found in the project area. Figure 3 identifies these areas. A formal snake survey was not conducted as this is outside of the scope of this project as well as outside of the most optimal season to best detect snakes.

#### 4.8 Streamside Protection and Enhancement Area (SPEA).

The SPEA for the project area has been identified using the Riparian Areas Regulation assessment methods provided by the provincial government (BC Government, Queen's Printer 2016).

In the Riparian Areas Regulation a SPEA is defined as "*an area (a) adjacent to a stream that links aquatic to terrestrial ecosystems and includes both existing and potential riparian vegetation and*

<sup>1</sup> The Species At Risk Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either extirpated, endangered, threatened, or a special concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.

<sup>2</sup> Species are assigned to provincial lists depending on their Provincial Conservation Status (see table below). The lists are as follows: **Red**: Includes any indigenous species or subspecies that have, or are candidates for, Extirpated, Endangered, or Threatened status in British Columbia. **Blue**: Includes any indigenous species or subspecies considered to be of Special Concern (formerly Vulnerable) in British Columbia. Taxa of Special Concern have characteristics that make them particularly sensitive or vulnerable to human activities or natural events. Blue-listed taxa are at risk, but are not Extirpated, Endangered or Threatened. **Yellow**: Includes species that are apparently secure and not at risk of extinction. Yellow-listed species may have red- or blue-listed subspecies.



*existing and potential adjacent upland vegetation that exerts an influence on the stream, and (b) the size of which is determined according to this regulation on the basis of an assessment report provided by a qualified environmental professional in respect of a development proposal.”*

From assessment of the project area and surrounding habitat and biophysical features, the SPEA was determined to be an average of 15 m, on either side, from the high water mark to effectively maintain stream health, erosion control and habitat for existing species within the stream. Following the finalization of plans for the development, Corvidae will submit a Riparian Areas Assessment report through FrontCounter BC to the Ministry of Forest Lands, Natural Resources and Rural Development.

## **5 Potential Environmental Effects**

The project development will result in loss of second growth forest, open meadows and rocky outcrop areas that provide habitat for wildlife and native vegetation. There will be an increase in impermeable surfaces and change in the contours of the area with the roads, lots and houses.

### **5.1 Valued Environmental Components**

Based on the review of the existing baseline information, the project area, the field assessment, and the environmental and social importance of certain environmental elements, the following Valued Environmental Components (VECs) have been identified for the project:

- Riparian Areas – identified in Figure 2 as the SPEA
- Wildlife habitat and wildlife habitat features

#### **5.1.1 Riparian Areas**

The SPEA is an average of 30 m wide for Streams 1 and 2 in the project area; in some areas it is wider than 30 m and some areas it is less. During the site assessment the riparian width was determined by the Zone of Sensitivity specific to the Riparian Areas Regulation (BC Government, Queen’s Printer 2016). The SPEA width is wide enough in all areas to maintain riparian health and habitat (as per definition in section 4.8). The riparian areas have been walked extensively and the boundary trees of the riparian area are clearly flagged to prevent clearing within that area. There will be a loss of the habitat outside of the designated riparian area. The QEP assessment has determined that the trees and understory vegetation remaining will sufficiently hold water during dry periods and slow water flow during wet periods to maintain the aquatic habitat and riparian health.

The stormwater from each lot will be treated in accordance with the City of Langford Bylaw 1000, then drained overland (through vegetation) into the riparian area. The stormwater being added back into the existing surface water volumes will help maintain current overland flow and existing habitat. See mitigations information in Section 6.1.1.





### 5.1.2 Wildlife and Wildlife Habitat

There is the potential for impacts to the local and migratory wildlife populations during construction activity and the lifetime of the development due to a loss in forested habitat. The wildlife documented in Section 4.7 will be impacted by loss of the 23.3 hectares of forested area and meadow habitat.

There will be impacts to amphibian habitat by the loss of wet soils and areas for hibernation upslope of the riparian habitat. This is specific to the northern red-legged frog.

There will be loss of the rocky outcrops that are habitat for the lizards found on site, impacting their survival in that area and availability of suitable habitat.

There will be impacts to the sharp-tailed snake habitat by fracturing of bedrock by blasting to create level lots. The blasting and clearing can shake the ground, alter hibernacula and render it useless or trap snakes.

## 6 Mitigation Measures

The mitigation measures provided in this report are to meet regulatory requirements and protect habitat while determining areas of lesser value for development. The regulatory requirements include the Riparian Areas Regulation, the City of Langford DPAs and the City of Langford requirement to maintain 30% of the project area as green space. Some of the green space may be manicured lawns, Corvidae recommends leaving as much green space as feasible to natural habitat with open meadows, Douglas fir forest and rocky outcrops instead of manicured.

These mitigations have addressed all environmental aspects, with a focus on the sensitive habitat features and VECs. The overall measures have considered the following, documented in this report:

- Protection of habitat, trees and wildlife features.
- Surface water flow direction and recommended surface water design areas to minimize/eliminate potential erosion.
- Identification of Riparian areas and recommended protection measures.
- Erosion and sediment control measures.
- Soil handling and storage recommendations for construction.
- Timing for construction.
- Mapping and information to act as decision-making tools to assist with the preparation of a rezoning, subdivision and development permit applications.

### 6.1 Protected Trees and Sensitive Wildlife Habitat

Figure 3 identifies wildlife features found in the project area and sensitive habitat. These features and sensitive areas will be protected during the development and for the future of the project.



This includes the two inactive nests found, the red-legged frog habitat and other key wildlife habitat identified below.

### **6.1.1 Riparian Areas to be Protected**

The two streams on the property, and the riparian areas surrounding them, will be protected during the duration of development and the lifetime of the project. They have been identified by a QEP and are part of the green space to remain in the project area. The width of the greenspace around the streams (SPEA) varies. In some areas it is greater than required and in some areas it is less; all widths have been determined to meet the regulatory requirements to maintain stream health. This will increase habitat and maintain areas for the red-legged frog and other amphibians and species that utilize the streams and forested areas on either side of them.

If any privately-owned lots overlap with the SPEA, the homeowners will be notified of the SPEA and will not be permitted to clear or develop in that area of their lot. This area, in individual yards, will require a restrictive covenant to remain natural/undisturbed.

During clearing, all trees must be felled away from the riparian area and hauled off site through areas designated to be cleared, not through the riparian habitat.

### **6.1.2 Stormwater Management**

The stormwater coming from each lot will be added back into the riparian areas. This will maintain water flows and ameliorate the loss of surrounding habitat by adding the rainwater back into the natural drainages. This will also mitigate the loss of natural overland flow that has concentrated in areas to small tributaries. The stormwater re-introduction to the streams will help maintain the riparian vegetation and habitat. The key factor will be the drainage through an approved treatment system to vegetation, then into the streams. This will provide adequately clean and suitable rainwater back into the habitat and reduce the impacts of the addition of impermeable surfaces.

In addition to the stormwater from each lot, there will be a naturalized stormwater pond at the southeast corner of the project area to capture stormwater from the roads in the project area on that side. This will connect to an existing naturalized stormwater pond that is located directly across the road from the property.

The naturalized stormwater pond will be vegetated with native vegetation that naturally occurs in the area. This includes sword fern, bracken fern and sedges. The result of a naturalized stormwater pond will be improved habitat where there is currently weeds, deleterious debris and a build-up of soils that were piled in the area.



### 6.1.3 Sharp Tailed Snake Habitat Protection

As shown on Figure 3, the two areas of documented sharp-tailed snake habitat will be directly affected by development. As this species is a federally (endangered) and provincially listed species at risk the following mitigation hierarchy (number one is the most preferential and decreasing in preference) options are recommended:

1. Avoid - preserve identified snake habitat to minimize impact and maintain important habitat features (e.g. south facing rocky slopes) where practical to not impact documented habitat.
2. Minimize – leave areas of identified habitat and move favoured snake features (cover features such as downed logs and rocks) to other green spaces within the project area. Requires having a biologist on site to conduct sharp-tailed snake salvage prior to construction and to monitor construction so individual mortality does not occur. Salvaged snakes would be taken to another documented location that is suitable habitat.
3. Compensate - maintain layout as currently proposed and provide similar habitat at a nearby location (preferred location is within a 5 km radius of the site) and recommendations state a 2:1 ratio of what was lost (e.g. if 100 m<sup>2</sup> of habitat was lost then 200 m<sup>2</sup> for compensation). Compensation could also be implemented through a local non-governmental organization (NGO) such as the Victoria based Habitat Acquisition Trust (HAT). Requires having a biologist on site to conduct sharp-tailed snake salvage prior to construction and to monitor construction so individual mortality does not occur. Salvaged snakes would be taken to the compensatory location.

To minimize or prevent the crushing of snakes during blasting, all clearing and blasting should be completed outside of the dry season (after August). Sharp tailed snakes will emerge from crevasses and be active when the rain starts. They will be out of the deep areas that may move and have potential to crush them when they are in their hibernacular state. During blasting and clearing an Environmental Monitor should be on site to monitor and salvage snakes to reduce mortality rates of the endangered species.

### 6.1.4 Fish and Fish Habitat

There is potential fish habitat in Stream 2, which has been impacted by past development (existing clearing at the southeast area of the property). The addition of the naturalized stormwater pond and maintaining the riparian area will result in improved areas for fish habitat. The existing gravel areas in the stream will not be touched during construction and will remain as existing habitat.

## 6.2 Erosion and Sediment Control Measures, Soil Handling

Prior to clearing, the riparian areas will be bordered with sediment fence to prevent sediment from migrating into that habitat. The sediment fence is to line the entire border and be keyed in to prevent soils from migrating under the fences during heavy rainfall events.



During clearing all trees will be felled away from the protected areas and removed through areas designated to be cleared.

Soil will be pulled back and away from the riparian areas and other green space. Soil storage will be outside of the green space on the edges of roads and lots. Corvidae recommends using the soil cleared for building to line the naturalized stormwater pond. See Section 6.3 for details.

For greenspace to be landscaped, the soil from individual lots can be used to add in areas where there is little or no soil for natural regeneration of native vegetation.

Due to the habitat – rocky outcrops and shallow topsoil – there will be little topsoil to be cleared. This topsoil is to be stored and used, as needed, for future reclamation around the building and road footprints. If there is not enough topsoil on site for landscaping, imported topsoil should be from a clean/weed free source to avoid importing invasive vegetation.

### **6.3 Utilization of Natural Resources**

#### **6.3.1 Soil Sharing**

The topsoil on site, in weed free areas, has a good native plant seed base. This soil should be used in the site for natural revegetation in greenspace areas. The topsoil can be stored then placed for landscaping. There is a high probability of wild flower bulbs (currently dormant) in the soil that will grow annually in a new area if topsoil is salvaged and placed elsewhere.

#### **6.3.2 Recommended Sword Fern Transplanting**

In the project area there are several hundred sword ferns. Some of the ferns are up to 60 years old. Corvidae recommends transplanting the ferns for use in other areas, where feasible. We have worked on projects with successful transplanting of sword ferns. They are easily transplanted if the following measures are taken:

- Transplant during the wet (fall/winter) periods to allow for root re-establishment with sufficient rainfall to grow in the new environment.
- Take the main roots (0.5 m or greater in depth).
- Take the surrounding soil and 0.3 m (or greater) circumference around the plant (in addition to the plant width).

The ferns would provide the following benefits:

- Act as rainwater catchment to deal with heavy run-off and rainfall events.
- Complete against the broom and other invasive species that are in the area.
- Provide shade and improved habitat for terrestrial wildlife.
- Naturalize the area with native vegetation to fill in the grass and rock areas, creating an aesthetically beautiful landscape.
- Utilize plants that would otherwise be destroyed during clearing.



- Save costs in landscape plants for the natural area.
- Have positive optics for salvaging native plants in the community.

Alternatively, there are options to donate the ferns to local landscaping companies or organizations where they would be of value.

### **6.3.3 Tree Salvage**

The trees felled from the site will be sold/utilized for their lumber value. There is potential for trees with wildlife features to be strategically placed in a green space area for fauna habitat. Trees can be laid in the creek to provide shading for fish, slow water flow and create erosion protection. This can be done strategically at the time of clearing. When trees are being placed it is recommended that a QEP be on site to ensure property placement, and that it is outside of the sensitive fisheries window (see Table 3).

## **6.4 Removal of Invasive Species and Deleterious Materials**

The poisonous hemlock and bull thistle must be removed prior to clearing. They are to be bagged and landfilled. The person removing the poisonous hemlock must be wearing protective clothing including gloves and impermeable fabric on their arms to avoid contact with the plants. Following clearing, the equipment used to pull the hemlock must be washed as it is highly toxic and any contact with the plant can cause inflammation on the skin. A very small amount of the poisonous hemlock, if ingested, will cause death (i.e. one seed or leaf). During clearing, caution must be taken to capture the seeds on the plant and avoid them falling onto the ground.

The area where the noxious weeds are also has other invasive species and garbage. Corvidae recommends removing all the material (chicken coups, old dwelling and associated furniture and household waste) to the landfill. Following removal of the waste, the area should be excavated to capture any seeds from the noxious weeds and any soils containing contaminants. The excavated material should be disposed of at an approved facility. Following excavation, the location is to be contoured to the size required for the naturalized stormwater pond. Soil from the single family home lots that is not needed for yards should be used to line the stormwater pond. From the assessment it has been determined that this soil will not contain noxious weed seeds or deleterious materials and is suitable for growing vegetation in and around the stormwater pond.

## **6.5 Timing for Construction**

To minimize the impacts of the project development on breeding birds and amphibians and hibernating snakes the project should avoid any clearing during the spring and summer and begin clearing in the fall. The following timing windows apply to the project area:



Table 3. Wildlife timing windows

Type	Least Risk Windows	Restriction dates	Restriction details
<b>Breeding birds (including goshawk)</b>	September 1 to March 14	March 15 to August 31	No clearing of vegetation during restriction period unless a nesting bird survey is completed by a qualified professional and no active nests are found. If a nest is found and determined to be active, a site-specific management plan will be required for works in the vicinity of the nest. Clearing between Sept 1 and March 14 annually does not require breeding bird surveys.
<b>Raptors and herons</b>	August 15 to January 30	Raptors – February 1 to August 31 annually  Herons – February 16 to August 31 annually	Construction activities may need to be modified to provide buffers for nesting or rearing raptors and herons as per <i>BCMoE Best Management Practices for Raptor Conservation during Urban and Rural Land Development in British Columbia</i> .
<b>Amphibians</b>	August 31st to April 1st	April 2nd to August 30th	The amphibian breeding period is typically spring/summer, with the dates recommended of the beginning of April to the end of August. This can be mitigated by amphibian salvage prior to construction if occurring in this timeframe.
<b>Fish</b>	General least risk timing window is June 15 to September 15.	September 15 <sup>th</sup> to June 15 <sup>th</sup>	Any instream works and any crossings of the riparian area (and culvert installation) should be during the least risk window.

## 6.6 Environmental Monitoring During Clearing

During clearing, Corvidae recommends reptile and amphibian monitoring and salvage. An Environmental Monitor can be on site during clearing to watch for snakes, frogs and lizards, removing them to avoid crushing them during activities. This is typical practice for large construction projects.

## 7 Significance of Environmental Effects

The development of this property with single family homes will have a significant impact on the sharp-tailed snake habitat outside of the areas to remain as green space. There will likely be impacts to the remaining greenspace if the blasting moves the ground and alters their hibernacular habitat.



## 7.1 Cumulative Effects

Throughout the area there is development. Specifically, along Latoria Road there are several developments of residential homes. To the east there is the Royal Bay development of thousands of homes that will continue over the next decade. This is in addition to four developments in the immediate area surrounding the property (within 1 km). The overall cumulative effects are the clearing of forested areas, loss of wildlife habitat including amphibians and birds and increased impermeable areas.

Figure 4 shows a view of the property (the red star indicates the entrance/southern area) and the surrounding land use and green space.



Figure 4. Overview of current surrounding land use

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**Appendix A: Site Photographs**



**Photo 1. Image of one of the many northern red-legged frogs observed on site.**



**Photo 2. Image of the great horned owl observed onsite.**



**Photo 3. Image of one of the many European wall lizards observed on site.**





**Photo 4.** Image of one of the many northern alligator lizards observed on site.



**Photo 5a and b.** Images of two of the abandoned nests observed along Stream 2.



**Photo 6.** Image of one of the fractured bedrock colluvium piles present within the eastern bedrock outcrop area that may provide ideal cover for a sharp-tailed snake hibernaculum.





**Photo 7. Image of the typical upland terrestrial herbaceous vegetation type present in the site's rocky outcrop areas.**



**Photo 8. Images of two of the many pools on site along Stream 2.**



**Photo 9. Poisonous hemlock observed on site.**



**Photo 10. Bull thistle on site beside poisonous hemlock.**





**Photo 11. Image of a dry channel in a lower reach of Stream 2 showing gravel beds that may support spring spawning habitat for cutthroat trout (to be preserved).**

**Appendix B: Conservation Data Centre List of Potential Animal Species within the Area**

<b>English Name</b>	<b>Scientific Name</b>	<b>COSEWIC</b>	<b>BC List</b>	<b>SARA</b>	<b>Class (English)</b>
<b>Northern Red-legged Frog</b>	<i>Rana aurora</i>	SC (May 2015)	Blue	1-SC (Jan 2005)	amphibians
<b>Wandering Salamander</b>	<i>Aneides vagrans</i>	SC (May 2014)	Blue		amphibians
<b>Western Toad</b>	<i>Anaxyrus boreas</i>	SC (Nov 2012)	Yellow	1-SC (Jan 2005)	amphibians
<b>American Bittern</b>	<i>Botaurus lentiginosus</i>		Blue		birds
<b>Band-tailed Pigeon</b>	<i>Patagioenas fasciata</i>	SC (Nov 2008)	Blue	1-SC (Feb 2011)	birds
<b>Barn Owl</b>	<i>Tyto alba</i>	T (Nov 2010)	Red	1-SC (Jun 2003)	birds
<b>Barn Swallow</b>	<i>Hirundo rustica</i>	T (May 2011)	Blue		birds
<b>Black Swift</b>	<i>Cypseloides niger</i>	E (May 2015)	Blue		birds
<b>Brandt's Cormorant</b>	<i>Phalacrocorax penicillatus</i>		Red		birds
<b>Caspian Tern</b>	<i>Hydroprogne caspia</i>	NAR (May 1999)	Blue		birds
<b>Common Murre</b>	<i>Uria aalge</i>		Red		birds
<b>Common Nighthawk</b>	<i>Chordeiles minor</i>	T (Apr 2007)	Yellow	1-T (Feb 2010)	birds
<b>Double-crested Cormorant</b>	<i>Phalacrocorax auritus</i>	NAR (May 1978)	Blue		birds
<b>Evening Grosbeak</b>	<i>Coccothraustes vespertinus</i>	SC (Nov 2016)	Yellow		birds
<b>Great Blue Heron, Fannini Subspecies</b>	<i>Ardea herodias fannini</i>	SC (Mar 2008)	Blue	1-SC (Feb 2010)	birds
<b>Green Heron</b>	<i>Butorides virescens</i>		Blue		birds
<b>Marbled Murrelet</b>	<i>Brachyramphus marmoratus</i>	T (May 2012)	Blue	1-T (Jun 2003)	birds



English Name	Scientific Name	COSEWIC	BC List	SARA	Class (English)
<b>Northern Goshawk, Laingi Subspecies</b>	<i>Accipiter gentilis laingi</i>	T (Apr 2013)	Red	1-T (Jun 2003)	birds
<b>Northern Pygmy-Owl, Swarthy Subspecies</b>	<i>Glaucidium gnoma swarthy</i>		Blue		birds
<b>Olive-sided Flycatcher</b>	<i>Contopus cooperi</i>	T (Nov 2007)	Blue	1-T (Feb 2010)	birds
<b>Peregrine Falcon, Anatum Subspecies</b>	<i>Falco peregrinus anatum</i>	SC (Apr 2007)	Red	1-SC (Jun 2012)	birds
<b>Purple Martin</b>	<i>Progne subis</i>		Blue		birds
<b>Short-eared Owl</b>	<i>Asio flammeus</i>	SC (Mar 2008)	Blue	1-SC (Jul 2012)	birds
<b>Vesper Sparrow, Affinis Subspecies</b>	<i>Pooecetes gramineus affinis</i>	E (Apr 2006)	Red	1-E (Dec 2007)	birds
<b>Western Bluebird (Georgia Depression Population)</b>	<i>Sialia mexicana</i> pop. 1		Red		birds
<b>Western Screech-owl, Kennicottii Subspecies</b>	<i>Megascops kennicottii kennicottii</i>	T (May 2012)	Blue	1-SC (Jan 2005)	birds
<b>Swamp Fingernail clam</b>	<i>Musculium partumeium</i>		Blue		bivalves
<b>Blue-grey Taildropper</b>	<i>Prophysaon coeruleum</i>	T (Apr 2016)	Blue	1-E (Dec 2007)	gastropod
<b>Broadwhorl Tightcoil</b>	<i>Pristiloma johnsoni</i>		Blue		gastropod
<b>Dromedary Jumping-slug</b>	<i>Hemphillia dromedarius</i>	T (May 2014)	Red	1-T (Jan 2005)	gastropod
<b>Pacific Vertigo</b>	<i>Vertigo andrusiana</i>		Red		gastropod
<b>Puget Oregonian</b>	<i>Cryptomastix devia</i>	XT (Apr 2013)	Red	1-XX (Jan 2005)	gastropod
<b>Threaded Vertigo</b>	<i>Nearctula</i> sp. 1	SC (Apr 2010)	Blue	1-SC (Jul 2012)	gastropod
<b>Umbilicate Sprite</b>	<i>Promenetus umbilicatellus</i>		Blue		gastropod



English Name	Scientific Name	COSEWIC	BC List	SARA	Class (English)
<b>Vancouver Fossaria</b>	<i>Galba vancouverensis</i>		Red		gastropod
<b>Warty Jumping-slug</b>	<i>Hemphillia glandulosa</i>	SC (Apr 2013)	Red	1-SC (Jan 2005)	gastropod
<b>Western Thorn</b>	<i>Carychium occidentale</i>		Blue		gastropod
<b>Autumn Meadowhawk</b>	<i>Sympetrum vicinum</i>		Blue		insects
<b>Black Saddlebags</b>	<i>Tramea lacerata</i>		Red		insects
<b>Boisduval's Blue, Blackmorei Subspecies</b>	<i>Plebejus icarioides blackmorei</i>		Blue		insects
<b>Common Ringlet, Insulana Subspecies</b>	<i>Coenonympha tullia insulana</i>		Red		insects
<b>Common Woodnymph, Incana Subspecies</b>	<i>Cercyonis pegala incana</i>		Red		insects
<b>Dun Skipper</b>	<i>Euphyes vestris</i>	T (Apr 2013)	Red	1-T (Jun 2003)	insects
<b>Edith's Checkerspot, Taylori Subspecies</b>	<i>Euphydryas editha taylori</i>	E (May 2011)	Red	1-E (Jun 2003)	insects
<b>Greenish Blue, Insulanus Subspecies</b>	<i>Plebejus saepiolus insulanus</i>	E (May 2012)	Red	1-E (Jun 2003)	insects
<b>Johnson's Hairstreak</b>	<i>Callophrys johnsoni</i>		Red		insects
<b>Large Marble, insulanus subspecies</b>	<i>Euchloe ausonides insulanus</i>	XT (Apr 2010)	Red	1-XX (Jun 2003)	insects
<b>Monarch</b>	<i>Danaus plexippus</i>	E (Nov 2016)	Blue	1-SC (Jun 2003)	insects
<b>Moss' Elfin, Mossii Subspecies</b>	<i>Callophrys mossii mossii</i>		Blue		insects
<b>Propertius Duskywing</b>	<i>Erynnis propertius</i>		Red		insects
<b>Silver-spotted Skipper</b>	<i>Epargyreus clarus</i>		Blue		insects
<b>Sinuus Snaketail</b>	<i>Ophiogomphus occidentis</i>		Blue		insects
<b>Western Branded Skipper, oregonia subspecies</b>	<i>Hesperia colorado oregonia</i>	E (Nov 2013)	Red		insects





English Name	Scientific Name	COSEWIC	BC List	SARA	Class (English)
<b>Western Pine Elfin, Sheltonensis Subspecies</b>	<i>Callophrys eryphon sheltonensis</i>		Blue		insects
<b>Western Pondhawk</b>	<i>Erythemis collocata</i>		Blue		insects
<b>Zerene Fritillary, Bremnerii Subspecies</b>	<i>Speyeria zerene bremnerii</i>		Red		insects
<b>American Water Shrew, Brooksi Subspecies</b>	<i>Sorex navigator brooksi</i>		Red		mammals
<b>Ermine, Anguinae Subspecies</b>	<i>Mustela erminea anguinae</i>		Blue		mammals
<b>Keen's Myotis</b>	<i>Myotis keenii</i>	DD (Nov 2003)	Blue	3 (Mar 2005)	mammals
<b>Townsend's Big-eared Bat</b>	<i>Corynorhinus townsendii</i>		Blue		mammals
<b>Sharp-tailed Snake</b>	<i>Contia tenuis</i>	E (Nov 2009)	Red	1-E (Jun 2003)	reptiles
<b>Painted Turtle - Pacific Coast Population</b>	<i>Chrysemys picta</i> pop. 1	T (Nov 2016)	Red	1-E (Dec 2007)	turtles

Search Criteria: Plants & Animals/MOE Regions:1- Vancouver Island ( Restricted to Red, Blue, and Legally designated species )/Regional Districts: Capital (CRD) ( Restricted to Red, Blue, and Legally designated species) /Habitat Types: Agriculture, Anthropogenic, Forest, Grassland/Shrub, Lakes, Riparian, Rock/Sparsley Vegetated Rock, Stream /River, Subterranean, Wetland ( Restricted to Red, Blue, and Legally designated species), BGC Zone: CDF (BC CDC 2017a).



## Appendix C: Conservation Data Centre List of Potential Plant Species within the Area

Scientific Name	English Name	BC List	COSEWIC	SARA	Name Category
<i>Entosthodon fascicularis</i>	banded cord-moss	Blue	SC (May 2015)	1-SC (Aug 2006)	Nonvascular Plant
<i>Bartramia stricta</i>	rigid apple moss	Red	E (Nov 2009)	1-E (Jun 2003)	Nonvascular Plant
<i>Syntrichia laevipila</i>	twisted oak moss	Blue	SC (Nov 2014)	1-SC (Jul 2005)	Nonvascular Plant
<i>Sanicula arctopoides</i>	bear's-foot sanicle	Red	T (Nov 2015)	1-E (Jun 2003)	Vascular Plant
<i>Triphysaria versicolor</i> ssp. <i>versicolor</i>	bearded owl-clover	Red	E (Nov 2011)	1-E (Jun 2003)	Vascular Plant
<i>Hosackia pinnata</i>	bog bird's-foot lotus	Red	E (May 2004)	1-E (Jul 2005)	Vascular Plant
<i>Epilobium torreyi</i>	brook spike-primrose	Red	E (Apr 2006)	1-E (Dec 2007)	Vascular Plant
<i>Ranunculus californicus</i>	California buttercup	Red	E (Nov 2008)	1-E (Feb 2011)	Vascular Plant
<i>Rupertia physodes</i>	California-tea	Blue			Vascular Plant
<i>Anagallis minima</i>	chaffweed	Blue			Vascular Plant
<i>Marah oregana</i>	coast manroot	Red	E (Nov 2009)		Vascular Plant
<i>Microseris bigelovii</i>	coast microseris	Red	E (Apr 2006)	1-E (Dec 2007)	Vascular Plant
<i>Silene scouleri</i> ssp. <i>scouleri</i>	coastal Scouler's catchfly	Red	E (May 2003)	1-E (Jan 2005)	Vascular Plant
<i>Githopsis specularioides</i>	common bluecup	Red			Vascular Plant



Scientific Name	English Name	BC List	COSEWIC	SARA	Name Category
<i>Trifolium cyathiferum</i>	cup clover	Blue			Vascular Plant
<i>Balsamorhiza deltoidea</i>	deltoid balsamroot	Red	E (Apr 2009)	1-E (Jun 2003)	Vascular Plant
<i>Epilobium densiflorum</i>	dense spike-primrose	Red	E (May 2005)	1-E (Aug 2006)	Vascular Plant
<i>Lupinus densiflorus</i> var. <i>densiflorus</i>	dense-flowered lupine	Red	E (May 2005)	1-E (Aug 2006)	Vascular Plant
<i>Rubus lasiococcus</i>	dwarf bramble	Blue			Vascular Plant
<i>Minuartia pusilla</i>	dwarf sandwort	Red	E (May 2004)	1-E (Jul 2005)	Vascular Plant
<i>Lomatium dissectum</i> var. <i>dissectum</i>	fern-leaved desert-parsley	Red			Vascular Plant
<i>Hippuris tetraphylla</i>	four-leaved mare's-tail	Red			Vascular Plant
<i>Plagiobothrys figuratus</i> ssp. <i>figuratus</i>	fragrant popcornflower	Red	E (Mar 2008)	1-E (Feb 2010)	Vascular Plant
<i>Castilleja levisecta</i>	golden paintbrush	Red	E (Nov 2007)	1-E (Jun 2003)	Vascular Plant
<i>Potentilla gracilis</i> var. <i>gracilis</i>	graceful cinquefoil	Red			Vascular Plant
<i>Epilobium halleanum</i>	Hall's willowherb	Blue			Vascular Plant
<i>Sidalcea hendersonii</i>	Henderson's checker-mallow	Blue			Vascular Plant
<i>Heterocodon rariflorus</i>	heterocodon	Blue			Vascular Plant
<i>Viola howellii</i>	Howell's violet	Red			Vascular Plant



<b>Scientific Name</b>	<b>English Name</b>	<b>BC List</b>	<b>COSEWIC</b>	<b>SARA</b>	<b>Name Category</b>
<i>Lupinus oreganus</i> var. <i>kincaidii</i>	Kincaid's lupine	Red	XT (Nov 2008)	1-XX (Feb 2011)	Vascular Plant
<i>Uropappus lindleyi</i>	Lindley's microseris	Red	E (Mar 2008)	1-E (Feb 2010)	Vascular Plant
<i>Ranunculus lobbii</i>	Lobb's water-buttercup	Red			Vascular Plant
<i>Packera macounii</i>	Macoun's groundsel	Blue			Vascular Plant
<i>Limnanthes macounii</i>	Macoun's meadow-foam	Red	T (Nov 2004)	1-T (Aug 2006)	Vascular Plant
<i>Trifolium dichotomum</i>	Macrae's clover	Red			Vascular Plant
<i>Zeltnera muehlenbergii</i>	Muhlenberg's centaury	Red	E (Mar 2008)	1-E (Feb 2010)	Vascular Plant
<i>Navarretia intertexta</i>	needle-leaved navarretia	Red			Vascular Plant
<i>Utricularia ochroleuca</i>	ochroleucous bladderwort	Blue			Vascular Plant
<i>Fraxinus latifolia</i>	Oregon ash	Red			Vascular Plant
<i>Hydrophyllum tenuipes</i>	Pacific waterleaf	Red			Vascular Plant
<i>Orobanche pinorum</i>	pine broomrape	Red			Vascular Plant
<i>Toxicodendron diversilobum</i>	poison oak	Blue			Vascular Plant



Scientific Name	English Name	BC List	COSEWIC	SARA	Name Category
<i>Trifolium depauperatum</i> var. <i>depauperatum</i>	poverty clover	Blue			Vascular Plant
<i>Lupinus lepidus</i>	prairie lupine	Red	E (Apr 2009)	1-E (Jun 2003)	Vascular Plant
<i>Sanicula bipinnatifida</i>	purple sanicle	Red	T (May 2001)	1-T (Jun 2003)	Vascular Plant
<i>Orthocarpus bracteosus</i>	rosy owl-clover	Red	E (May 2004)	1-E (Jul 2005)	Vascular Plant
<i>Eurybia radulina</i>	rough-leaved aster	Red			Vascular Plant
<i>Thysanocarpus curvipes</i>	sand lacepod	Blue			Vascular Plant
<i>Idahoa scapigera</i>	scalegod	Blue			Vascular Plant
<i>Hosackia gracilis</i>	seaside bird's foot lotus	Red	E (Nov 2010)	1-E (Jun 2003)	Vascular Plant
<i>Plagiobothrys tenellus</i>	slender popcornflower	Red	T (Nov 2008)	1-T (Feb 2011)	Vascular Plant
<i>Tonella tenella</i>	small-flowered tonella	Red	E (Nov 2003)	1-E (Jul 2005)	Vascular Plant
<i>Rubus nivalis</i>	snow bramble	Blue			Vascular Plant
<i>Acmispon americanus</i> var. <i>americanus</i>	Spanish-clover	Blue			Vascular Plant
<i>Lupinus rivularis</i>	streambank lupine	Red	E (Nov 2002)	1-E (Jan 2005)	Vascular Plant
<i>Psilocarphus elatior</i>	tall woolly-heads	Red	E (May 2001)	1-E (Jun 2003)	Vascular Plant



<b>Scientific Name</b>	<b>English Name</b>	<b>BC List</b>	<b>COSEWIC</b>	<b>SARA</b>	<b>Name Category</b>
<i>Nuttallanthus texanus</i>	Texas toadflax	Red			Vascular Plant
<i>Elatine rubella</i>	three-flowered waterwort	Blue			Vascular Plant
<i>Callitriche heterophylla</i> var. <i>heterophylla</i>	two-edged water-starwort	Blue			Vascular Plant
<i>Bidens amplissima</i>	Vancouver Island beggarticks	Blue	SC (Nov 2001)	1-SC (Jun 2003)	Vascular Plant
<i>Claytonia washingtoniana</i>	Washington springbeauty	Red			Vascular Plant
<i>Ranunculus alismifolius</i> var. <i>alismifolius</i>	water-plantain buttercup	Red	E (Apr 2009)	1-E (Jun 2003)	Vascular Plant
<i>Myriophyllum quitense</i>	waterwort water-milfoil	Blue			Vascular Plant
<i>Meconella oregana</i>	white meconella	Red	E (May 2005)	1-E (Aug 2006)	Vascular Plant
<i>Sericocarpus rigidus</i>	white-top aster	Red	SC (Apr 2009)	1-SC (Jun 2003)	Vascular Plant
<i>Clarkia purpurea</i> ssp. <i>quadrivulnera</i>	wine-cup clarkia	Red			Vascular Plant
<i>Callitriche marginata</i>	winged water-starwort	Blue			Vascular Plant
<i>Viola praemorsa</i> var. <i>praemorsa</i>	yellow montane violet	Red	E (Nov 2007)	1-E (Jun 2003)	Vascular Plant



Scientific Name	English Name	BC List	COSEWIC	SARA	Name Category
<i>Dryopteris arguta</i>	coastal wood fern	Blue	SC (Nov 2001)	1-SC (Jun 2003)	Vascular Plant
<i>Woodwardia fimbriata</i>	giant chain fern	Blue			Vascular Plant
<i>Alopecurus carolinianus</i>	Carolina meadow-foxtail	Red			Vascular Plant
<i>Wolffia columbiana</i>	Columbian water-meal	Blue			Vascular Plant
<i>Bulbostylis capillaris</i>	densetuft hairsedge	Red			Vascular Plant
<i>Lilaea scilloides</i>	flowering quillwort	Blue			Vascular Plant
<i>Carex tumulicola</i>	foothill sedge	Red	E (Mar 2008)	1-E (Feb 2010)	Vascular Plant
<i>Allium geyeri</i> var. <i>tenerum</i>	Geyer's onion	Blue			Vascular Plant
<i>Carex interrupta</i>	green-fruited sedge	Blue			Vascular Plant
<i>Carex feta</i>	green-sheathed sedge	Blue			Vascular Plant
<i>Triteleia howellii</i>	Howell's triteleia	Red	E (May 2003)	1-E (Jan 2005)	Vascular Plant
<i>Juncus kelloggii</i>	Kellogg's rush	Red	E (May 2003)	1-E (Jan 2005)	Vascular Plant
<i>Potamogeton oakesianus</i>	Oakes' pondweed	Blue			Vascular Plant
<i>Allium crenulatum</i>	Olympic onion	Blue			Vascular Plant
<i>Cephalanthera austini</i>	phantom orchid	Red	E (Nov 2014)	1-T (Jun 2003)	Vascular Plant
<i>Juncus oxymeris</i>	pointed rush	Blue			Vascular Plant



<b>Scientific Name</b>	<b>English Name</b>	<b>BC List</b>	<b>COSEWIC</b>	<b>SARA</b>	<b>Name Category</b>
<b><i>Glyceria leptostachya</i></b>	slender-spiked mannagrass	Blue			Vascular Plant
<b><i>Allium ampletens</i></b>	slimleaf onion	Blue			Vascular Plant
<b><i>Malaxis brachypoda</i></b>	white adder's-mouth orchid	Blue			Vascular Plant
<b><i>Platanthera ephemerantha</i></b>	white-lip rein orchid	Red			Vascular Plant
<b><i>Isoetes nuttallii</i></b>	Nuttall's quillwort	Blue			Vascular Plant
<b><i>Ophioglossum pusillum</i></b>	northern adder's-tongue	Blue			Vascular Plant

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