NORTH COWICHAN MUNICIPAL FORESTRY PROGRAM

STRATEGY FOR MANAGING SPECIES AT RISK

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1.0 Introduction

There are several levels of management and criteria at both the federal and provincial level identifying 'Species at Risk' (SAR) with legal management requirements and non-legal management recommendations. In addition to legally binding requirements, the North Cowichan Municipal Forestry Program (NCMFP) through their Mission statement: ***To maintain and enhance North Cowichan's valuable municipal forest resources for all users through sustainable forestry, ecological stewardship, and sound fiscal management.*** implies that while maintaining and managing their forest resources they will manage for Species at Risk and other wildlife by being good ecological stewards.

This guide is intended to develop appropriate management recommendations to ensure that the NCMFP meets both the legal requirements and the non-legal recommendations for the management of species at risk on their municipal land.

NCMFP is required to meet several legal obligations under federal and provincial legislation. These legal obligations are the Federal *Species at Risk Act* (SARA), the *Migratory Bird Convention Act* (MBCA), the *Fisheries Act* and the Provincial *Wildlife Act* and *Wildlife Amendment Act*.

1.1 Legislative Framework

Jurisdiction over the 'environment' and 'species at risk', is divided between the federal and provincial governments. The Federal Government has jurisdiction over all *SARA*-listed species on federally owned lands such as National Parks and Department of National Defense Lands and over First Nations Reserve land. The prohibitions under the act, which include the protection of residences and their critical habitats applies only to species that are listed under Schedule 1. The Federal Government also has jurisdiction over migratory birds wherever they occur and over aquatic species wherever they occur due to its constitutional responsibilities for fisheries.

The Provincial Government has jurisdiction over all other *SARA*-listed species and must protect listed species to at least *SARA* standards or the Federal Government may extend its jurisdiction and apply *SARA* through its 'Safety Net' provisions. Local Governments can be expected to be required to protect species at risk to provincial standards, which must in turn meet *SARA* standards. Local governments are authorized by British Columbia's Community Charter to regulate for the 'protection of the natural environment' and have been delegated jurisdiction by the Province over most private land uses, water use, and waste management.

The federal *Fisheries Act* contains provisions to protect against the harmful alteration, disruption or destruction of fish habitat.

The federal *Migratory Bird Convention Act* (MBCA) protects migratory birds through the establishment of migratory bird sanctuaries; through the establishment of hunting bag limits and regulations and seasonal timing windows. The act contains prohibitions against activities that may be harmful to birds, including the taking of feathers (for hats), pollution, and incidental take. The act prohibits the killing or

harming of migratory birds, eggs, or nests. When birds, nests, or eggs are destroyed during industrial activities that do not intend to destroy birds or nests, it is called 'incidental take'.

The provincial Wildlife Act contains provisions to protect against possession, taking, injury, molestation or destruction of (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. The Peregrine Falcon and Burrowing owl are listed under schedule 1 in SARA.

1.2 North Cowichan Municipal Forest

The Municipality of North Cowichan's Municipal Forest Reserve (MFR) is 5,344 ha of privately-owned forest lands which is approximately 25% of the municipal land base (Figure 1) (MNC 2016). The Annual Allowable Cut (AAC) is 20,000 cubic metres with a targeted annual harvest of up to 2% of the total forested area (MNC 2016). This supports their integrated forest management plan by providing the community with logging revenue while balancing recreation and conservation. Harvested stands are regenerated by planting back native species of Douglas-fir (Fd), grand fir (Bg), western redcedar (Cw) and white pine (Pw) (MNC 2016).

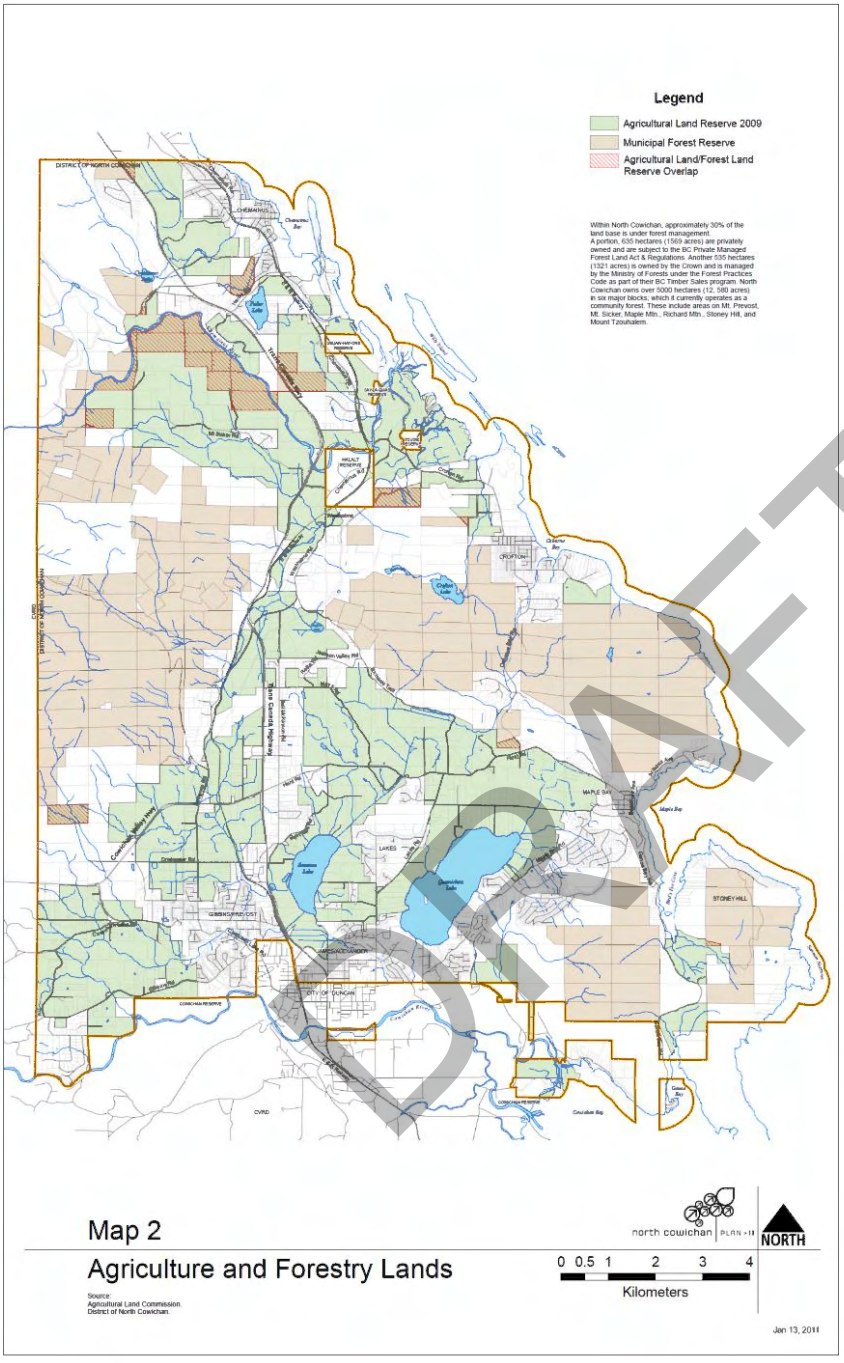
The MFR is located on the southeast coast of Vancouver Island and is entirely within the Municipal boundaries. The Forest Reserve falls within two Biogeoclimatic (BEC) Zones, the Coastal Western Hemlock (CWH) and the Coast Douglas Fir (CDF). The BEC variant that dominates the Forest Reserve is the CWHxm (Coastal Western Hemlock Very Dry Maritime) while the CDFmm (Coastal Douglas fir Moist Maritime) variant is represented in the eastern portion such as Maple Mountain and Stoney Hill and is usually found between sea-level and 150m in elevation.

The CWHxm occurs at low elevations from Kelsey Bay to the north and Sooke to the south on Vancouver Island. This variant is known for its warm dry summers and moist mild winters with very little snowfall. Growing seasons are long and feature water deficits on growing sites (Green and Klinka 1994). The zonal forested sites within CWHxm are dominated with Douglas fir, western hemlock and lesser amounts of western redcedar with understory species that include salal, dull Oregon grape, red huckleberry and the mosses *Hylocomium splendens* and *Kindbergia oregana* (Green and Klinka 1994).

The CDFmm lies within the rainshadow of the Vancouver Island and Olympic Mountains and is found at low elevations along southeast Vancouver Island from Bowser to Victoria and on the Gulf Islands. The summers are warm and dry and the winters mild and wet. The growing seasons are very long and have pronounced water deficits on zonal and drier sites (Green and Klinka 1994). The zonal forests within the CDFmm are dominated with Douglas fir, grand fir and western redcedar while drier sites have Garry oak and arbutus. The understory on the zonal sites is dominated with salal, dull Oregon-grape, ocean-spray and the moss *Kindbergia oregana* (Green and Klinka 1994).

The topography of the area varies from low elevation flatlands to smaller, local mountains forming part of the Vancouver Island Range. The bedrock geology is underlain by volcanic rock with areas of some maritime deposits and shales.

Figure 1: North Cowichan Agriculture and Forestry Lands



2.0 North Cowichan Forestry Program's Strategy for Managing Species at Risk

North Cowichan Forestry Program does not currently have a formal system in place to manage SAR. The Forestry Program's overriding mandate is to provide the community with logging revenue while balancing recreation and conservation. This requires the removal of trees and vegetation and replanting trees where harvesting has occurred. Within the context of this mandate, NCMFP must endeavor to comply with the legislative requirements related to SAR. This requires several key steps. NCMFP must

determine whether a SAR and/or their residence may potentially be found within the area planned for operational activities, and then whether the species is actually present in the area. If a SAR is found to occur in an operating area, NCMFP will have to apply "best management practices" to protect or minimize disturbance to these species and their habitats and mitigate impacts if necessary. Best management practices are practical and cost-effective and are designed to minimize negative impacts on SAR. These can involve modifying treatments, timing, etc., within the constraints imposed by the overriding mandate. In some cases, SAR may have a high probability of being present, but a low probability of being negatively impacted by the planned treatment (e.g. habitat is not affected by harvesting treatments).

The overriding mandate is to proactively manage for a focus list of Species at Risk affected by terrestrial forestry practices on NCMFR, while ensuring public and worker safety.

- The NCMFP can meet legal requirements for protecting these SAR, to the extent feasible within the context of their overriding mandate. This will include recognizing locations of the listed species and their habitats, protecting or minimizing disturbance to these species and their habitats, and mitigating impacts if necessary.
- The primary goal is to demonstrate due diligence in meeting policy objectives concerning SAR management.

To manage for Species at Risk, NCMFP should consider:

- Implementing a program to train staff and contractors and promote conservation of native biodiversity including species, wildlife habitats, ecological or natural community types, at both a stand and landscape level.
- Implement a program to protect threatened and endangered species.

2.1 Developing a Focus List of Species at Risk

Federal and provincial SAR classification criteria and listings to develop a FOCUS LIST of species, plants and plant communities potentially present with the MFR are provided by:

- BC Conservation Data Centre (CDC) Red and Blue-listed wildlife and plant species and ecological communities;
- COSEWIC (Committee on the Status of Endangered Wildlife in Canada);
- Global (G) and Provincial Conservation Status (S);
- Federal *Species at Risk Act* (SARA), Schedule 1, 2 and 3;
- Provincial *Forest and Range Practices Act* (FRPA), Government Action Regulations (GAR), Identified Wildlife Management Strategy (IWMS)
- Provincial *Wildlife Act* and *Wildlife Amendment Act.*
- *Migratory Bird Convention Act*
- Stewardship Centre of British Columbia, Species at Risk and Local Government

Many of these species are not relevant for management within the NCMFR lands. The first step in developing a SAR management strategy is to identify the list of species that will be the focus of the strategy. The goal is to produce a concise list of key species that are potentially impacted by forest harvesting. The full list of SARA Schedule 1, provincial red and blue-listed species and IWMS species (Appendices 1 and 2) will be screened to identify species that will be retained in the focus list. The species listed under the following classifications includes a wide range of species occurring in diverse habitats within the CWHxm and CDFmm BEC Variants within the Municipality of North Cowichan (e.g. fish, whales, mosses, birds, snails, butterflies, plants, etc.). Many of these species are not relevant for management in NCMFR operating areas.

Two different search sites were used to develop the initial lists of Mammals, Birds, Amphibians, Reptiles, Fishes, Insects, Molluscs, Vascular Plants, Mosses and Ecological Communities.

- The first search site used was developed by the **Species Stewardship Centre of British Columbia**; Species at Risk and Local Government. The search included all Species at Risk (Birds, Reptiles, Amphibians, Fishes Insects, Molluscs, Vascular Plants, Mosses, Fungus) listed by COSEWIC, SARA Schedule 1, BC Red and Blue list, *BC Wildlife* Act and Identified Wildlife.

- The second search site is the **BC Species and Ecosystems Explorer** developed by the Conservation Data Centre (CDC). The search included all Birds, Reptiles, Amphibians, Fishes Insects, Molluscs, Vascular Plants, Mosses, Fungus and Ecological Communities listed with the CWHxm and CDFmm BEC Variants within North Cowichan. The list included all species listed by COSEWIC, SARA Schedule 1, BC Red and Blue list, *BC Wildlife* Act and Identified Wildlife.
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From these classifications, the first step is to put together a broad list of focus species NCMFR is able to manage. These will include any species which have legal management requirements. The full list identified above will be screened to identify species that will be retained in the focus list.

1. This list will be trimmed using a species inclusion criteria evaluation which includes the following (Table 1):
   - Exclude species whose ranges do not overlap with NCMFR (e.g. alpine species, marine species).
   - Exclude species occurring in habitats, which are minimally or not impacted by forestry operations.
   - Exclude species whose habitat requirements are too broad (generalists).
   - Exclude species, which are protected under the existing riparian management legislation (e.g. freshwater fish, species preferring riparian habitats, wetlands, etc).
   - Exclude species (plants) that have a very low probability of being identified in the field due to their physical attributes, life cycles, and/or habitats.
   - Exclude species already covered by higher level plan (HLP) requirements.

Table 1. Classes for geographic and habitat overlap

Class	Description
Geographic overlap	
None	Operations do not overlap with published geographic distribution of species
Low	Operations overlap with a limited proportion of the published geographic distribution of the species. (note that a species with a very restricted distribution which overlaps significantly with the an operational area would be rated High)
Moderate	Operations overlap with a moderate proportion of the published geographic distribution of the species.
High	Operations overlap with a significant proportion of the published geographic distribution of the species.
Habitat overlap	
None	Habitats characteristic for species are not found in operating areas
Low	Habitats characteristic for species may be found in limited frequency within operating areas
Moderate	Habitats characteristic for species may be found with moderate frequency within operating areas
High	Habitats characteristic for species are commonly found within operating areas

2. A management strategy for each focus species will be developed documenting key habitat requirements, sensitivities to forestry operations, habitat/geographic rating and possible mitigation potential, etc.

3.0 SAR Potentially Present within North Cowichan Municipal Forest

The key goal of the SAR strategy is that it must be operationally pragmatic. It has to be clear cost-effective; otherwise its integration into operational practice will be problematic. The focus should be on the recognition of habitats/residences that potentially support SAR, and the identification of the species themselves.

Another source of spatial data available for SAR analysis is the Element Occurrence Record data for red and blue listed species provided by the BC Conservation Data Center.

3.1 Initial List of SAR

The full list of SAR species was compiled in Excel spreadsheets reformatted from the Conservation Data Center Species and Ecosystem Explorer and the Stewardship Centre of British Columbia, Species at Risk and Local Government. The full lists are found in Appendices 1 through 3.

- The **Stewardship Centre of British Columbia** lists 141 Species at Risk within the Municipality of North Cowichan.
  The list is comprised of:
  - → 51 provincial red -listed species,

- → 84 provincial blue-listed species,
- → 13 Identified Wildlife,
- → 22 COSEWIC Endangered,
- → 12 COSEWIC Threatened,
- → 20 COSEWIC Special Concern,
- → 47 SARA Schedule 1.

The list includes:

- → 10 Mammals (Appendix 1-2),
- → 21 Birds (Appendix 1-3),
- → 2 Reptiles, 3 Amphibians (Appendix 1-4),
- → 3 Fishes (Appendix 1-5),
- → 16 Insects (Appendix 1-6),
- → 14 Molluscs (Appendix 1-7),
- → 64 Vascular Plants (Appendix 1-8)
- → 8 Mosses (Appendix1-9).

❖ The **CDC** listed 90 plant and animal Species at Risk and 28 Ecological Communities within the CWHxm and CDFmm BEC Variants with North Cowichan.
The list is comprised of:

- → provincial red and blue-listed species,
- → Identified Wildlife,
- → COSEWIC Endangered, Threatened, and Special Concern,
- → SARA Schedule 1
- → *Wildlife Act* of BC

The list includes:

- → 1 Reptiles, 3 Amphibians (Appendix 2-2),
- → 19 Birds (Appendix 2-3),
- → 6 Mammals (Appendix 2-4),
- → 1 Turtle and 1 Bivalve (Appendix 2-5)
- → 7 Gastropod (Appendix 2-6),
- → 13 Insects (Appendix 2-7),
- → 28 Ecological Communities (19 Red-listed and 9 Blue-listed) (Appendix 2-8).
- → 39 Vascular, Non-Vascular Plants Lichens and Mosses (Appendix 2-9)

3.2 The NCMFR FOCUS List

The final Focus Lists of SAR with the NCMFR have been derived from a combination of the two provincial search sites, the Stewardship Centre of British Columbia and the Conservation Data Centre (CDC). The list includes only those species that are suspected to have geographical and habitat overlap within the

North Cowichan Municipal Forest Reserve and those species and/or habitat and ecological communities that can be recognized by the people carrying out forestry activities within the forest reserve. The list of Focus Species of Animals is the same for the CDFmm as the CWHxm1 (Tables 2 to 6). There are 3 amphibians, 1 reptile, 1 turtle, 10 birds, 4 mammals and 4 molluscs.

Keen's Long-eared Myotis was originally considered a separate species and was blue-listed provincially; however recent genetic work in 2016 suggests that the Long-eared Myotis and Keen's Myotis are one in the same species and should be considered as the Long-eared Myotis (SCCP; web accessed October 2018). This species is considered common and not endangered. Keen's Myotis has been removed from SAR Focus List.

The Plants and Ecological Communities on the Focus Lists are those that occur within mixed deciduous/conifer forests and conifer forests within the CWHxm and CDFmm BEC Subzone/Variants. Although many of the species are the same, the species and ecological communities Focus Lists have been separated into the two BEC Variants. There are 6 plant species on the Focus List for the CWHxm1 (Table 7) and 12 plant species on the Focus List for the CDFmm (Table 9). There are 5 ecological communities on the Focus List for the CWHxm1 (Table 8) and 8 ecological communities on the Focus List for the CDFmm (Table 10). Some of the listed plant species and ecological communities for the CDFmm BEC Variant tend be associated with rocky, Garry Oak meadows where harvesting impacts are unlikely to occur.

Section 4.1 of this report provides General Management Practices proposed to minimize the negative impacts on the habitat attributes of SAR including those not on the Focus List and those that are. These can involve modifying treatments, retention of stand attributes and geographical features and timing, etc. In some cases, a SAR may have a high probability of being present but has low probability of being negatively impacted by harvesting activities – no further action is required. Section 4.2 provides Specific Management Practices that are recommended for protecting habitat attributes specific to the species on the Focus list.

3.2.1 Focus List for the CWHxm1 BEC Variant

The Focus list for the **CWHxm1** includes:

- 4 Mammals (Table 2)
- 1 Reptile (Table 3)
- 1 Turtles (Table 3)
- 10 Birds (Table 4)
- 3 Amphibians (Table 5)
- 4 Molluscs (Table 6)
- 6 Vascular Plant (Table7)
- 5 Ecological Communities (Table 8)

Table 2: NCMFR Focus List of Mammals for the CWHxm1 and CDFmm

3.2.1.1 Mammals

English Name	Scientific Name	COSEWIC	SARA	BC Status	Habitat
Mammals					
Townsend's Big-eared Bat	*Corynorhinus townsendii*	None	None	Blue	Forages within 3 km of the daytime roosting site, which must be extremely dark. Caves, tree cavities and buildings are all used. Maternity colonies found in cave features on Mt Tzouhalem and possibly Mt Prevost.
American Water Shrew, brooksi subspecies	*Sorex palustris brooksi*	None	None	Red	Requires complex riparian habitat with overhanging vegetation, coarse woody debris and undercut banks.
Roosevelt Elk	*Cervus elaphus roosevelti*	None	None	Blue	Require closed canopy older forests at lower elevations in winter; associated with slide tracks, lowland rich sites and riparian areas for forage.
Little Brown Myotis	*Myotis lucifugus*	Endangered	Schedule 1 - E	Yellow	Use caves, rock crevices, cliffs and snags as natural roosts. Foraging occurs over water. Winter hibernation sites (caves, tunnels, abandoned mines, and similar sites) Maternity colonies are commonly in warm sites in buildings.

3.2.1.2 Reptile and Turtle

Table 3: NCMFR Focus List of Reptile and Turtle for the CWHxm1 and CDFmm

English Name	Scientific Name	COSEWIC	SARA	BC Status	Habitat
Reptiles					
Sharp-tailed Snake	*Contia tenuis*	Endangered	Schedule 1	Red	Inhabits open Douglas fir/arbutus forests, usually on south facing rocky slopes, which likely provide both nesting and hibernation sites. Breed on rocky warm sites with vegetative cover.
Western Painted Turtle (Pacific coast population)	*Chrysemys picta pop. 1*	Endangered	Schedule 1	Red	Females dig nests on south facing slopes close to the water in May or June. The young hatch in late summer, but often overwinter in the nest. Egg-laying and nursery habitats are specific with respect to exposure (southern aspect), substrate type (dry and light soils with little vegetation cover), and distance from aquatic habitat (within 150 m). Requires warm, sparsely vegetated openings on well-drained soils for nesting. Vegetation cover hinders nest excavation and lowers soil temperatures for incubation, and plant roots can interfere with hatching

3.2.1.3 **Birds**

Table 4: NCMFR Focus List of Birds for the CWHxm1 and CDFmm

English Name	Scientific Name	COSEWIC	SARA	BC Status	Habitat
Birds					
Peregrine Falcon (*anatum* subspecies)	*Falco peregrinus anatum*	Special Concern	Schedule 1	Red	Found on southern Vancouver Island, Gulf Islands and the southern interior of BC. Typically nest on rock cliffs above lakes or river valleys where abundant prey is nearby.
Olive-sided flycatcher	*Contopus cooperi*	Threatened	Schedule 1	Blue	Will often breed in the same coniferous forest area. Nests are placed most often in conifers on horizontal limbs from two to 15 m from the ground. Favour semi-open habitats with standing dead trees, often around bogs or beaver ponds. Birds typically perch in snags.
Common Nighthawk	*Chordeiles minor*	Threatened	Schedule 1	Yellow	Occurs in a wide variety of open habitats, including logged areas, openings, landings, roads, and fields. Lay their eggs on open gravel sites such as landings, openings in young seral, open fields.
Barn Swallow	*Hirundo rustica*	Threatened	None	Blue	Will nest under bridges and under eaves in buildings. Nests are mud/grass structures tucked up under a structure.
Purple Martin	*Progne subis*	None	None	Blue	Nest in snags and nesting boxes near wetlands and estuaries.
Great Blue Heron (*fannini* subspecies)	*Ardea herodias fannini*	Special Concern	Schedule 1	Blue	Nests are found in colonies or single structures in tall Sitka spruce, western red cedar, western hemlock, pine, red alder and black cottonwood. Found in mature forest within 8 km of foraging habitats such as rivers, wetlands, and eelgrass meadows
Northern Goshawk (*laingi* subspecies)	*Accipiter gentilis laingi*	Threatened	Schedule 1	Red	Requires extensive areas of high, closed canopy forest with adequate space to fly between the trees to forage on prey. 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.. Nest trees tend to be one of the largest trees in the stand. March and April tend to be the most active months for goshawk courtship, territory re-establishment, nest building and egg laying; however, during mild winters, courtship is initiated in February and, at times, as early as January.
Western Screech Owl (kennicotti subspecies)	*Megascops kennicottii kennicottii*	Threatened	Schedule 1	Blue	Nests in cavities within large, old trees and is strongly associated with riparian areas. Western Screech-Owls nest in tree cavities, including those excavated by Pileated Woodpeckers and Northern Flickers ; they also readily use nest-boxes. British Columbia nests ranged from 1.2 to 12.2 m above ground; all nests reported were in trees >25 cm dbh.
Band-tailed Pigeon	*Patagioenas fasciata*	Special Concern	Schedule 1	Blue	Favour mature forest with a berry-rich shrub understory. Band-tailed Pigeons require mineral sites where they drink mineralized water and ingest minerals encrusted on soils. Show strong fidelity to mineral sites; in some populations, almost all birds (99%) are thought to occur within 50 km of a mineral site. Mineral sites are likely the most sparsely distributed and vital habitat for Band-tailed Pigeons.
Northern Pygmy-Owl, swarthi subspecies	*Glaucidium gnoma swarthi*	None	None	Blue	Secondary cavity nester, and is dependent upon woodpecker or natural cavities.

3.2.1.4 **Amphibians**

Table 5: NCMFR Focus List of Amphibians for the CWHxm1 and CDFmm

English Name	Scientific Name	COSEWIC	SARA	BC Status	Habitat
Amphibians					
Northern Red-legged Frog	*Rana aurora*	Special Concern	Schedule 1	Blue	Found in a wide variety of lowland aquatic habitats; adults spend the majority of the growing season on land and are most abundant in mature deciduous riparian forests with abundant woody debris.
Western Toad	*Anaxyrus boreas*	Special Concern	Schedule 1	Yellow	Breed in a wide variety of warm, shallow aquatic habitats, from ditches to lakes margins; toads inhabit a variety of habitats including forest, grassland, avalanche slopes and clear cuts.
Wandering Salamander	*Aneides vagrans*	Special Concern	None	Blue	Hides under fallen trees, under rocks, in crevices, under bark and in rotten wood; female lays a clutch of six to nine eggs in some concealed location such as under bark.

3.2.1.5 Molluscs

Table 6: NCMFR Focus List of Molluscs for the CWHxm1 and CDFmm

English Name	Scientific Name	COSEWIC	SARA	BC Status	Habitat
Molluscs					
Dromedary Jumping-Slug	*Hemphillia dromedarius*	Threatened	Schedule 1	Red	Known from six sites on southern VI and five sites are within are remnant patches of old-growth forest. The sixth is in mature forest with abundant woody debris. Eggs are deposited in rotting wood. Closest ones found near Mt Brenton in OG remnant patch. In BC, this species is associated with older, coniferous forest and old-growth forest attributes. Important microhabitat features consist of abundant coarse woody debris, including large-diameter decaying logs, and shaded, moist forest floor conditions.
Blue-Grey Taildropper Slug	*Prophysaon coeruleum*	Endangered	Schedule 1	Red	Found on Mt Tzouhalem and other locations on southern VI. It inhabits moist, coniferous or mixed-wood forests of varying age classes All records from BC are from within the CDF biogeoclimatic zone; often associated with older forests and required microhabitat features include abundant coarse woody debris or other cover, a deep forest litter layer, and shaded, moist forest floor conditions.
Oregon Forestsnail	*Allogona townsendiana*	Endangered	Schedule 1	Red	Occupies a wide variety of habitats, but is most commonly found in broadleaf forests dominated by big-leaf maple and red alder with stinging nettle and sword fern in the understory. Other requirements are abundant leaf litter and large woody debris, which provide protection from extreme temperatures and drying during winter hibernation. Latest sighting in 2014 in Chase Woods (Ovaska and Sopuck 2014).
Warty Jumping Slug	*Hemphillia glandulosa*	Special Concern	Schedule 1	Blue	Inhabits a variety of moist forest and riparian habitats at low to middle elevations. Abundant woody debris and leaf litter are important for cover and the slugs are frequently encountered at the base of sword ferns. Closest ones found near Mt Brenton and Keating Lake. This species occupies moist forested habitats and riparian sites from low to middle elevations

3.2.1.6 Plants – Dicots and Monocots

Table 7: NCMFR Focus List of Plants for the CWHxm1

English Name	Scientific Name	COSEWIC	BC List	SARA	Habitat Subtype
DICOTS					
deltoid balsamroot	*Balsamorhiza deltoidea*	E (Apr 2009)	Red	1-E (Jun 2003)	Rock/Sparsely Vegetated Rock;Grassland;Mixed Forest (deciduous/coniferous mix);Sand Dune;Beach;Garry Oak Woodland. Found in rocky, exposed areas containing Garry oak, or in open meadows near the ocean.
Macoun's meadow-foam	*Limnanthes macounii*	T (Nov 2004)	Red	1-T (Aug 2006)	Meadow;Deciduous/Broadleaf Forest;Garry Oak Vernal Pool;Garry Oak Maritime Meadow Vernal pools, seepage areas on rocky slopes, wet depressions in open Douglas fir Garry Oak forests.
pine broomrape	*Orobanche pinorum*		Red		Conifer Forest - Mesic (average);Conifer Forest - Moist/wet Parasitic on coniferous species; moist to mesic sites in the lowland zone; rare on S Vancouver Island
purple sanicle	*Sanicle bipinnatifida*	T (May 2001)	Red	1-T (Jun 2003)	Rock/Sparsely Vegetated Rock;Deciduous/Broadleaf Forest;Garry Oak Woodland;Garry Oak Maritime Meadow. Found in dry to mesic meadows and mesic, open, deciduous woodlands. Specimen found on SW slope of Mount Tzouhalem
white-top aster	*Sericocarpus rigidus*	SC (Apr 2009)	Red	1-SC (Jun 2003)	Rock/Sparsely Vegetated Rock;Meadow;Mixed Forest (deciduous/coniferous mix);Garry Oak Woodland Dry meadows, woodlands and rocky slopes in the lowland zone In North Cowichan found on Maple Mountain, Ecological Reserve on Mount Tzouhalem, Elkington Property on Quamichan Lake.
Howell's violet	*Viola howellii*		Red		Rock/Sparsely Vegetated Rock;Meadow;Conifer Forest - Moist/wet;Garry Oak Woodland Mesic to moist woodlands and forests in the lowland zone In North Cowichan found in Somenos Garry Oak Protected Area.

3.2.1.7 Ecological Communities

Table 8: NCMFR Focus List of Ecological Communities for the CWHxm1

Scientific Name	English Name	Global Status	Prov Status	BC List	Biogeoclimatic Units	Ecosystem Group
Ecological Communities						
Arbutus menziesii / Arctostaphylos columbiana	arbutus / hairy manzanita	G2	S2	Red	CDFmm/00;CWHxm 1/00	Terrestrial - Forest: Broadleaf - dry
Pseudotsuga menziesii - Pinus contorta / Racomitrium canescens	Douglas-fir - lodgepole pine / grey rock-moss	GNR	S2	Red	CWHxm1/02	Terrestrial - Forest: Coniferous - dry
Thuja plicata / Lonicera involucrata	western redcedar / black twinberry	GNR	S1	Red	CWHdm/14;CWHx m1/14;CWHxm2/14	Terrestrial - Forest: Coniferous - moist/wet
Thuja plicata / Rubus spectabilis	western redcedar / salmonberry	GNR	S1S2	Red	CWHdm/13;CWHx m1/13;CWHxm2/13	Terrestrial - Forest: Coniferous - moist/wet
Tsuga heterophylla - Thuja plicata / Blechnum spicant	western hemlock - western redcedar / deer fern	G2G3	S2	Red	CWHdm/06;CWHx m1/06;CWHxm2/06	Terrestrial - Forest: Coniferous - moist/wet

3.2.2 Focus List for the CDFmm BEC Subzone

The Focus list for the **CDFmm** includes:

- 4 Mammals (Table 2)
- 1 Reptile (Table 3)
- 1 Turtles (Table 3)
- 10 Birds (Table 4)
- 3 Amphibians (Table 5)
- 4 Molluscs (Table 6)
- 12 Vascular Plants (Table 9)
- 8 Ecological Communities (Table 10)

The focus list for the amphibians, reptile, turtle, birds, mammals, and molluscs is the same as the one listed in section 3.2.1 for the CWHxm1 BGC variant (Table 2 to 6). The plants listed for the CDFmm are in Table 9 and the Plant Communities are in Table 10.

3.2.2.1 Plants – Dicots and Monocots

Table 9: NCMFR Focus List of Plants (Dicots) for the CDFmm

Scientific Name	English Name	COSEWIC	BC List	SARA	BGC	Habitat Subtype
DICOTS						
Balsamorhiza deltoidea	deltoid balsamroot	E (Apr 2009)	Red	1-E (Jun 2003)	CDFmm;CWHxm	Rock/Sparsely Vegetated Rock;Grassland;Mixed Forest (deciduous/coniferous mix);Sand Dune;Beach;Garry Oak Woodland. Found in rocky, exposed areas containing Garry oak, or in open meadows near the ocean.
Limnanthes macounii	Macoun's meadow-foam	T (Nov 2004)	Red	1-T (Aug 2006)	CDFmm;CWHxm	Meadow;Deciduous/Broadleaf Forest;Garry Oak Vernal Pool;Garry Oak Maritime Meadow Vernal pools, seepage areas on rocky slopes, wet depressions in open Douglas fir Garry Oak forests.
Lomatium dissectum var. *dissectum*	fern-leaved desert-parsley		Red		CDFmm	Rock/Sparsely Vegetated Rock;Meadow;Grassland;Mixed Forest (deciduous/coniferous mix);Garry Oak Maritime Meadow Dry grasslands, shrublands, talus and rocky slopes in the steppe and montane zones
Orobanche pinorum	pine broomrape		Red		CDFmm;CWHmm; CWHxm	Conifer Forest - Mesic (average);Conifer Forest - Moist/wet Parasitic on coniferous species; moist to mesic sites in the lowland zone; rare on S Vancouver Island
Sanicula bipinnatifida	purple sanicle	T (May 2001)	Red	1-T (Jun 2003)	CDFmm;CWHxm	Rock/Sparsely Vegetated Rock;Deciduous/Broadleaf Forest;Garry Oak Woodland;Garry Oak Maritime Meadow. Found in dry to mesic meadows and mesic, open, deciduous woodlands. Specimen found on SW slope of Mount Tzouhalem
Sericocarpus rigidus	white-top aster	SC (Apr 2009)	Red	1-SC (Jun 2003)	CDFmm;CWHxm	Rock/Sparsely Vegetated Rock;Meadow;Mixed Forest (deciduous/coniferous mix);Garry Oak Woodland Dry meadows, woodlands and rocky slopes in the lowland zone In North Cowichan found on Maple Mountain, Ecological Reserve on Mount Tzouhalem, Elkington Property on Quamichan Lake.
Tonella tenella	small-flowered tonella	E (Nov 2003)	Red	1-E (Jul 2005)	CDFmm	Vernal Pools/Seasonal Seeps;Rock/Sparsely Vegetated Rock;Talus;Conifer Forest - Dry; Garry Oak Woodland
Uropappus lindleyi	Lindley's microseris	E (Mar 2008)	Red	1-E (Feb 2010)	CDFmm	Cliff;Meadow;Deciduous/Broadleaf Forest; Conifer Forest - Dry; Garry Oak Coastal Bluffs. Occurs on sandstone cliffs, steep grassy slopes, and xeric, open deciduous or conifer forests on rocky slopes and cliffs). Grows on dry open forests dominated by Garry Oak and mixed woodland types with an overstory of Douglas fir, Arbutus, and Garry Oak on south- or southwest-facing, steep (70-90%), well-drained, gravelly or rocky slopes at low elevations (0-80 m) .
Viola howellii	Howell's violet		Red		CDFmm;CWHmm; CWHxm;MHmm	Rock/Sparsely Vegetated Rock;Meadow;Conifer Forest - Moist/wet; Garry Oak Woodland Mesic to moist woodlands and forests in the lowland zone In North Cowichan found in Somenos Garry Oak Protected Area.

Table 5: NCMFR Focus List of Plants (Monocots) for the CDFmm

Scientific Name	English Name	COSEWIC	BC List	SARA	BGC	Habitat Subtype
MONOCOTS						
Platanthera ephemerantha	white-lip rein orchid		Red		CDFmm;CWHvh	Conifer Forest - Dry; Garry Oak Woodland Dry forests and forest margins in the lowland to montane zones; rare in coastal BC Documented on Saltspring Island and Saanich.
Triteleia howellii	Howell's triteleia	E (May 2003)	Red	1-E (Jan 2005)	CDFmm	Meadow; Deciduous/Broadleaf Forest; Conifer Forest - Dry; Garry Oak Woodland;Garry Oak Coastal Bluffs. In North Cowichan documented on the Cowichan River Estuary, Somenos Garry Oak Protected Area and the Elkington Property on Quamichan Lake. Grows in Garry oak stands, on deep, dark soils in rich understories.

3.2.2.2 Plant Communities

Table 10: NCMFR Focus List of Ecological Communities for the CDFmm

Scientific Name	English Name	Global Status	Prov Status	BC List	Identified Wildlife	Biogeoclimatic Units	Ecosystem Group
Ecological Communities							
Abies grandis / Mahonia nervosa	grand fir / dull Oregon-grape	G1	S1	Red		CDFmm/04	Terrestrial - Forest: Coniferous - mesic
Arbutus menziesii / Arctostaphylos columbiana	arbutus / hairy manzanita	G2	S2	Red		CDFmm/00;CWHxm1/00	Terrestrial - Forest: Broadleaf - dry
Pseudotsuga menziesii - Arbutus menziesii	Douglas-fir - arbutus	GNR	S2	Red		CDFmm/02	Terrestrial - Forest: Coniferous - dry
Pseudotsuga menziesii / Mahonia nervosa	Douglas-fir / dull Oregon-grape	G2	S2	Red	Y (Jun 2006)	CDFmm/01	Terrestrial - Forest: Coniferous - mesic
Pseudotsuga menziesii / Melica subulata	Douglas-fir / Alaska oniongrass	G1	S1	Red	Y (Jun 2006)	CDFmm/03	Terrestrial - Forest: Coniferous - dry
Quercus garryana / Bromus carinatus	Garry oak / California brome	G1	S1	Red		CDFmm/00	Terrestrial - Forest: Broadleaf - dry
Quercus garryana / Holodiscus discolor	Garry oak / oceanspray	G1	S1	Red		CDFmm/00	Terrestrial - Forest: Broadleaf - dry
Thuja plicata / Symphoricarpos albus	western redcedar / common snowberry	GNR	S1	Red		CDFmm/07	Terrestrial - Flood: Flood (Highbench);Terrestrial - Forest: Mixed - moist/wet

Management Practices

3.3 General Management Practices

3.3.1 Breeding Birds

- Where practicable the timing of harvesting should avoid the nesting window of all forest dwelling breeding birds. The most sensitive areas within or adjacent to coastal forests are rock outcrops with snags and shrub cover, wetlands, riparian areas, floodplains and estuaries.

3.3.2 Snags and Coarse Woody Debris

- In general, dying trees and snags (standing dead trees) have important habitat attributes and should be retained where possible, preferably in areas of aggregate retention for future recruiting of both wildlife trees and coarse woody debris. Many species use both snags and stumps. Bunnell (1998) states that 56 vertebrate species in the rich CWH zone use cavities for reproduction, from primary and secondary cavity nesting birds, breeding mammals such as Myotis sp. and Black Bears to amphibians and reptiles. Tree cavities and loose bark are important natural roost sites for bats and may be limiting in some parts of the range (British Columbia Ministry of Water, Land and Air Protection 2004). The use however is highest and most important for cavity nesting birds. The larger woodpeckers play a key role in forest ecosystems by excavating holes for many of the secondary cavity nesters, such as Hooded Mergansers, chickadees, nuthatches, Brown Creepers, Winter Wrens and some owls.

- Coarse Woody Debris (CWD) should be retained across the landscape post-harvesting as frequently as possible. CWD offers shelter, feeding and breeding sites for numerous invertebrates, amphibians and mammals. CWD also provides a buffered microclimate for seedling establishment. If an area has low volumes of CWD, placement of logs could enhance the habitat values for many species.

- Retention of large CWD structures is important for maintaining winter denning structures in altered landscapes. Large logs and root boles may provide adequate winter den sites. Logs need to be a minimum of 100 cm diameter and 5 m long from the root wad for bears however smaller animals will use smaller diameter logs. These should all be of an early decay class, with hard shells where possible. Root bole (>75 cm) cavities should be closed on one side, so that only one entrance exists.

- Salvaging of cedar should be regulated so as not to remove any potential denning structures and to maintain optimum levels of coarse woody debris.

3.3.3 Bears Dens

- Timing of harvesting is critical around occupied bear den sites. Harvesting should occur after June 1 (if occupied), so as to not cause the bears, especially females with cubs to

abandon the den, leaving the young extremely vulnerable to predation. Bears will enter dens from late October into November, depending on the severity of winter conditions and the amount of available forage.

- If other winter bear den sites are located during harvesting, they should be retained as whole trees or in areas of retention, with green recruitment trees for future den sites. Local Ministry of Environment personnel should be contacted. Construction of artificial den sites is often proposed as an alternative to the conservation of adequate natural denning habitat for Black Bears.

3.3.4 Wildlife Tree Retention Areas

- When allowing firewood cutting, all Wildlife Tree Retention Areas (WTRA) should be marked in the field as well as retained wildlife trees so as to avoid cutting these important habitat features for the maintenance of biodiversity.

- WTRA should be anchored around large snags, larger pieces of CWD, wetlands and rock outcrops.

- When planning retention for an area, the establishment of connectivity should be considered that would include incorporating gullies, unstable terrain, riparian reserves wetlands, rock outcrops and special wildlife habitats and features. This provides a connection between habitats as opposed to having scattered islands of habitat.

3.3.5 Roads

- If roads are to be built, they should be kept to a minimum and as narrow as will be allowed. All disturbed areas associated with new roads should be re-vegetated with native species where possible.

3.3.6 Raptor Nests

- If any raptor nests are observed during pre-harvesting activities they should be flagged and assessed for breeding activity. If the nest is occupied timing should be taken into consideration when planning logging. Harvesting adjacent to occupied nest trees could be disturbing to the birds, causing nest abandonment. With Bald Eagles, dates of egg laying and the young leaving the nest vary on the coast; on the south east coast nesting can occur at the beginning of February and extend to mid to late August. Eggs are incubated for 33-36 days and young remain in the nest for 10-13 weeks. Therefore, harvesting within the vicinity of the nest site should be restricted while the nest is occupied. There are no restrictions as to the size of area that should be left around an eagle nest tree. Eagles will use the same nest and nest tree year after year, making repairs when needed. Blood and Anweiler (1994) recommend that restricting land activities within 250 m of eagles perching and 75 to 100 m if dense shielding vegetation

is present. Any raptor nest tree should be included within areas of retention along with perch trees and future nest trees.

3.3.7 Wetlands

- All wetlands should contain reserves that include the extent of the hydroriparian influence. Many of these wetlands are breeding and rearing sites for a variety of amphibians and should be identified at a site level and given consideration for protection through No Work Zones or retention patches. Where possible, maintain the forest influence and connections between these pocket wetlands and stream environments and/or forest patches through focused retention.

3.3.8 Forest Structure

- Vertical and structural variability should be retained throughout a stand. This can be achieved by the use of variable stocking densities when planting, in combination with spacing or thinning.

3.4 Specific SAR Management Practices

The key objective of developing a Focus Lists is to synthesize the complex amount of information available on SAR into a concise, accessible data source relevant to NCMFR operations. The final step is to relate this information to management practices. A set of best management practices (BMPs) have been developed for each species, which will address the sensitivity of the species in relation to NCMFR harvesting (Tables 11 to 18). A species identification sheet has been developed for each species with a brief description, biology, habitat and management practices which can be used to help identify the species in the field by forestry staff (Appendix 3 (Amphibians and Reptiles), Appendix 4 (Birds), Appendix 5 (Mammals), Appendix 6 (Molluscs), Appendix 7 (Plants)).

If any of the species on the Focus Lists are found, they should be documented with their locations recorded with a GPS point, a habitat description and a photo if possible. The sightings should then be reported to the BC Conservation Data Centre.

https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre/submit-data

Conservation Data Centre (CDC)
Office:
250-356-0928
Email:
cdcdata@gov.bc.ca

3.4.1 BMP- Amphibians and Reptiles

Field reference cards have been provided for Amphibians and Reptiles, including Turtles in Appendix 3. The following table provides a summary of key habitat features and recommended management practices for each species considered for the Focus List (Table 11).

- Western Toad (Figure 2)
- Wandering Salamander (Figure 3)
- Northern Red-legged Frog (figure 4)
- Sharp-tailed Snake (Figure 5)
- Western Painted Turtle (Pacific coast population) (Figure 6)

Table 11: BMPs for the NCMFR Focus List of Amphibians, Reptiles and Turtles

English Name	Scientific Name	Habitat	Management
Amphibians			
Northern Red-legged Frog	*Rana aurora*	Found in a wide variety of lowland aquatic habitats; adults spend the majority of the growing season on land and are most abundant in mature deciduous riparian forests with abundant woody debris.	Maintain buffers and connectivity around breeding wetlands.
Western Toad	*Anaxyrus boreas*	Breed in a wide variety of warm, shallow aquatic habitats, from ditches to lakes margins; toads inhabit a variety of habitats including forest, grassland, avalanche slopes and clear cuts.	Reduce road mortality during migrations. Maintain drainage into wetlands and small bodies of water.
Wandering Salamander	*Aneides vagrans*	Hides under fallen trees, under rocks, in crevices, under bark and in rotten wood; female lays a clutch of six to nine eggs in some concealed location such as under bark.	Leave CWD, especially near moist areas.
Reptiles			
Sharp-tailed Snake	*Contia tenuis*	Inhabits open Douglas fir/arbutus forests, usually on south facing rocky slopes, which likely provide both nesting and hibernation sites. Breed on rocky warm sites with vegetative cover.	Maintain shrub cover on rocky sites. Avoid road construction and equipment use if snakes are observed in area.
Western Painted Turtle (Pacific coast population)	*Chrysemys picta pop. 1*	Females dig nests on south facing slopes close to the water in May or June. The young hatch in late summer, but often overwinter in the nest. Egg-laying and nursery habitats are specific with respect to exposure (southern aspect), substrate type (dry and light soils with little vegetation cover), and distance from aquatic habitat (within 150 m). Requires warm, sparsely vegetated openings on well-drained soils for nesting. Vegetation cover hinders nest excavation and lowers soil temperatures for incubation, and plant roots can interfere with hatching	Reduce road mortality during migrations; maintain nesting grounds near permanent ponds and lakes.

3.4.2 BMP – Birds

Field reference cards have been provided for Birds in Appendix 4. The following table provides a summary of key habitat features and recommended management practices for each species considered for the Focus List (Table 12).

- Northern Goshawk (*laingi* subspecies) (Figure 7)
- Great Blue Heron (*fannini* subspecies) (Figure 8)
- Northern Pygmy-Owl (*swarthi* subspecies (Figure 9)
- Barn Swallow (Figure 10)
- Western Screech Owl (*kennicotti* subspecies) (Figure 11)
- Band-tailed Pigeon (Figure 12)
- Olive-sided flycatcher (Figure 13)
- Purple Martin (Figure 14)
- Peregrine Falcon (*anatum* subspecies) (Figure 15)
- Common Nighthawk (Figure 16)

Table 12: BMPs for the NCMFR Focus List of Birds

English Name	Scientific Name	COSEWIC	SARA	BC Status	Habitat	Management
Birds						
Peregrine Falcon (*anatum* subspecies)	*Falco peregrinus anatum*	Special Concern	Schedule 1	Red	Found on southern Vancouver Island, Gulf Islands and the southern interior of BC. Typically nest on rock cliffs above lakes or river valleys where abundant prey is nearby.	Maintain a buffer around cliff nest site and do not disturb during the breeding season.
Olive-sided flycatcher	*Contopus cooperi*	Threatened	Schedule 1	Blue	Will often breed in the same coniferous forest area. Nests are placed most often in conifers on horizontal limbs from two to 15 m from the ground. Favour semi-open habitats with standing dead trees, often around bogs or beaver ponds. Birds typically perch in snags.	Retain and protect nest until after the breeding season. Retain snags near riparian sites.
Common Nighthawk	*Chordeiles minor*	Threatened	Schedule 1	Yellow	Occurs in a wide variety of open habitats, including logged areas, openings, landings, roads, and fields. Lay their eggs on open gravel sites such as landings, openings in young seral, open fields.	Nests are not defined structures. Often just the eggs are noticed on the bare ground and/or a female deterring intruders with broken wing behavior. Retain and protect nest until after the breeding season.
Barn Swallow	*Hirundo rustica*	Threatened	None	Blue	Will nest under bridges and under eaves in buildings. Nests are mud/grass structures tucked up under a structure.	Retain and protect nest until after the breeding season.
Purple Martin	*Progne subis*	None	None	Blue	Nest in snags and nesting boxes near wetlands and estuaries.	Maintain snags and trees with cavities near wetlands
Great Blue Heron (*fannini* subspecies)	*Ardea herodias fannini*	Special Concern	Schedule 1	Blue	Nests are found in colonies or single structures in tall Sitka spruce, western red cedar, western hemlock, pine, red alder and black cottonwood. Found in mature forest within 8 km of foraging habitats such as rivers, wetlands, and eelgrass meadows	Maintain buffer around colony nesting trees or single nest tree during the breeding season. Avoid logging, blasting and road building within 200m during the sensitive nesting period from February 1st to June 30th,
Northern Goshawk (*laingi* subspecies)	*Accipiter gentilis laingi*	Threatened	Schedule 1	Red	Requires extensive areas of high, closed canopy forest with adequate space to fly between the trees to forage on prey. 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.. Nest trees tend to be one of the largest trees in the stand. March and April tend to be the most active months for goshawk courtship, territory re-establishment, nest building and egg laying; however, during mild winters, courtship is initiated in February and, at times, as early as January.	Maintain nest trees in large contiguous area that includes good forage and post fledgling habitat.
Western Screech Owl (kennicotti subspecies)	*Megascops kennicottii kennicottii*	Threatened	Schedule 1	Blue	Nests in cavities within large, old trees and is strongly associated with riparian areas. Western Screech-Owls nest in tree cavities, including those excavated by Pileated Woodpeckers and Northern Flickers ; they also readily use nest-boxes. British Columbia nests ranged from 1.2 to 12.2 m above ground; all nests reported were in trees >25 cm dbh.	Maintain snags and trees with cavities especially around riparian areas.
Band-tailed Pigeon	*Patagioenas fasciata*	Special Concern	Schedule 1	Blue	Favour mature forest with a berry-rich shrub understory. Band-tailed Pigeons require mineral sites where they drink mineralized water and ingest minerals encrusted on soils. Show strong fidelity to mineral sites; in some populations, almost all birds (99%) are thought to occur within 50 km of a mineral site. Mineral sites are likely the most sparsely distributed and vital habitat for Band-tailed Pigeons.	Retain and protect nest until after the breeding season.
Northern Pygmy-Owl, swarthi subspecies	*Glaucidium gnoma swarthi*	None	None	Blue	Secondary cavity nester, and is dependent upon woodpecker or natural cavities.	Maintain snags and trees with cavities.

3.4.3 MP – Mammals

Field reference cards have been provided for Mammals in Appendix 5. The individual species are listed below and a summary of their key habitat attributes and recommended management practices are included in Table 13.

- Townsend's Big-eared Bat (Figure 19)
- American Water Shrew, brooksi subspecies (Figure 17)
- Roosevelt Elk (Figure 18)
- Little Brown Myotis (Figure 20)

Table 13: BMPs for the NCMFR Focus List of Mammals

English Name	Scientific Name	COSEWIC	SARA	BC Status	Habitat	Management
Mammals						
Townsend's Big-eared Bat	*Corynorhinus townsendii*	None	None	Blue	Forages within 3 km of the daytime roosting site, which must be extremely dark. Caves, tree cavities and buildings are all used. Maternity colonies found in cave features on Mt Tzouhalem and possibly Mt Prevost.	Maintain buffers around cave features
American Water Shrew, brooksi subspecies	*Sorex palustris brooksi*	None	None	Red	Requires complex riparian habitat with overhanging vegetation, coarse woody debris and undercut banks.	Vancouver Island Common Water Shrews have been captured along riparian corridors in young forests (age classes 1 and 2) through to older forest (age class 7; Craig 2002). If the riparian corridor is harvested, then water shrews likely will not be present until the water quality and riparian zone recovers (likely structural stages 3–7). Maintain riparian habitat.
Roosevelt Elk	*Cervus elaphus roosevelti*	None	None	Blue	Require closed canopy older forests at lower elevations in winter; associated with slide tracks, lowland rich sites and riparian areas for forage.	Winter habitat is the most critical habitat requirement.
Little Brown Myotis	*Myotis lucifugus*	Endangered	Schedule 1 - E	Yellow	Use caves, rock crevices, cliffs and snags as natural roosts. Foraging occurs over water. Winter hibernation sites (caves, tunnels, abandoned mines, and similar sites) Maternity colonies are commonly in warm sites in buildings.	Maintain Wildlife Trees with cavities. Protect any caves and karst formations. No road construction around caves until area checked by a registered professional.

4.2.4 BMP – Molluscs

Field reference cards have been provided for Molluscs in Appendix 6. The following table provides a summary of key habitat features and recommended management practices for each species considered for the Focus List (Table 14).

- Dromedary Jumping-Slug (Figure 24)
- Blue-Grey Taildropper Slug (Figure 23)
- Oregon Forestsnail (Figure 21)
- Warty Jumping Slug (Figure 22)

Table 14: BMPs for the NCMFR Focus List of Molluscs

Molluscs			
Dromedary Jumping-Slug	*Hemphillia dromedarius*	Known from six sites on southern VI and five sites are within are remnant patches of old-growth forest. The sixth is in mature forest with abundant woody debris. Eggs are deposited in rotting wood. Closest ones found near Mt Brenton in OG remnant patch. In BC, this species is associated with older, coniferous forest and old-growth forest attributes. Important microhabitat features consist of abundant coarse woody debris, including large-diameter decaying logs, and shaded, moist forest floor conditions.	Maintain levels of CWD on the forest floor in moist sites.
Blue-Grey Taildropper Slug	*Prophysaon coeruleum*	Found on Mt Tzouhalem and other locations on southern VI. It inhabits moist, coniferous or mixed-wood forests of varying age classes All records from BC are from within the CDF biogeoclimatic zone; often associated with older forests and required microhabitat features include abundant coarse woody debris or other cover, a deep forest litter layer, and shaded, moist forest floor conditions.	Maintain levels of CWD on the forest floor in moist sites.
Oregon Forestsnail	*Allogona townsendiana*	Occupies a wide variety of habitats, but is most commonly found in broadleaf forests dominated by big-leaf maple and red alder with stinging nettle and sword fern in the understory. Other requirements are abundant leaf litter and large woody debris, which provide protection from extreme temperatures and drying during winter hibernation.	Maintain levels of CWD and leaf litter on the forest floor , Both living dying vegetation are important; these conditions help prevent the loss of moisture and extreme fluctuations in temperature that are thought to be particularly detrimental to hibernating snails.
Warty Jumping Slug	*Hemphillia glandulosa*	Inhabits a variety of moist forest and riparian habitats at low to middle elevations. Abundant woody debris and leaf litter are important for cover and the slugs are frequently encountered at the base of sword ferns. Closest ones found near Mt Brenton and Keating Lake. This species occupies moist forested habitats and riparian sites from low to middle elevations	Maintain levels of CWD on the forest floor in moist sites.

3.4.4 BMP – Plants

Field reference cards have been provided for Plants in Appendix 7. The following table provides a summary of key habitat features and recommended management practices for each species considered for the Focus List (Table 15).

- deltoid balsamroot (Figure 25)
- Macoun's meadow-foam (Figure 26)
- pine broomrape (Figure 28)
- purple sanicle (Figure 29)
- white-top aster (Figure 30)
- Howell's violet (Figure 31)
- fern-leaved desert-parsley (Figure 27)
- small-flowered tonella (Figure 32)
- Lindley's microseris (Figure 33)
- white-lip rein orchid (Figure 35)
- Howell's triteleia (Figure 34)

Plants: CWHxm1

Table 15: BMPs for the NCMFR Focus List of Plants in the CWHxm1

English Name	Scientific Name	Habitat Subtype	Management
DICOTS			
deltoid balsamroot	*Balsamorhiza deltoidea*	Rock/Sparsely Vegetated Rock;Grassland;Mixed Forest (deciduous/coniferous mix);Sand Dune;Beach;Garry Oak Woodland. Found in rocky, exposed areas containing Garry oak, or in open meadows near the ocean.	Most immediate threat is habitat destruction such as brushing and clearing.Known plants on Mount Tzouhalem. Do not pick plant and report sightings. Avoid the area where plant is found.
Macoun's meadow-foam	*Limnanthes macounii*	Meadow;Deciduous/Broadleaf Forest;Garry Oak Vernal Pool;Garry Oak Maritime Meadow Vernal pools, seepage areas on rocky slopes, wet depressions in open Douglas fir Garry Oak forests.	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Macoun's meadow-foam
pine broomrape	*Orobanche pinorum*	Conifer Forest - Mesic (average);Conifer Forest - Moist/wet Parasitic on coniferous species; moist to mesic sites in the lowland zone; rare on S Vancouver Island	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Pine Broomrape
purple sanicle	*Sanicle bipinnatifida*	Rock/Sparsely Vegetated Rock;Deciduous/Broadleaf Forest;Garry Oak Woodland;Garry Oak Maritime Meadow. Found in dry to mesic meadows and mesic, open, deciduous woodlands. Specimen found on SW slope of Mount Tzouhalem	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Purple Sanicle.
white-top aster	*Sericocarpus rigidus*	Rock/Sparsely Vegetated Rock;Meadow;Mixed Forest (deciduous/coniferous mix);Garry Oak Woodland Dry meadows, woodlands and rocky slopes in the lowland zone In North Cowichan found on Maple Mountain, Ecological Reserve on Mount Tzouhalem, Elkington Property on Quamichan Lake.	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for White-top aster.
Howell's violet	*Viola howellii*	Rock/Sparsely Vegetated Rock;Meadow;Conifer Forest - Moist/wet;Garry Oak Woodland Mesic to moist woodlands and forests in the lowland zone In North Cowichan found in Somenos Garry Oak Protected Area.	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Howell's violet.

Plants: CDFmm

Table 16: BMPs for the NCMFR Focus List of Plants (Dicots) in the CDFmm

Scientific Name	English Name	Habitat Subtype	Management
DICOTS			
Balsamorhiza deltoidea	deltoid balsamroot	Rock/Sparsely Vegetated Rock;Grassland;Mixed Forest (deciduous/coniferous mix);Sand Dune;Beach;Garry Oak Woodland. Found in rocky, exposed areas containing Garry oak, or in open meadows near the ocean.	Most immediate threat is habitat destruction such as brushing and clearing.Known plants on Mount Tzouhalem. Do not pick plant and report sightings. Avoid the area where plant is found.
Limnanthes macounii	Macoun's meadow-foam	Meadow;Deciduous/Broadleaf Forest;Garry Oak Vernal Pool;Garry Oak Maritime Meadow Vernal pools, seepage areas on rocky slopes, wet depressions in open Douglas fir Garry Oak forests.	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Macoun's meadow-foam
Lomatium dissectum var. *dissectum*	fern-leaved desert-parsley	Rock/Sparsely Vegetated Rock;Meadow;Grassland;Mixed Forest (deciduous/coniferous mix);Garry Oak Maritime Meadow Dry grasslands, shrublands, talus and rocky slopes in the steppe and montane zones	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Fern-leaved Desert-parsley
Orobanche pinorum	pine broomrape	Conifer Forest - Mesic (average);Conifer Forest - Moist/wet Parasitic on coniferous species; moist to mesic sites in the lowland zone; rare on S Vancouver Island	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Pine Broomrape.
Sanicula bipinnatifida	purple sanicle	Rock/Sparsely Vegetated Rock;Deciduous/Broadleaf Forest;Garry Oak Woodland;Garry Oak Maritime Meadow. Found in dry to mesic meadows and mesic, open, deciduous woodlands. Specimen found on SW slope of Mount Tzouhalem	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Purple Sanicle.
Sericocarpus rigidus	white-top aster	Rock/Sparsely Vegetated Rock;Meadow;Mixed Forest (deciduous/coniferous mix);Garry Oak Woodland Dry meadows, woodlands and rocky slopes in the lowland zone In North Cowichan found on Maple Mountain, Ecological Reserve on Mount Tzouhalem, Elkington Property on Quamichan Lake.	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for White-top aster.
Tonella tenella	small-flowered tonella	Vernal Pools/Seasonal Seeps;Rock/Sparsely Vegetated Rock;Talus;Conifer Forest - Dry; Garry Oak Woodland	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for small-flowered tonella
Uropappus lindleyi	Lindley's microseris	Cliff;Meadow;Deciduous/Broadleaf Forest; Conifer Forest - Dry; Garry Oak Coastal Bluffs. Occurs on sandstone cliffs, steep grassy slopes, and xeric, open deciduous or conifer forests on rocky slopes and cliffs). Grows on dry open forests dominated by Garry Oak and mixed woodland types with an overstory of Douglas fir, Arbutus, and Garry Oak on south- or southwest-facing, steep (70-90%), well-drained, gravelly or rocky slopes at low elevations (0-80 m) .	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Lindley's microseris.
Viola howellii	Howell's violet	Rock/Sparsely Vegetated Rock;Meadow;Conifer Forest - Moist/wet; Garry Oak Woodland Mesic to moist woodlands and forests in the lowland zone In North Cowichan found in Somenos Garry Oak Protected Area.	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Howell's violet.

Table 16: BMPs for the NCMFR Focus List of Plants (Monocots) in the CDFmm (continued)

Scientific Name	English Name	Habitat Subtype	Management
MONOCOTS			
Platanthera ephemerantha	white-lip rein orchid	Conifer Forest - Dry; Garry Oak Woodland Dry forests and forest margins in the lowland to montane zones; rare in coastal BC Documented on Saltspring Island and Saanich.	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for white-lip rein orchid.
Triteleia howellii	Howell's triteleia	Meadow; Deciduous/Broadleaf Forest; Conifer Forest - Dry; Garry Oak Woodland;Garry Oak Coastal Bluffs. In North Cowichan documented on the Cowichan River Estuary, Somenos Garry Oak Protected Area and the Elkington Property on Quamichan Lake. Grows in Garry oak stands, on deep, dark soils in rich understories.	Document location of occurrence, contact qualified professional to verify identification. Prevent direct mortality from road or stream crossing construction or maintenance activities. Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Howell's triteleia.

4.2.6 BMP – Ecological Communities

In Terrestrial Ecosystem Mapping (TEM) site series classifications are used, however, the CDC ecological communities are derived from the Ministry of Forests Vegetation Classification which describes plant associations. Plant associations are the basic unit of the vegetation classification hierarchy. Each unit is differentiated by a diagnostic combination of species. Tree species, or broad forest types, are emphasized at the upper levels of the hierarchy (classes/orders), and understory vegetation at the lower levels, however, floristic similarity is used to group units (BC Forest Service). Tables 17 and 18 list the Ecological Communities possible present within the NCMRF. The associated Biogeoclimatic Unit is listed beside each of the ecological communities and indicates where it is likely to be found within the CWHxm and CDF.

All the Ecological Communities listed in Tables 17 and 18 are provincially red-listed. Two of the Ecological Communities within the CDFmm, the Douglas-fir / dull Oregon-grape and Douglas-fir / Alaska oniongrass are listed as Identified Wildlife under FRPA (2004). The Accounts and Measures for Managing Identified Wildlife document (FRPA 2004) recommend that there should be no disturbance to all seral stages on Crown Land. However, there is no legal protection for ecological communities other than those communities found in protected areas. To refrain from harvesting/disturbing all seral stages is not practicable for forest operations within the NCMFR, which is private land.

Ecological Communities: CWHxm1

Table 17: BMPs for the NCMFR Focus List of Ecological Communities for the CWHxm1

English Name	Biogeoclimatic Units	Ecosystem Group	Ecosystem Description (Green and Klinka 1994)	Management
arbutus / hairy manzanita	CDFmm/00;CWHxm 1/00	Terrestrial - Forest: Broadleaf - dry	Typically found on the gentle upper slopes and ridge crests of bedrock hills on shallow, medium textured soils. Sites are predominately shedding and dry, colluvial veneers over bedrock. Soils are rubbly, very fine sands, rapidly to well drained. Characterized by dense shrub thickets of hairy manzanita with scattered arbutus and lodgepole pine.	All the Ecological Communities listed in this table are provincially red-listed. The Accounts and Measures for Managing Identified Wildlife document (FRPA 2004) recommend that there should be no disturbance to all seral stages. However, this is not practicable; therefore it is suggested that the following management recommendations only pertain to old-growth stands within the NCMF. - Reduce the spread of invasive species. - Maintain or enhance where possible old forest structure within stands such as large old vets, large snags, downed logs - Maintain some patches of interior forest conditions where possible. - Do not develop roads or trails. - Do not harvest or salvage except when required to create windfirm boundaries. - Do not harvest or salvage except when required to create windfirm boundaries. - Do not remove non-timber forest products. - Do not develop recreational sites, trails, or fa cavities. - Minimize impacts to vegetation, soils, and hydrology when operating adjacent to a WHA, particularly during adjacent road development and maintenance. - Reduce recreational use where possible (i.e., dirt bikes, mountain bikes, and other off-road vehicles). - Reduce fuel accumulations and shade-tolerant understorey vegetation through controlled pre-scribed fire (where practical), manual or mechanical removal, which may or may not be combined with piling and burning.
Douglas-fir - lodgepole pine / grey rock-moss	CWHxm1/02	Terrestrial - Forest: Coniferous - dry	Occurs on ridgecrests, hilltops and south-facing upper slopes, often on areas with shallow soils and exposed bedrock. Sites are rapidly to well drained, very dry and often nutrient poor.	
western redcedar / black twinberry	CWHdm/14;CWHx m1/14;CWHxm2/14	Terrestrial - Forest: Coniferous - moist/wet	Occurs on level areas subject to winter flooding due to very poor drainage. Parent materials are fine-textured marine deposits. Soils are mostly loams and are gleyed at 20 to 35 cm due to the fluctuating water table. Soils are wet in winter and moist in summer and have a medium to very rich nutrient regime. This long lived seral association has a canopy of red alder and a shrub layer of salmonberry), black twinberry, trailing blackberry, common snowberry, and thimbleberry). The herb layer is dominated by bracken fern, sword fern, and vanilla leaf. The expected climax community is a Thuja plicata (western red cedar) type.	
western redcedar / salmonberry	CWHdm/13;CWHx m1/13;CWHxm2/13	Terrestrial - Forest: Coniferous - moist/wet	Occurs on level areas subject to winter flooding due to poor drainage. At these sites, parent materials are generally fine-textured marine deposits. Soils are very moist in winter and fresh in summer and have a medium to very rich nutrient regime. Has an open canopy of red alder and western redcedar. The shrub layer is dominated by salmonberry with trailing blackberry and red huckleberry). The diverse herb layer is dominated by bracken fern, sword fern, and vanilla-leaf. The moss layer is sparse but *Kindbergia praelonga* (slender-beaked moss) and *Plagiomnium insigne* (coastal leafy moss) may be present.	
western hemlock - western redcedar / deer fern	CWHdm/06;CWHx m1/06;CWHxm2/06	Terrestrial - Forest: Coniferous - moist/wet	Overstory of western hemlock, western redcedar and some Douglas fir. Shrub layer dominated by salal, false azalea and red huckleberry. Herb layer is comprised of mainly sword fern.	

Ecological Communities: CDFmm

Table 18: BMPs for the NCMFR Focus List of Ecological Communities for the CDFmm

Scientific Name	English Name	Biogeoclimatic Units	Ecosystem Group	Ecosystem Description (Green and Klinka 1994)	Management
Ecological Communities					
Abies grandis / Mahonia nervosa	grand fir / dull Oregon-grape	CDFmm/04	Terrestrial - Forest: Coniferous - mesic	Occurs on all aspects of mid-slopes and is found on morainal and inactive colluvial materials. Soils are well drained, have a medium texture, are moderately dry , and have a rich to very rich nutrient regime. Mature and old stages of this ecological community are fairly closed coniferous forests of Douglas-fir, grand fir, and western redcedar. Western flowering dogwood, western yew, cascara and bigleaf maple may be present but with low cover. There is a dense shrub layer consisting of salal and dull Oregon-grape and baldhip rose, often with oceanspray), red huckleberry, and saskatoon. The herb layer is sparse	All the Ecological Communities listed in this table are provincially red-listed. The Accounts and Measures for Managing Identified Wildlife document (FRPA 2004) recommend that there should be no disturbance to all seral stages. However, this is not practicable; therefore it is suggested that the following management recommendations only pertain to old-growth stands within the NCMF. - Reduce the spread of invasive species. - Maintain or enhance where possible old forest structure within stands such as large old vets, large snags, downed logs - Maintain some patches of interior forest conditions where possible. - Do not develop roads or trails. - Do not harvest or salvage except when required to create windfirm boundaries. - Do not harvest or salvage except when required to create windfirm boundaries. - Do not remove non-timber forest products. - Do not develop recreational sites, trails, or fa cavities. - Minimize impacts to vegetation, soils, and hydrology when operating adjacent to a WHA, particularly during adjacent road development and maintenance. - Reduce recreational use where possible (i.e., dirt bikes, mountain bikes, and other off-road vehicles). - Reduce fuel accumulations and shade-tolerant understorey vegetation through controlled pre-scribed fire (where practical), manual or mechanical removal, which may or may not be combined with piling and burning.
Arbutus menziesii / Arctostaphylos columbiana	arbutus / hairy manzanita	CDFmm/00;CWHxm1/00	Terrestrial - Forest: Broadleaf - dry	Typically found on the gentle upper slopes and ridge crests of bedrock hills on shallow, medium textured soils. Sites are predominately shedding and dry, colluvial veneers over bedrock. Soils are rubbly, very fine sands, rapidly to well drained. Characterized by dense shrub thickets of hairy manzanita with scattered arbutus and lodgepole pine.	
Pseudotsuga menziesii - Arbutus menziesii	Douglas-fir - arbutus	CDFmm/02	Terrestrial - Forest: Coniferous - dry	Mixed woodland community is found primarily on hillsides and rocky knolls with dry, southern exposures. It is occasionally found on level ground with extremely well-drained, gravelly soils. The soil nutrient regime is very poor to medium. Douglas fir, Arbutus and some Garry Oak The well developed shrub layer consists of ocean spray, Snow berry, dull Oregon grape. Herbaceous layer also well developed, dominated by showy white fawn lily, shooting star, and many other herbaceous flowering plants.	
Pseudotsuga menziesii / Mahonia nervosa	Douglas-fir / dull Oregon-grape	CDFmm/01	Terrestrial - Forest: Coniferous - mesic	Found on mesic and slightly drier than mesic sites up to 380 m elevation (150 m, north of Duncan). These sites are usually on middle- to upper-slope positions with gentle topography, on all aspects. The soil nutrient regime is poor to medium. These forests usually have well-developed vertical structure, due to the presence of tall shrubs and trees of different age and height classes. Mature and old forests contain moderately open to closed stands typically dominated by Douglas-fir, with one or both of grand fir and western redcedar in the tree canopy. Bigleaf maple and red alder may be present. The moderate to dense shrub layer is dominated by dull Oregon-grape, salal and ocean spray. Young stands on similar sites in the adjacent CWHxm1 subzone can be completely dominated by salal, with few if any other shrubs or herbs present.	
Pseudotsuga menziesii / Melica subulata	Douglas-fir / Alaska oniongrass	CDFmm/03	Terrestrial - Forest: Coniferous - dry	Found on Mount Richards. 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. It is characterized by a moderately open canopy of Douglas fir with some interspersed Garry oak, especially in canopy gaps. Arbutus is occasionally present, but other conifer species are absent. The shrub layer is sparse to absent, and consists of hairy honeysuckle, common snowberry and tall Oregon-grape.	
Quercus garryana / Bromus carinatus	Garry oak / California brome	CDFmm/00	Terrestrial - Forest: Broadleaf - dry	Found n Mount Tzouhalem. Found primarily on hillsides and rocky knolls with dry, southern exposures and may have occurred more commonly on deep organic enriched soils where it was maintained by early fire management. It typically occurs in places where pockets of deeper loamy soils have formed in bedrock cracks or between large pieces of colluvium. It often forms a mosaic with the Garry oak / ocean spray ecological community, which occupies the drier and shallower micro-sites. Garry oak is the most abundant tree species and is occasionally overtopped by single older (> 100 years) Douglas-fir trees that have survived previous fires. Where undisturbed, snowberry is most frequently found in the shrub layer, but surrounding land uses and lack of ecosystem management has allowed Scotch broom to invade and disrupt the natural ecosystem structure and processes in this community.	
Quercus garryana / Holodiscus discolor	Garry oak / oceanspray	CDFmm/00	Terrestrial - Forest: Broadleaf - dry	Found on Mount Tzouhalem. Found primarily on hillsides and rocky knolls with dry, southern exposures. It typically occurs in places where thin layers of soil have formed over volcanic bedrock or blocky colluvium. The soil is prone to compaction and erosion caused by trampling, and this type of disturbance allows Scotch broom to invade. Garry oak is the most abundant tree species and often forms dense stands. Older (> 100 years) Douglas-fir that have survived previous fires may be sparsely distributed and may overtop the oaks. Scattered arbutus, grand fir, western yew, and cascara may be present. In relatively undisturbed sites, ocean spray and snowberry dominate a well-defined shrub layer.	
Thuja plicata / Symphoricarpos albus	western redcedar / common snowberry	CDFmm/07	Terrestrial - Flood: Flood (Highbench);Terrestrial - Forest: Mixed - moist/wet	This ecological community occurs on high bench riparian floodplains. A number of small and degraded occurrences have been mapped. There are no remaining occurrences with excellent or good ecological integrity. Significant loss and degradation has occurred in the past and numerous threat factors are ongoing. Dominated by Fd, Hw, Cw, dull Oregon grape and red huckleberry dominates the shrub layer.	

4.0 Recommendations

- The NCMFR list of Species at Risk, including all animals, plants and ecological communities should be reviewed annually and updated if necessary. The status of Species at Risk is regularly reviewed by both the provincial and federal governments. The present status of listed species can change depending on the results of further scientific research. A species or ecological community can also change based on the number of confirmed species sightings reported to the governing agencies.

- Species at Risk observed in the field should be verified by a qualified professional and reported to the provincial Conservation Data Centre.

- Species at Risk training should be undertaken annually with all forestry staff and field contractors.

- The Species at Risk Field Cards should be distributed to staff and contractors working in the field.

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APPENDIX 1: SARA Schedule 1 Species, provincial Red- and Blue-listed Species and Identified Wildlife Species (Endangered, Threatened, Special Concern) Potentially Present in the Municipality of North Cowichan from Species at Risk and Local Government: a Primer for BC. Stewardship Centre of British Columbia (Pearson and Healy 2012)

Appendix 1-1: Summary and Search Criteria (Stewardship Centre of BC)

Summary			
Species		**Status**	
Number of Species	141	BC Red List	51
Mammals	10	BC Blue List	84
Birds	21	Identified Wildlife	13
Reptiles	2	COSEWIC Endangered	22
Amphibians	3	COSEWIC Threatened	12
Fishes	3	COSEWIC Special Concern	20
Insects	16	SARA Schedule 1	47
Molluscs	14	Extirpated from BC	0
Vascular Plants	64	Extinct	0
Mosses	8		
Fungus	0		

Search Criteria		
Taxonomic Group	All	
Juridiction	All	
COSEWIC	All	
BC Status	Red,Blue,Yellow	
BC Wildlife Act	All	
Identified Wildlife	All	
SARA	All	
Management Category	All	
Habitat	All	
Regional District		**Cowichan Valley Regional District: North Cowichan**
Forest District	**South Island Forest District (DSI)**	
Please cite these pages as: Pearson, Mike and Healey, M.C.2012. Species at Risk and Local Government: a Primer for BC. Stewardship Centre of British Columbia, Courtenay BC.		
Authorship Acknowledgements Dis claimer		
Hosted by the Vancouver Community Network and the Community Mapping Network		

Appendix 1-2: Mammals (Stewardship Centre of BC)

Mammals						NC Focus
English Name	**Scientific Name**	**COSEWIC**	**SARA**	**BC Status**	**Habitat**	**List**
Grey Whale	*Eschrichtius robustus*	Special Concern	Schedule 1	Blue		NO
Steller Sea Lion	*Eumetopias jubatus*	Special Concern	Schedule 1	Blue		NO
Vancouver Island Marmot	*Marmota vancouverensis*	Endangered	Schedule 1	Red	sub alpine and alpine species, will relocate into logged areas	NO
Townsend's Big-eared Bat	*Corynorhinus townsendii*	None	None	Blue	forages within 3 km of the daytime roosting site, which must be extremely dark. Caves, tree cavities and buildings are all used	YES
Wolverine (vancouverensis subspecies)	*Gulo gulo vancouverensis*	Special Concern	None	Red		NO
American Water Shrew, brooksi subspecies	*Sorex palustris brooksi*	None	None	Red	requires complex riparian habitat with overhanging vegetation, coarse woody debris and undercut banks.	YES
Keen's Myotis (**now renamed as the Long-eared Myotis and considered not at Risk)**	*Myotis keenii*	Data Deficient	Schedule 3	Blue	requires mature low elevation coastal forests and riparian areas for foraging, humid caves for winter hibernation and tree cavities, rock faces and crevices for roosting and breeding	NO
Roosevelt Elk	*Cervus elaphus roosevelti*	None	None	Blue	require forested habitat for overwintering; associated with slide tracks, lowland rich sites and riparian areas for forage	YES
Ermine, Anguinae Subspecies	*Mustela erminea anguinae*	None	None	Blue		NO
Little Brown Myotis	*Myotis lucifugus*	Endangered	None	Yellow		YES

Appendix 1-3: Birds (Stewardship Centre of BC)

Birds						NC Focus
English Name	**Scientific Name**	**COSEWIC**	**SARA**	**BC Status**	**Habitat**	**List**
Peregrine Falcon (anatum subspecies)	*Falco peregrinus anatum*	Special Concern	Schedule 1	Red	nest on cliff ledges (or high rise buildings), often near wetlands; found in the interior of BC and have been introduced on the Gulf Islands; smaller than *pealei* subspecies	NO
Peregrine Falcon (pealei subspecies)	*Falco peregrinus pealei*	Special Concern	Schedule 1	Blue	breeds on the coastal islands and the adjacent mainland. Its center of abundance in this province is in the Queen Charlotte Islands; typically nests on ledges of rocky island cliffs, usually near seabird colonies	YES
Vesper Sparrow (*affinis* subspecies)	*Pooecetes gramineus affinis*	Endangered	Schedule 1	Red	prefer dry open areas with low, sparse vegetation. They nest on the ground between late April and mid-July	NO
Olive-sided flycatcher	*Contopus cooperi*	Threatened	Schedule 1	Blue	favour semi-open habitats with standing dead trees, often around bogs or beaver ponds. Birds typically perch in snags	YES
Common Nighthawk	*Chordeiles minor*	Threatened	Schedule 1	Yellow	occurs in a wide variety of open habitats, including urban areas, where it may nest on gravel-topped building roofs	YES
Barn Swallow	*Hirundo rustica*	Threatened	None	Blue		YES
Purple Martin	*Progne subis*	None	None	Blue		YES
Marbled Murrelet	*Brachyramphus marmoratus*	Threatened	Schedule 1	Blue	Nests on mossy platforms in older forests	YES
Great Blue Heron (fannini subspecies)	*Ardea herodias fannini*	Special Concern	Schedule 1	Blue	found in mature forest within 8 km of foraging habitats such as rivers, wetlands, and eelgrass meadows	YES
Barn Owl	*Tyto alba*	Threatened	Schedule 1	Blue	nest in cavities in trees, buildings or cliffs	NO
Green Heron	*Butorides virescens*	None	None	Blue		NO
Northern Goshawk (laingi subspecies)	*Accipiter gentilis laingi*	Threatened	Schedule 1	Red	requires extensive areas of high, closed canopy forest with adequate space to fly between the trees.	YES
Short-eared Owl	*Asio flammeus*	Special Concern	Schedule 1	Blue	inhabits extensive areas of open habitats including marshlands, estuaries, and grasslands	NO
Western Screech Owl (kennicotti subspecies)	*Megascops kennicottii kennicottii*	Threatened	Schedule 1	Blue	nests in cavities within large, old trees and is strongly associated with riparian areas	YES
Double-crested Cormorant	*Phalacrocorax auritus*	Not at Risk	None	Blue		NO
Band-tailed pigeon	*Patagioenas fasciata*	Special Concern	Schedule 1	Blue	favour mature forest with a berry-rich shrub understory	YES
Northern Pygmy-Owl, swarthi subspecies	*Glaucidium gnoma swarthi*	None	None	Blue	secondary cavity nester, and is dependent upon woodpecker or natural cavities	YES
Sooty Grouse	*Dendragapus fuliginosus*	None	None	Yellow	will nest in young seral plantations where there is an abundance of forage including berries	NO
Tufted Puffin	*Fratercula cirrhata*	None	None	Blue		NO
White-tailed Ptarmigan, Saxatilis Subspecies	*Lagopus leucura saxatilis*	None	None	Blue	found at subalpine and alpine habitats and will overwinter in conifers at higher elevations	YES
Cassin's Auklet	*Ptychoramphus aleuticus*	Special Concern	None	Blue		NO

Appendix 1-4: Reptiles and Amphibians (Stewardship Centre of BC)

Reptiles						NC Focus
English Name	**Scientific Name**	**COSEWIC**	**SARA**	**BC Status**	**Habitat**	**List**
Sharp-tailed Snake	*Contia tenuis*	Endangered	Schedule 1	Red	inhabits open Douglas fir/arbutus forests, usually on south facing rocky slopes, which likely provide both nesting and hibernation sites	YES
Western PaintedTurtle (Pacific coast population)	*Chrysemys picta pop. 1*	Endangered	Schedule 1	Red	Females dig nests on south facing slopes close to the water in May or June. The young hatch in late summer, but often overwinter in the nest	YES

Amphibians						NC Focus
English Name	**Scientific Name**	**COSEWIC**	**SARA**	**BC Status**	**Habitat**	**List**
Northern Red-legged Frog	*Rana aurora*	Special Concern	Schedule 1	Blue	found in a wide variety of lowland aquatic habitats; adults spend the majority of the growing season on land and are most abundant in mature deciduous riparian forests with abundant woody debris	YES
Western Toad	*Anaxyrus boreas*	Special Concern	Schedule 1	Yellow	breed in a wide variety of warm, shallow aquatic habitats, from ditches to lakes margins; toads inhabit a variety of habitats including forest, grassland, avalanche slopes and clear cuts	YES
Wandering Salamander	Aneides vagrans	Special Concern	None	Blue	hides under fallen trees, under rocks, in crevices, under bark and in rotten wood; female lays a clutch of six to nine eggs in some concealed location such as under bark	YES

Appendix 1-5: Fishes (Stewardship Centre of BC)

Fishes						NC Focus
English Name	**Scientific Name**	**COSEWIC**	**SARA**	**BC Status**	**Habitat**	**List**
Dolly Varden	*Salvelinus malma*	None	None	Yellow		NO
Coastal Cutthroat Trout	*Oncorhynchus clarkii clarkii*	None	None	Blue		NO

Appendix 1-6: Insects (Stewardship Centre of BC)

Insects						NC Focus
English Name	**Scientific Name**	**COSEWIC**	**SARA**	**BC Status**	**Habitat**	**List**
Dun Skipper	*Euphyes vestris*	Threatened	Schedule 1	Red	found in moist, open areas containing sedges, which are the larval food plan	NO
Greenish Blue, insulanus subspecies	*Plebejus saepiolus insulanus*	Endangered	Schedule 1	Red	usually found in riparian areas and meadows, including disturbed areas such as old roads or campgrounds.	NO
Monarch	*Danaus plexippus*	Special Concern	Schedule 1	Blue	Monarchs require milkweed (*Asclepius* sp.), the larval food plant, and wildflowers for nectar	NO
Beaverpond Baskettail	*Epitheca canis*	None	None	Blue		NO
Western Pondhawk	*Erythemis collocata*	None	None	Blue		NO
Autumn Meadowhawk	*Sympetrum vicinum*	None	None	Blue		NO
Blue Dasher	*Pachydiplax longipennis*	None	None	Blue		NO
Common Ringlet, insulana subspecies	*Coenonympha tullia insulana*	None	None	Red		NO
Western Pine Elfin, Sheltonensis Subspecies	*Callophrys eryphon sheltonensis*	None	None	Blue		NO
Moss' Elfin, Mossii Subspecies	*Callophrys mossii mossii*	None	None	Blue		NO
Common Woodnymph, Incana Subspecies	*Cercyonis pegala incana*	None	None	Red		NO
Propertius Duskywing	*Erynnis propertius*	None	None	Red		NO
Western Branded Skipper, oregonia subspecies	*Hesperia colorado oregonia*	Endangered	None	Red		NO
Boisduval's Blue, Blackmorei Subspecies	*Plebejus icarioides blackmorei*	None	None	Blue		NO
Zerene Fritillary, Bremnerii Subspecies	*Speyeria zerene bremnerii*	None	None	Red		NO
Clodius Parnassian, claudianus subspecies	*Parnassius clodius claudianus*	None	None	Blue		NO

Appendix 1-7: Molluscs (Stewardship Centre of BC)

Molluscs						NC Focus
English Name	**Scientific Name**	**COSEWIC**	**SARA**	**BC Status**	**Habitat**	**List**
Dromedary Jumping-slug	*Hemphillia dromedarius*	Threatened	Schedule 1	Red	Documented from six sites on southern VI and five sites are within remnant patches of old-growth forest. The sixth is in mature forest with abundant woody debris. Eggs are deposited in rotting wood. Closest ones to NCMF found near Mt Brenton in OG remnant patch. In BC, this species is associated with older, coniferous forest and old-growth forest attributes. Important microhabitat features consist of abundant coarse woody debris, including large-diameter decaying logs, and shaded, moist forest floor conditions.	YES
Blue-Grey Taildropper Slug	*Prophysaon coeruleum*	Endangered	Schedule 1	Red	Found on Mt Tzouhalem and other locations on southern VI. It inhabits moist, coniferous or mixed-wood forests of varying age classes All records from BC are from within the CDF biogeoclimatic zone; often associated with older forests. Required microhabitat features include abundant coarse woody debris or other cover, a deep forest litter layer, and shaded, moist forest floor conditions.	YES
Oregon Forestsnail	*Allogona townsendiana*	Endangered	Schedule 1	Red	Occupies a wide variety of habitats, but is most commonly found in broadleaf forests dominated by big-leaf maple and red alder with stinging nettle and sword fern in the understory.	YES
Warty Jumping-slug	*Hemphillia glandulosa*	Special Concern	Schedule 1	Blue	Inhabits a variety of moist forest and riparian habitats at low to middle elevations. Abundant woody debris and leaf litter are important for cover and the slugs are frequently encountered at the base of sword ferns.	YES

Appendix 1-8: Vascular Plants (Stewardship Centre of BC)

Vascular Plants						NC Focus
English Name	**Scientific Name**	**COSEWIC**	**SARA**	**BC Status**	**Habitat**	**List**
Scouler's Catchfly	*Silene scouleri ssp. grandis*	Endangered	Schedule 1	Red	confined to three small islands near Victoria	NO
Dense Spike-primrose	*Epilobium densiflorum*	Endangered	Schedule 1	Red	grows in open meadows and seeps close to the ocean	NO
Pink Sand-verbena	*Abronia umbellata var. breviflora*	Endangered	Schedule 1	Red	occurs on the upper areas of sand beaches just below the driftwood zone.	NO
Prairie Lupine	*Lupinus lepidus*	Endangered	Schedule 1	Red	inhabits very dry exposed sites with nutrient-poor soils, including recently disturbed areas.	NO
Purple Sanicle	*Sanicula bipinnatifida*	Threatened	Schedule 1	Red	dry meadows and on eroding coastal bluffs	YES
White Meconella	*Meconella oregana*	Endangered	Schedule 1	Red	five sites on VI and the Gulf Islands; plants grow on open, south-facing slopes, with shallow soils wetted by seepage in spring	NO
Bog Bird's-foot Trefoil	*Hosackia pinnata*	Endangered	Schedule 1	Red	occurs in moist open meadows, stream banks, and seepages	NO
Howell's Triteleia	*Triteleia howellii*	Endangered	Schedule 1	Red	occurs on rock outcrops in Garry oak meadows and highly disturbed sites dominated by introduced weeds.	NO
Macoun's Meadowfoam	*Limnanthes macounii*	Threatened	Schedule 1	Red	occurs close to the ocean in open Garry oak or Douglas fir forest on sites that are wet or flooded during winter and spring	YES
Tall Woolly-heads	*Psilocarphus elatior*	Endangered	Schedule 1	Red	found in the dried beds of vernal pools and other moist sites in open forest	NO
Vancouver Island Beggarticks	*Bidens amplissima*	Special Concern	Schedule 1	Blue	found in shallow shoreline areas of ponds, lake margins, bogs and in intertidal zones	NO
Alpine Anemone	*Anemone drummondii var. drummondii*	None	None	Blue		NO
Green-fruited Sedge	*Carex interrupta*	None	None	Red		NO
California-tea	*Rupertia physodes*	None	None	Blue		NO
Scalepod	*Idahoa scapigera*	None	None	Red		NO
Spring Hornwort	*Ceratophyllum echinatum*	None	None	Blue		NO
Slender-spiked Mannagrass	*Glyceria leptostachya*	None	None	Blue		NO
Snow Bramble	*Rubus nivalis*	None	None	Blue		NO
Henderson's Checker-mallow	*Sidalcea hendersonii*	None	None	Blue		NO
Washington Springbeauty	*Claytonia washingtoniana*	None	None	Red		NO
Heterocodon	*Heterocodon rariflorum*	None	None	Blue		NO
Needle-leaved Navarretia	*Navarretia intertexta*	None	None	Red		NO
Poison Oak	*Toxicodendron diversilobum*	None	None	Blue		NO
Deltoid Balsamroot	*Balsamorhiza deltoidea*	Endangered	Schedule 1	Red	found in dry, open sites along the coast, often with Garry Oak	YES
Yellow Montane Violet	*Viola praemorsa ssp. praemorsa*	Endangered	Schedule 1	Red	occurs on steep rocky slopes under Garry oak trees and on open grasslands	NO
Lindley's Microseris	*Uropappus lindleyi*	Endangered	Schedule 1	Red	plant occurs on grassy, rocky bluffs	NO
Nodding Semaphoregrass	*Pleuropogon refractus*	None	None	Blue		NO
Nuttall's Quillwort	*Isoetes nuttallii*	None	None	Blue		NO
Leafy Mitrewort	*Mitellastra caulescens*	None	None	Blue		NO
White-top Aster	*Sericocarpus rigidus*	Special Concern	Schedule 1	Red	grows on dry, shallow soils with little shade in gently rolling, grassy meadows, often with Garry Oak	YES
California Hedge-parsley	*Yabea microcarpa*	None	None	Blue		NO
Fern-leaved Desert-parsley	*Lomatium dissectum var. dissectum*	None	None	Red		NO
Oregon Ash	*Fraxinus latifolia*	None	None	Red		NO
Pine Broomrape	*Orobanche pinorum*	None	None	Red		YES
Small-flowered Godetia	*Clarkia purpurea ssp. quadrivulnera*	Candidate for Listing	None	Red		NO
Yellow Sand-verbena	*Abronia latifolia*	None	None	Blue		NO
Pacific Vertigo	*Vertigo andrusiana*	None	None	Red		NO

Appendix 1-8: Vascular Plants (Stewardship Centre of BC)

Vascular Plants						NC Focus
English Name	**Scientific Name**	**COSEWIC**	**SARA**	**BC Status**	**Habitat**	**List**
Slimleaf Onion	*Allium amplectens*	None	None	Blue		NO
Olympic Onion	*Allium crenulatum*	None	None	Red		NO
Beach Bindweed	*Calystegia soldanella*	None	None	Blue		NO
Green-sheathed Sedge	*Carex feta*	None	None	Blue		NO
Scouler's Corydalis	*Corydalis scouleri*	Not at Risk	None	Yellow		NO
Erect Pygmyweed	*Crassula connata var. connata*	Candidate for Listing	None	Red		NO
Awned Cyperus	*Cyperus squarrosus*	None	None	Blue		NO
Sand-dwelling Wallflower	*Erysimum arenicola var. torulosum*	None	None	Blue		NO
Olympic Mountain Aster	*Eucephalus paucicapitatus*	None	None	Blue		NO
Common Bluecup	*Githopsis specularioides*	None	None	Red		NO
American Glehnia	*Glehnia littoralis ssp. leiocarpa*	None	None	Blue		NO
Seaside Juniper	*Juniperus maritima*	None	None	Blue		NO
Water Marigold	*Megalodonta beckii*	None	None	Blue		NO
Tooth-leaved Monkey-flower	*Mimulus dentatus*	None	None	Blue		NO
Waterwort Water-milfoil	*Myriophyllum quitense*	None	None	Blue		NO
Mountain Owl-clover	*Orthocarpus imbricatus*	None	None	Red		NO
Macoun's Groundsel	*Packera macounii*	None	None	Blue		NO
White-lip Rein Orchid	*Piperia candida*	None	None	Red		NO
Black Knotweed	*Polygonum paronychia*	None	None	Blue		NO
Smith's Fairybells	*Prosartes smithii*	None	None	Blue		NO
Slender Woolly-heads	*Psilocarphus tenellus*	Not at Risk	None	Yellow		NO
Dwarf Bramble	*Rubus lasiococcus*	None	None	Blue		NO
Scouler's Campion	*Silene scouleri ssp. scouleri*	Endangered	Schedule 1	Red	grows along seashores in dry meadows and rocky bluffs. It is largely found within 30 m of the shoreline or within Garry Oak meadows at higher elevations	NO
Cup Clover	*Trifolium cyathiferum*	None	None	Red		NO
Ochroleucous Bladderwort	*Utricularia ochroleuca*	None	None	Blue		NO
Howell's Violet	*Viola howellii*	None	None	Blue		YES
Giant Chain Fern	*Woodwardia fimbriata*	None	None	Blue		NO

Appendix 1-9: Mosses (Stewardship Centre of BC)

Mosses						NC Focus
English Name	**Scientific Name**	**COSEWIC**	**SARA**	**BC Status**	**Habitat**	**List**
Banded Cord Moss	*Entosthodon fascicularis*	Special Concern	Schedule 1	Blue		NO
Twisted Oak Moss	*Syntrichia laevipila*	Special Concern	Schedule 1	Blue		NO
Lacks a Common Name	*Rosulabryum erythroloma*	None	None	Blue		NO
Lacks a Common Name	*Ditrichum schimperi*	None	None	Blue		NO
Lacks a Common Name	*Funaria muhlenbergii*	None	None	Blue		NO
Lacks a Common Name	*Platyhypnidium riparioides*	None	None	Blue		NO
Lacks a Common Name	*Pleuroziopsis ruthenica*	None	None	Blue		NO
Lacks a Common Name	*Ptychomitrium gardneri*	None	None	Blue		NO

APPENDIX 2: Species at Risk Potentially Present in the Municipality of North Cowichan from BC Species and Ecosystems Explorer Conservation Data Centre (CDC) (CDC 2017)

Appendix 2-1: Search Criteria (Conservation Data Centre)

Search Criteria

Search Type: Plants &
Animals
AND BC Conservation Status:Red (Extirpated, Endangered, or Threatened) OR Blue (Special Concern) OR Yellow (Not at Risk)
AND Regional Districts: Cowichan Valley (CVRD) (Restricted to Red, Blue, and Legally designated species)
AND Habitat Types: Forest,Riparian,Stream/River,Wetland (Restricted to Red, Blue, and Legally designated species)
AND BGC Zone:CDF, CWH
Sort Order:Scientific Name Ascending
Open Government License– BC

Appendix 2-2: Amphibians and Reptiles (Conservation Data Centre)

Scientific Name	English Name	BC List	Identified Wildlife	Habitat Subtype	North Cowichan Forestry Focus Animal SAR List	Species Habitat Needs	Management Requirements
AMPHIBIAN							
Anaxyrus boreas	Western Toad	Blue		Bog;Fen;Swamp;Marsh;Riparian Forest; Riparian Shrub; Stream/River;Lake;Meadow;Grassland;Deciduous/Broadleaf Forest; Conifer Forest - Mesic	YES	Breed in Ponds; Wetlands, riparian habitat, upland areas	Reduce road mortality during migrations
Aneides vagrans	Wandering Salamander	Blue		Riparian Forest;Talus;Shrub - Natural; Conifer Forest - Moist/wet; Shrub - Logged	YES	Terrestrial; Coarse Woody Debris (CWD), moist sites	Leave CWD, especially near moist areas
Rana aurora	Northern Red-legged Frog	Blue	Y (May 2004)	Bog;Fen;Swamp;Marsh;Riparian Forest; Riparian Shrub;	YES	Ponds and wetlands for breeding.	maintain buffers and connectivity around breeding wetlands
REPTILES							
Contia tenuis	Sharp-tailed Snake	Red		Caves;Sub-soil;Rock/Sparsely Vegetated Rock;Talus;Meadow;Conifer Forest - Dry; Garry Oak	YES	Breed on rocky warm sites with vegetative cover	maintain shrub cover on rocky sites

Appendix 2-3: Birds (Conservation Data Centre)

Scientific Name	English Name	BC List	Identified Wildlife	Habitat Subtype	North Cowichan Forestry Focus Animal SAR List	Species Habitat Needs	Management Requirements
BIRDS							
Chordeiles minor	Common Nighthawk	Yellow		Bog;Fen;Swamp;Marsh;Stream/River;Lake;Pasture/Old Field; Cultivated Field;Hedgerow;Cliff;Rock/Sparsely Vegetated Rock;Talus;Meadow;Grassland;Sagebrush Steppe; Deciduous/Broadleaf Forest; Conifer Forest - Mesic (average);Conifer Forest - Dry; Conifer Forest - Moist/wet; Mixed Forest (deciduous/coniferous mix);Urban/Suburban; Pond/Open Water; Antelope-brush Steppe; Gravel Bar	YES	yellow-listed	
Coccothraustes vespertinus	Evening Grosbeak	Yellow		Riparian Forest; Deciduous/Broadleaf Forest; Conifer Forest - Mesic (average);Conifer Forest - Dry; Conifer Forest - Moist/wet; Mixed Forest (deciduous/coniferous mix);Urban/Suburban	NO	yellow-listed	
Accipiter gentilis laingi	Northern Goshawk, *laingi* subspecies	Red	Y (May 2004)	Estuary; Riparian Forest; Pasture/Old Field; Cultivated Field;Hedgerow;Meadow;Conifer Forest - Mesic (average);Conifer Forest - Dry; Conifer Forest - Moist/wet; Mixed Forest (deciduous/coniferous mix);Krummholz	YES	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 (McLaren 1999). Nest trees tend to be one of the largest trees in the stand. March and April tend to be the most active months for goshawk courtship, territory re-establishment, nest building and egg laying; however, during mild winters, courtship is initiated in February and, at times, as early as January	Maintain nest trees in large contiguous area that includes good forage and post fledgling habitat.
Falco peregrinus anatum	Peregrine Falcon, *anatum* subspecies	Red		Bog;Fen;Swamp;Marsh;Alkali Ponds/Salt Flats; Stream/River;Lake;Pasture/Old Field; Cultivated Field;Hedgerow;Cliff;Rock/Sparsely Vegetated Rock;Talus;Meadow;Grassland;Shrub - Natural; Sagebrush Steppe;Beach;Urban/Suburban; Pond/Open Water; Riparian Herbaceous; Antelope-brush Steppe; Gravel Bar	YES	Anatum Peregrine Falcons typically nest on rock cliffs above lakes or river valleys where abundant prey is nearby.	
Sialia mexicana pop. 1	Western Bluebird (Georgia Depression population)	Red		Pasture/Old Field; Cultivated Field;Hedgerow;Meadow;Grassland;Deciduous/Broadleaf Forest; Conifer Forest - Mesic (average);Conifer Forest - Dry; Mixed Forest (deciduous/coniferous mix);Urban/Suburban; Garry Oak Woodland	YES	Bluebirds inhabit open woodlands, grasslands, riparian areas, and agricultural lands and sometimes foraged in beach and intertidal areas along the coast. They feed on a variety of invertebrates and on berries and fruits in season and nest in cavities, the absence of which often limit populations. The birds were relatively common, during summers, and bred regularly in the Fraser Valley and southern Vancouver Island from the late 1800s through the 1950s, when numbers began to decline swiftly	Conservation efforts in North Cowichan are bring back the Western Bluebird. Maintain snags.

Scientific Name	English Name	BC List	Identified Wildlife	Habitat Subtype	North Cowichan Forestry Focus Animal SAR List	Species Habitat Needs	Management Requirements
Tyto alba	Barn Owl	Red		Marsh;Riparian Forest;Riparian Shrub;Pasture/Old Field;Cultivated Field;Hedgerow;Meadow;Grassland;Sagebrush Steppe;Mixed Forest (deciduous/coniferous mix);Urban/Suburban;Riparian Herbaceous;Antelope-brush Steppe;Gravel Bar	NO		
Ardea herodias fannini	Great Blue Heron, *fannini* subspecies	Blue	Y (May 2004)	Estuary;Swamp;Marsh;Vernal Pools/Seasonal Seeps;Riparian Forest;Lake;Pasture/Old Field;Cultivated Field;Hedgerow;Intertidal Marine;Meadow;Deciduous/Broadleaf forest; Conifer Forest - Mesic (average);Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix);Marine Island;Beach;Urban/Suburban;Pond/Open Water;Reefs;Eelgrass Beds;Riparian Herbaceous;Mudflats - Intertidal;Sheltered Waters - Marine	YES	Nests colonially in tall Sitka spruce, western red cedar, western hemlock, pine, red alder and black cottonwood (Campbell et al. 1990).	Maintain buffer around colony nesting trees or single nest tree
Asio flammeus	Short-eared Owl	Blue	Y (May 2004)	Estuary;Marsh;Pasture/Old Field;Cultivated Field;Hedgerow;Meadow;Grassland;Urban/Suburban;Pond/Open Water;Riparian Herbaceous;Alpine/Subalpine Meadow;Alpine Grassland	NO	Short-eared Owls have been documented using newly cleared forests. Nests are usually situated on a raised, dry site within low, concealing vegetation.	
Brachyramphus marmoratus	Marbled Murrelet	Blue	Y (May 2004)	Kelp Bed;Riparian Forest;Stream/River;Lake;Rock/Sparsely Vegetated Rock;Conifer Forest - Mesic (average);Conifer Forest - Moist/wet;Subtidal Marine;Sheltered Waters - Marine	NO	Will nest on mossy platforms of older trees	managed at a landscape level through WHAs
Butorides virescens	Green Heron	Blue		Estuary;Swamp;Marsh;Riparian Forest;Riparian Shrub;Stream/River;Lake;Urban/Suburban;Pond/Open Water;Riparian Herbaceous	NO	nests in riparian habitat of marshes and wetlands	
Contopus cooperi	Olive-sided Flycatcher	Blue		Bog;Fen;Swamp;Riparian Forest;Conifer Forest - Mesic (average);Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix);Pond/Open Water	YES	Will often breed in same coniferous forest area. Nests are placed most often in conifers on horizontal limbs from two to 15 m from the ground.	Retain and protect nest until after the breeding season

Scientific Name	English Name	BC List	Identified Wildlife	Habitat Subtype	North Cowichan Forestry Focus Animal SAR List	Species Habitat Needs	Management Requirements
Cypseloides niger	Black Swift	Blue		Bog;Fen;Swamp;Marsh;Stream/River;Lake;Cliff;Pond/Open Water	NO		
Falco peregrinus pealei	Peregrine Falcon, ***pealei*** subspecies	Blue		Estuary;Marsh;Stream/River;Lake;Pasture/Old Field;Cultivated Field;Hedgerow;Cliff;Rock/Sparsely Vegetated Rock;Intertidal Marine;Meadow;Marine Island;Beach;Urban/Suburban;Pond/Open Water;Riparian Herbaceous;Gravel Bar;Mudflats - Intertidal;Sheltered Waters - Marine	NO		
Glaucidium gnoma swarthi	Northern Pygmy-Owl, ***swarthi*** subspecies	Blue	Y (Jun 2006)	Bog;Fen;Swamp;Marsh;Riparian Forest;Pasture/Old Field;Cultivated Field;Hedgerow;Meadow;Shrub - Natural;Deciduous/Broadleaf Forest;Conifer Forest - Mesic (average);Conifer Forest - Dry;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix);Krummholtz;Urban/Suburban	YES	It is most frequently encountered along forest edges or in disturbed areas.	Retain and protect nest until after the breeding season
Hirundo rustica	Barn Swallow	Blue		Estuary;Bog;Fen;Swamp;Marsh;Riparian Forest;Riparian Shrub;Stream/River;Lake;Pasture/Old Field;Cultivated Field;Hedgerow;Meadow;Grassland;Shrub - Natural;Sagebrush Steppe;Deciduous/Broadleaf Forest;Conifer Forest - Mesic (average);Conifer Forest - Dry;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix);Urban/Suburban;Pond/Open Water;Riparian Herbaceous;Antelope-brush Steppe;Gravel Bar;Shrub - Logged;Industrial	YES	Will use buildings and bridges for construction of nests	Retain and protect nest until after the breeding season
Megascops kennicottii kennicottii	Western Screech-Owl, ***kennicottii*** subspecies	Blue		Riparian Forest;Pasture/Old Field;Hedgerow;Conifer Forest - Mesic (average);Conifer Forest - Dry;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix);Urban/Suburban	YES	Western Screech-Owls nest in tree cavities, including those excavated by Pileated Woodpeckers (Dryocopus pileatus) and Northern Flickers (Colaptes auratus); they also readily use nest-boxes. British Columbia nests ranged from 1.2 to 12.2 m above ground; all nests reported were in trees >25 cm dbh.	Retain and protect nest until after the breeding season
Patagioenas fasciata	Band-tailed Pigeon	Blue		Riparian Forest;Pasture/Old Field;Cultivated Field;Deciduous/Broadleaf Forest;Conifer Forest - Mesic (average);Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix);Hot Spring;Urban/Suburban;Warm Spring;Cold Spring	YES	Band-tailed Pigeons require mineral sites where they drink mineralized water and ingest minerals encrusted on soils.Band-tailed Pigeons show strong fidelity to mineral sites; in some populations, almost all birds (99%) are thought to occur within 50 km of a mineral site. Mineral sites are likely the most sparsely distributed and vital habitat for Band-tailed Pigeons (COSEWIC 2008).	If observed protect mineral site
Phalacrocorax auritus	Double-crested Cormorant	Blue		Estuary;Stream/River;Lake;Cliff;Rock/Sparsely Vegetated Rock;Intertidal Marine;Conifer Forest - Mesic (average);Subtidal Marine;Marine Island;Urban/Suburban;Sheltered Waters - Marine	NO	Not found on forest lands; could be present near booming ground and dryland sorts	
Progne subis	Purple Martin	Blue		Estuary;Bog;Fen;Swamp;Marsh;Riparian Forest;Stream/River;Pasture/Old Field;Cultivated Field;Hedgerow;Deciduous/Broadleaf Forest;Conifer Forest - Mesic (average);Conifer Forest - Dry;Conifer Forest - Moist/wet;Urban/Suburban;Sheltered Waters - Marine	YES	Nest in snags and nesting boxes near wetlands and estuaries	maintain snages near wetlands

Appendix 2-4: Mammals (Conservation Data Centre)

Scientific Name	English Name	BC List	Identified Wildlife	Habitat Subtype	North Cowichan Forestry Focus Animal SAR List	Species Habitat Needs	Management Requirements
MAMMALS							
Gulo gulo vancouverensis	Wolverine, *vancouverensis* subspecies	Red	Y (May 2004)	Estuary;Bog;Fen;Swamp;Marsh;Stream/River;Cliff;Rock/ Sparsely Vegetated Rock;Talus;Avalanche Track;Meadow;Grassland;Shrub - Natural;Deciduous/Broadleaf Forest;Conifer Forest - Mesic (average);Conifer Forest - Dry;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix);Alpine/Subalpine Meadow;Alpine Grassland	NO	Subalpine and alpine species. Not observed on VI for many years.	
Sorex palustris brooksi	American Water Shrew, *brooksi* subspecies	Red	Y (Jun 2006)	Bog;Fen;Swamp;Marsh;Riparian Forest;Riparian Shrub;Stream/River;Riparian Herbaceous;Gravel Bar	YES	Vancouver Island Common Water Shrews have been captured along riparian corridors in young forests (age classes 1 and 2) through to older forest (age class 7; Craig 2002). If the riparian corridor is harvested, then water shrews likely will not be present until the water quality and riparian zone recovers (likely structural stages 3–7).	Urban development and forestry practices occurring within riparian habitats throughout Vancouver Island are undoubtedly degrading and reducing the amount of preferred habitat
Cervus elaphus roosevelti	Roosevelt Elk	Blue		Estuary;Bog;Fen;Swamp;Marsh;Riparian Forest;Riparian Shrub;Lake;Pasture/Old Field;Cultivated Field;Hedgerow;Avalanche Track;Meadow;Grassland;Shrub - Natural;Deciduous/Broadleaf Forest;Conifer Forest - Mesic (average);Conifer Forest - Dry;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix);Pond/Open Water;Riparian Herbaceous;Gravel Bar;Shrub - Logged;Alpine/Subalpine Meadow;Alpine Grassland	YES	Require closed canopy older forests at lower elevations in winter.	Winter habitat is the most critical habitat requirement.
Corynorhinus townsendii	Townsend's Big-eared Bat	Blue		Riparian Forest;Caves;Grassland;Shrub - Natural;Deciduous/Broadleaf Forest;Conifer Forest - Mesic (average);Conifer Forest - Dry;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix);Urban/Suburban;Shrub - Logged;Industrial	YES	Maternity colonies found in cave features on Mt Tzouhalem and possibly Mt Prevost	Maintain buffers around cave features

Scientific Name	English Name	BC List	Identified Wildlife	Habitat Subtype	North Cowichan Forestry Focus Animal SAR List	Species Habitat Needs	Management Requirements
Mustela erminea anguinae	Ermine, *anguinae* subspecies	Blue		Riparian Forest;Riparian Shrub;Pasture/Old Field;Cultivated Field;Hedgerow;Talus;Tundra;Meadow;Shrub - Natural;Conifer Forest - Mesic (average);Conifer Forest - Dry;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix);Krummholtz;Riparian Herbaceous;Gravel Bar	NO	A variety of forest and woodland habitats	Maintain CWD
Myotis keenii	Keen's Myotis	Blue	Y (May 2004)	Riparian Forest;Caves;Cliff;Rock/Sparsely Vegetated Rock;Talus;Conifer Forest - Mesic (average);Conifer Forest - Moist/wet;Hot Spring;Urban/Suburban;Industrial	YES	Across the range it has been found roosting in southwest-facing rock crevices, among geothermally heated rocks, in tree cavities, in bark crevices, and in buildings. Tree cavities and loose bark are important natural roost sites and may be limiting in some parts of the range. Known maternity roosts and summer feeding areas in British Columbia are at elevations below 240 meters; known hibernation sites occur above 400 meters in caves over 100 meters long (British Columbia Ministry of Water, Land and Air Protection 2004). These bats have been observed foraging over hot spring pools and clearings above scrubby salal .	Maintain Wildlife Trees with cavities. Protect any caves and karst formations. No road construction around caves until area checked by a registered prefessional.

Appendix 2-5: Turtles and Bivalves (Conservation Data Centre)

Scientific Name	English Name	BC List	Identified Wildlife	Habitat Subtype	North Cowichan Forestry Focus Animal SAR List	Species Habitat Needs	Management Requirements
TURTLES							
Chrysemys picta pop. 1	Painted Turtle - Pacific Coast Population	Red		Bog;Fen;Swamp;Marsh;Riparian Forest;Riparian Shrub;Lake;Urban/Suburban;Pond/Open Water;Riparian Herbaceous;Gravel Bar;Industrial	YES	Its egg-laying and nursery habitats are specific with respect to exposure (southern aspect), substrate type (dry and light soils with little vegetation cover), and distance from aquatic habitat (within 150 m). requires warm, sparsely vegetated openings on well-drained soils for nesting. Vegetation cover hinders nest excavation and lowers soil temperatures for incubation, and plant roots can interfere with hatching	Reduce road mortality during migrations; maintain nestring grounds near permanent ponds and lakes
BIVALVE							
Musculium partumeium	Swamp Fingernailclam	Blue		Vernal Pools/Seasonal Seeps;Stream/River;Lake;Pond/Open Water	NO	Most common in ponds and swamps with muddy bottoms and in small lakes and eddies of rivers among organic detritus. Also common in temporary ponds. Only two specimens documented.	

Appendix 2-6: Gastropods (Conservation Data Centre)

Scientific Name	English Name	BC List	Identified Wildlife	Habitat Subtype	North Cowichan Forestry Focus Animal SAR List	Species Habitat Needs	Management Requirements
GASTROPODS							
Hemphillia dromedarius	Dromedary Jumping-slug	Red		Conifer Forest - Moist/wet	NO	Closest ones found near Mt Brenton in OG remnant patch. In BC, this species is associated with older, coniferous forest and old-growth forest attributes (COSEWIC 2003a). Important microhabitat features consist of abundant coarse woody debris, including large-diameter decaying logs, and shaded, moist forest floor conditions.	Maintain levels oif CWD on the forest floor in moist sites
Hemphillia glandulosa	Warty Jumping-slug	Red		Riparian Forest;Deciduous/Broadleaf Forest;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix)	NO	Closest ones found near Mt Brenton and Keating Lake. This species occupies moist forested habitats and riparian sites from low to middle elevations	Maintain levels oif CWD on the forest floor in moist sites
Carychium occidentale	Western Thorn	Blue		Mixed Forest (deciduous/coniferous mix)	NO	In low elevation forests in rich, relatively undisturbed leaf litter; usually dominated by Bigleaf maple	
Nearctula sp. 1	Threaded Vertigo	Blue		Deciduous/Broadleaf Forest;Mixed Forest (deciduous/coniferous mix)	NO	Found at Chemainus Lake and Becher Bay on VI. Found at rich sites in deciduous and mixed forests within moist leaf litter	
Pristiloma johnsoni	Broadwhorl Tightcoil	Blue		Talus;Deciduous/Broadleaf Forest;Conifer Forest - Mesic (average);Conifer Forest - Dry;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix)	NO	In leaf litter of deciduous, coniferous and mixed-wood forests to an elevation of over 1300 m in the subalpine. It has also been reported from vegetated rockslide habitats (Forsyth 2004).	
Promenetus umbilicatellus	Umbilicate Sprite	Blue		Vernal Pools/Seasonal Seeps;Stream/River;Lake;Pond/Open Water	NO	This species is found in vernal ponds and marshes and springtime flooded margins of intermittent streams, often with dense vegetation and mud substrate	
Prophysaon coeruleum	Blue-grey Taildropper	Blue		Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix)	NO	Found on Mt Tzouhalem and other locations on southern VI. It inhabits moist, coniferous or mixed-wood forests of varying age classes All records from BC are from within the CDF biogeoclimatic zone; often associated with older forests and required microhabitat features include abundant coarse woody debris or other cover, a deep forest litter layer, and shaded, moist forest floor conditions (COSEWIC, 2006).	

Appendix 2-7: Insects (Conservation Data Centre)

Scientific Name	English Name	BC List	Identified Wildlife	Habitat Subtype	North Cowichan Forestry Focus Animal SAR List	Species Habitat Needs	Management Requirements
INSECTS							
Callophrys johnsoni	Johnson's Hairstreak	Red	Y (Jun 2006)	Conifer Forest - Mesic (average);Conifer Forest - Moist/wet	NO	Specific habitat in the top of conifers; lives off parasitic mistletoe. Difficult to observe	
Cercyonis pegala incana	Common Wood-nymph, *incana* subspecies	Red		Pasture/Old Field;Cliff;Grassland;Conifer Forest - Dry	NO	This species is considered a Garry oak ecosystems species.	
Coenonympha tullia insulana	Common Ringlet, *insulana* subspecies	Red		Pasture/Old Field;Meadow;Grassland;Shrub - Natural;Deciduous/Broadleaf Forest;Conifer Forest - Mesic (average);Conifer Forest - Dry;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix)	NO	found on SE VI. This species is known from Garry oak and associated ecosystems	
Erynnis propertius	Propertius Duskywing	Red		Meadow;Mixed Forest (deciduous/coniferous mix);Garry Oak Woodland	NO	found on SE VI. This species is known from Garry oak and associated ecosystems	
Hesperia colorado oregonia	Western Branded Skipper, *oregonia* subspecies	Red		Pasture/Old Field;Grassland;Deciduous/Broadleaf Forest	NO	found on SE VI. This species is known from Garry oak and associated ecosystems	
Plebejus saepiolus insulanus	Greenish Blue, *insulanus* subspecies	Red		Riparian Forest;Riparian Shrub;Pasture/Old Field;Meadow;Grassland;Deciduous/Broadleaf Forest;Riparian Herbaceous;Gravel Bar	NO	found on SE VI. This species is known from Garry oak and associated ecosystems	
Speyeria zerene bremnerii	Zerene Fritillary, *bremnerii* subspecies	Red		Meadow;Grassland;Deciduous/Broadleaf Forest;Urban/Suburban;Industrial	NO	Found on eastern VI. The species is associated with mesic meadows in Douglas-fir habitat The larval food plants include Violets. The species depends on these plants and if riparian areas or habitats where these plants grow change due to natural succession or other threats (see threats), the population declines. Open meadow and sparsely wooded areas where these plants grow are at risk	
Callophrys eryphon sheltonensis	Western Pine Elfin, *sheltonensis* subspecies	Blue		Bog;Shrub - Natural;Krummholtz	NO	Not found in forested habitat	
Callophrys mossii mossii	Moss' Elfin, *mossii* subspecies	Blue		Cliff;Rock/Sparsely Vegetated Rock;Talus;Grassland;Shrub - Natural;Deciduous/Broadleaf Forest	NO	found on SE VI. This species is known from Garry oak and associated ecosystems	
Erythemis collocata	Western Pondhawk	Blue		Marsh;Pond/Open Water	NO	Not found in forested habitat	
Ophiogomphus occidentis	Sinuous Snaketail	Blue		Stream/River;Lake	NO	Not found in forested habitat	
Pachydiplax longipennis	Blue Dasher	Blue		Marsh;Riparian Forest;Stream/River;Lake;Cliff;Pond/Open Water	NO	Not found in forested habitat	
Sympetrum vicinum	Autumn Meadowhawk	Blue		Riparian Shrub;Stream/River;Lake;Mixed Forest (deciduous/coniferous mix);Pond/Open Water;Riparian Herbaceous	NO	Found on lower Mainland	

Appendix 2-8: Red- and Blue-listed Ecological Communities of the CDFmm and CWHxm1 BGC Subzones (Conservation Data Centre)

Search Criteria

Search Type: Ecological Communities
AND Ecosystem Realm-Groups: Terrestrial - Forest
AND Municipalities: North Cowichan
AND BGC Zone, Subzone, Variant, Phase:CDFmm, CWHxm1
Sort Order:Scientific Name Ascending
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Scientific Name	English Name	Global Status	Prov Status	BC List	Identified Wildlife	Biogeoclimatic Units	Ecosystem Group
Ecological Coimmunities							
Populus trichocarpa - Alnus rubra / Rubus spectabilis	black cottonwood - red alder / salmonberry	GNR	S3	Blue		CDFmm/08;CWHdm/09;CWHds1/09;CWHds2/09;CWHmm1/09;CWHms1/08;CWHms2/08;CWHvm1/10;CWHwm/06;CWHws1/08;CWHws2/08;CWHxm1/09;CWHxm2/09	Terrestrial - Flood: Flood Midbench (Fm);Terrestrial - Forest: Broadleaf - moist/wet
Populus trichocarpa / Salix sitchensis	black cottonwood / Sitka willow	GNR	S2S3	Blue		CWHdm/10;CWHxm1/10;CWHxm2/10	Terrestrial - Flood: Flood Midbench (Fm);Terrestrial - Forest: Broadleaf - moist/wet
Pseudotsuga menziesii / Polystichum munitum	Douglas-fir / sword fern	G2G4	S2S3	Blue		CWHdm/04;CWHxm1/04;CWHxm2/04	Terrestrial - Forest: Coniferous - dry
Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon Dry Maritime	Douglas-fir - western hemlock / salal Dry Maritime	G3G4	S2S3	Blue		CWHdm/03;CWHxm1/03;CWHxm2/03	Terrestrial - Forest: Coniferous - dry
Thuja plicata / Carex obnupta	western redcedar / slough sedge	GNR	S2S3	Blue		CWHdm/15;CWHxm1/15;CWHxm2/15	Terrestrial - Forest: Coniferous - moist/wet;Wetland - Mineral: Wetland Swamp (Ws)
Thuja plicata - Picea sitchensis / Lysichiton americanus	western redcedar - Sitka spruce / skunk cabbage	G3?	S3?	Blue		CWHdm/12;CWHds1/12;CWHds2/12;CWHmm1/12;CWHms1/11;CWHms2/11;CWHvh1/13;CWHvh2/13;CWHvm1/14;CWHwh1/12;CWHwh2/06;CWHws1/11;CWHxm1/12;CWHxm2/12	Terrestrial - Forest: Coniferous - moist/wet;Wetland - Mineral: Wetland Swamp (Ws)
Thuja plicata / Polystichum munitum - Lysichiton americanus	western redcedar / sword fern - skunk cabbage	GNR	S3?	Blue		CDFmm/11;CDFmm/Ws53;CWHdm/12;CWHdm/Ws53;CWHxm1/Ws53;CWHxm2/12;CWHxm2/Ws53	Terrestrial - Forest: Coniferous - moist/wet;Wetland - Mineral: Wetland Swamp (Ws)
Thuja plicata / Polystichum munitum Very Dry Maritime	western redcedar / sword fern Very Dry Maritime	GNR	S2S3	Blue		CWHxm1/05;CWHxm2/05	Terrestrial - Forest: Coniferous - mesic
Thuja plicata / Tiarella trifoliata Very Dry Maritime	western redcedar / three-leaved foamflower Very Dry Maritime	G3	S2S3	Blue		CWHxm1/07;CWHxm2/07	Terrestrial - Forest: Coniferous - moist/wet

Scientific Name	English Name	Global Status	Prov Status	BC List	Identified Wildlife	Biogeoclimatic Units	Ecosystem Group
Ecological Coimmunities							
Abies grandis / Mahonia nervosa	grand fir / dull Oregon-grape	G1	S1	Red		CDFmm/04	Terrestrial - Forest: Coniferous - mesic
Abies grandis / Tiarella trifoliata	grand fir / three-leaved foamflower	G1	S1	Red		CDFmm/06	Terrestrial - Forest: Coniferous - moist/wet
Arbutus menziesii / Arctostaphylos columbiana	arbutus / hairy manzanita	G2	S2	Red		CDFmm/00;CWHxm1/00	Terrestrial - Forest: Broadleaf - dry
Picea sitchensis / Rubus spectabilis Very Dry Maritime	Sitka spruce / salmonberry Very Dry Maritime	G3	S2	Red		CWHxm1/08;CWHxm2/08	Terrestrial - Flood: Flood (Highbench);Terrestrial - Forest: Mixed - moist/wet
Pseudotsuga menziesii - Arbutus menziesii	Douglas-fir - arbutus	GNR	S2	Red		CDFmm/02	Terrestrial - Forest: Coniferous - dry
Pseudotsuga menziesii / Mahonia nervosa	Douglas-fir / dull Oregon-grape	G2	S2	Red	Y (Jun 2006)	CDFmm/01	Terrestrial - Forest: Coniferous - mesic
Pseudotsuga menziesii / Melica subulata	Douglas-fir / Alaska oniongrass	G1	S1	Red	Y (Jun 2006)	CDFmm/03	Terrestrial - Forest: Coniferous - dry
Pseudotsuga menziesii - Pinus contorta / Racomitrium canescens	Douglas-fir - lodgepole pine / grey rock-moss	GNR	S2	Red		CWHxm1/02	Terrestrial - Forest: Coniferous - dry
Quercus garryana - Arbutus menziesii	Garry oak - arbutus	G1	S1	Red		CDFmm/00	Terrestrial - Forest: Broadleaf - dry
Quercus garryana / Bromus carinatus	Garry oak / California brome	G1	S1	Red		CDFmm/00	Terrestrial - Forest: Broadleaf - dry
Quercus garryana / Holodiscus discolor	Garry oak / oceanspray	G1	S1	Red		CDFmm/00	Terrestrial - Forest: Broadleaf - dry
Thuja plicata / Achlys triphylla	western redcedar / vanilla-leaf	G1	S1	Red		CDFmm/12	Terrestrial - Forest: Coniferous - moist/wet
Thuja plicata / Lonicera involucrata	western redcedar / black twinberry	GNR	S1	Red		CWHdm/14;CWHxm1/14;CWHxm2/14	Terrestrial - Forest: Coniferous - moist/wet
Thuja plicata / Oemleria cerasiformis	western redcedar / Indian-plum	G1	S1	Red		CDFmm/13	Terrestrial - Forest: Coniferous - moist/wet
Thuja plicata - Pseudotsuga menziesii / Eurhynchium oreganum	western redcedar - Douglas-fir / Oregon beaked-moss	GNR	S1	Red		CDFmm/05	Terrestrial - Forest: Coniferous - moist/wet
Thuja plicata / Rubus spectabilis	western redcedar / salmonberry	GNR	S1S2	Red		CWHdm/13;CWHxm1/13;CWHxm2/13	Terrestrial - Forest: Coniferous - moist/wet
Thuja plicata / Symphoricarpos albus	western redcedar / common snowberry	GNR	S1	Red		CDFmm/07	Terrestrial - Flood: Flood (Highbench);Terrestrial - Forest: Mixed - moist/wet
Tsuga heterophylla - Pseudotsuga menziesii / Eurhynchium oreganum	western hemlock - Douglas-fir / Oregon beaked-moss	G3G4	S2	Red		CWHxm1/01;CWHxm2/01	Terrestrial - Forest: Coniferous - mesic
Tsuga heterophylla - Thuja plicata / Blechnum spicant	western hemlock - western redcedar / deer fern	G2G3	S2	Red		CWHdm/06;CWHxm1/06;CWHxm2/06	Terrestrial - Forest: Coniferous - moist/wet

Appendix 2-9: Plants (Vascular, Non-Vascular, and Lichens) (Conservation Data Centre)

Vascular Plants – Dicots - Blue-listed

Scientific Name	English Name	Global Status	Prov Status	COSEWIC	BC List	SARA	General Status Canada	BGC	Habitat Subtype	Focus Plant SAR List	Habitat	Management Requirements
DICOTS												
Anagallis minima	chaffweed	G5	S3		Blue		3 - Sensitive (2010)	CDFmm;CWHxm	Estuary;Stream/River;Rock/Sparsely Vegetated Rock;Meadow;Beach;Pond/Open Water;Gravel Bar;Garry Oak Vernal Pool;**Garry Oak Maritime Meadow**	NO		
Bidens amplissima	Vancouver Island beggarticks	G3	S3	SC (Nov 2001)	Blue	1-SC (Jun 2003)	3 - Sensitive (2010)	CDFmm;CWHdm;CWHms;CWHxm	Estuary;Marsh;Beach;Mudflats - Intertidal	NO		
Erythranthe dentata	tooth-leaved monkey-flower	G5	S2S3		Blue		2 - May be at risk (2010)	CWHvh;CWHvm	Riparian Forest;Stream/River	NO		
Eucephalus paucicapitatus	Olympic mountain aster	G3?	S3		Blue		3 - Sensitive (2010)	CMA;CWHvh;CWHvm;MHmm	Rock/Sparsely Vegetated Rock;Talus;Conifer Forest - Mesic (average);Krummholtz;Alpine/Subalpine Meadow	NO	This species has been moderately correlated with limestones on Vancouver Island based on inventories by H. Roemer	
Heterocodon rariflorum	heterocodon	G5	S3		Blue		3 - Sensitive (2010)	CDFmm;CWHds;CWHxm;ICHdw;IDFdm;IDFxh;PPdh	Vernal Pools/Seasonal Seeps;Conifer Forest - Mesic (average);Conifer Forest - Moist/wet;Garry Oak Maritime Meadow	NO		
Mitellastra caulescens	leafy mitrewort	G5	S2S3		Blue		3 - Sensitive (2010)	CMA;CWHds;CWHms;CWHxm;MHmm	Riparian Forest;Cliff;Rock/Sparsely Vegetated Rock;Talus;Conifer Forest - Mesic (average);Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix)	YES	Found in Chilliwack and possibly VI	Flowering Plants - Saxifrage Family
Packera macounii	Macoun's groundsel	G5	S3		Blue		3 - Sensitive (2010)	CDFmm;CWHmm;CWHxm	Rock/Sparsely Vegetated Rock;Grassland;Conifer Forest - Dry	YES	Found on eastern VI; one specimen found near Bonsall Creek on Mt Prevost. Occasional in meadows and along the coast. Open woods and dry open places.	
Rubus lasiococcus	dwarf bramble	G5	S3		Blue		3 - Sensitive (2010)	CDFmm;CWHds;CWHmm;CWHxm;ESSFmw;MHmm	Conifer Forest - Mesic (average);Conifer Forest - Moist/wet	YES	Known locations in the Chemainus River valley. Mesic to moist thickets and open forests in the montane and lower subalpine zones	
Rubus nivalis	snow bramble	G4?	S3?		Blue		3 - Sensitive (2010)	CDFmm;CWHdm;CWHmm;CWHvh;CWHvm;CWHxm;ICHmw;MHmm	Conifer Forest - Mesic (average);Conifer Forest - Moist/wet	YES	In B.C., Rubus nivalis is a forest-understory plant found in moist forests and glades at mid-elevations in the montane zone This species prefers moist, shade environments under the forest canopy, but will tolerate some sun exposure as it regenerates in logged areas. Though systematic assessments have not been undertaken in B.C, plants in cutblocks have displayed reduced vigour with sun-scalded leaves and less dense growth in comparison to colonies in standing timber	
Rupertia physodes	California-tea	G4	S3		Blue		3 - Sensitive (2010)	CDFmm;CWHmm;CWHxm;MHmm	Deciduous/Broadleaf Forest;**Garry Oak Woodland**	YES		
Sidalcea hendersonii	Henderson's checker-mallow	G3	S3		Blue		3 - Sensitive (2010)	CDFmm;CWHxm	Estuary;Marsh	NO		
Toxicodendron diversilobum	poison oak	G5	S3?		Blue		3 - Sensitive (2010)	CDFmm;CWHdm;CWHxm	Cliff;Rock/Sparsely Vegetated Rock;Deciduous/Broadleaf Forest;Conifer Forest - Dry;**Garry Oak Woodland**	NO		
Utricularia ochroleuca	ochroleucous bladderwort	G4?	S2S3		Blue		3 - Sensitive (2010)	BWBSdk;CDFmm;ESSFmv;ICHmw	Fen;Marsh;Pond/Open Water	NO		

Vascular Plants – Dicots - Red-listed

Scientific Name	English Name	Global Status	Prov Status	COSEWIC	BC List	SARA	General Status Canada	BGC	Habitat Subtype	Focus Plant SAR List	Habitat	Management Requirements
DICOTS												
Balsamorhiza deltoidea	deltoid balsamroot	G5	S1	E (Apr 2009)	Red	1-E (Jun 2003)	1 - At Risk (2010)	CDFmm;CWHxm	Rock/Sparsely Vegetated Rock;Grassland;Mixed Forest (deciduous/coniferous mix);Sand Dune;Beach;**Garry Oak Woodland**	YES		
Claytonia washingtoniana	Washington springbeauty	G2G4	S2		Red		2 - May be at risk (2010)	CDFmm;CWHdm;CWHxm;IDFww	Cliff;Talus;Conifer Forest - Dry;Mixed Forest (deciduous/coniferous mix)	YES	Moist to mesic mossy rock outcrops and forests in the lowland and montane zones	
Fraxinus latifolia	Oregon ash	G5	S1S2		Red		2 - May be at risk (2010)	CDFmm;CWHxm	Estuary;Swamp;Stream/River	NO		
Hosackia pinnata	bog bird's-foot lotus	G4G5	S1	E (May 2004)	Red	1-E (Jul 2005)	1 - At Risk (2010)	CDFmm;CWHmm	Vernal Pools/Seasonal Seeps;Meadow;Grassland;Riparian Herbaceous;**Garry Oak Vernal Pool**	NO		
Limnanthes macounii	Macoun's meadow-foam	G2	S2	T (Nov 2004)	Red	1-T (Aug 2006)	1 - At Risk (2010)	CDFmm;CWHxm	Meadow;Deciduous/Broadleaf Forest;Garry Oak Vernal Pool;**Garry Oak Maritime Meadow**	YES		
Lomatium dissectum var. *dissectum*	fern-leaved desert-parsley	G4T4	S1S2		Red			CDFmm	Rock/Sparsely Vegetated Rock;Meadow;Grassland;Mixed Forest (deciduous/coniferous mix);**Garry Oak Maritime Meadow**	YES		
Meconella oregana	white meconella	G2G3	S1	E (May 2005)	Red	1-E (Aug 2006)	1 - At Risk (2010)	CDFmm;CWHxm	Rock/Sparsely Vegetated Rock;Deciduous/Broadleaf Forest;**Garry Oak Coastal Bluffs**	NO		
Orobanche pinorum	pine broomrape	G4	S1		Red		2 - May be at risk (2010)	CDFmm;CWHmm;CWHxm	Conifer Forest - Mesic (average);Conifer Forest - Moist/wet	YES		
Sanicula bipinnatifida	purple sanicle	G5	S2	T (May 2001)	Red	1-T (Jun 2003)	1 - At Risk (2010)	CDFmm;CWHxm	Rock/Sparsely Vegetated Rock;Deciduous/Broadleaf Forest;Garry Oak Woodland;**Garry Oak Maritime Meadow**	YES		
Sericocarpus rigidus	white-top aster	G3	S2	SC (Apr 2009)	Red	1-SC (Jun 2003)	3 - Sensitive (2010)	CDFmm;CWHxm	Rock/Sparsely Vegetated Rock;Meadow;Mixed Forest (deciduous/coniferous mix);**Garry Oak Woodland**	YES		
Silene scouleri ssp. *scouleri*	coastal Scouler's catchfly	G5T3T5	S1	E (May 2003)	Red	1-E (Jan 2005)		CDFmm	Garry Oak Woodland;Garry Oak Maritime Meadow;**Garry Oak Coastal Bluffs**	NO		
Tonella tenella	small-flowered tonella	G5	S1S2	E (Nov 2003)	Red	1-E (Jul 2005)	1 - At Risk (2010)	CDFmm	Vernal Pools/Seasonal Seeps;Rock/Sparsely Vegetated Rock;Talus;Conifer Forest - **Dry;Garry Oak Woodland**	YES		
Trifolium cyathiferum	cup clover	G4	S2		Red		2 - May be at risk (2010)	BGxh;CDFmm;CWHmm;CWHxm;ICHdw;ICHmw;IDFdm;IDFxh	Vernal Pools/Seasonal Seeps;Riparian Forest;Riparian Shrub;**Garry Oak Maritime Meadow**	NO		
Uropappus lindleyi	Lindley's microseris	G5	S1	E (Mar 2008)	Red	1-E (Feb 2010)	1 - At Risk (2010)	CDFmm	Cliff;Meadow;Deciduous/Broadleaf Forest;Conifer Forest - **Dry;Garry Oak Coastal Bluffs**	YES		
Viola howellii	Howell's violet	G4	S2		Red		3 - Sensitive (2010)	CDFmm;CWHmm;CWHxm;MHmm	Rock/Sparsely Vegetated Rock;Meadow;Conifer Forest - Moist/wet;**Garry Oak Woodland**	YES		
Viola praemorsa ssp. *praemorsa*	yellow montane violet	G5T3T5	S2	E (Nov 2007)	Red	1-E (Jun 2003)		CDFmm;CWHxm	Pasture/Old Field;Meadow;**Garry Oak Woodland**	NO		

Vascular Plants – Ferns and Monocots

FERNS												
Woodwardia fimbriata	giant chain fern	G5	S3		Blue		3 - Sensitive (2010)	CDFmm;CWHxm	Stream/River;Rock/Sparsely Vegetated Rock	NO		
MONOCOTS												
Allium amplectens	slimleaf onion	G4	S3		Blue		3 - Sensitive (2010)	CDFmm;CWHxm	Vernal Pools/Seasonal Seeps;Rock/Sparsely Vegetated Rock;Meadow;**Garry Oak Woodland;Garry Oak Coastal Bluffs**	NO		
Carex feta	green-sheathed sedge	G5	S3		Blue		2 - May be at risk (2010)	CDFmm;CWHxm	Marsh;Vernal Pools/Seasonal Seeps;Meadow;Urban/Suburban;Riparian Herbaceous;**Garry Oak Maritime Meadow**	NO		
Carex interrupta	green-fruited sedge	G4	S2S3		Blue		2 - May be at risk (2010)	CDFmm;CWHdm;CWHxm	Stream/River;Riparian Herbaceous;Gravel Bar	NO		
Glyceria leptostachya	slender-spiked mannagrass	G3	S3		Blue		3 - Sensitive (2010)	CDFmm;CWHdm;CWHwh;CWHxm	Bog;Fen;Swamp;Marsh;Lake;Pond/Open Water;Mudflats - Intertidal	NO		
Prosartes smithii	Smith's fairybells	G5	S2S3		Blue		3 - Sensitive (2010)	CWHmm;CWHvh;CWHvm;CWHxm	Riparian Forest;Deciduous/Broadleaf Forest;Conifer Forest - Moist/wet;Mixed Forest (deciduous/coniferous mix)	YES		
Platanthera ephemerantha	white-lip rein orchid	G3?	S2		Red		2 - May be at risk (2010)	CDFmm;CWHvh	Conifer Forest - **Dry;Garry Oak Woodland**	YES		
Triteleia howellii	Howell's triteleia	G4G5T3T4Q	S1	E (May 2003)	Red	1-E (Jan 2005)		CDFmm	Meadow;Deciduous/Broadleaf Forest;Conifer Forest - Dry;**Garry Oak Woodland;Garry Oak Coastal**	YES		

Vascular Plants – Quillworts and Moss

Scientific Name	English Name	Global Status	Prov Status	COSEWIC	BC List	SARA	General Status Canada	BGC	Habitat Subtype	Focus Plant SAR List	Habitat	Management Requirements
QUILLWORTS												
Isoetes nuttallii	Nuttall's quillwort	G4?	S3		Blue		3 - Sensitive (2010)	CDFmm;CWHxm	Vernal Pools/Seasonal Seeps;Stream/River;Rock/Sparsely Vegetated Rock;Meadow;Conifer Forest - **Dry;Garry Oak Woodland;Garry Oak Vernal Pool;Garry Oak Maritime Meadow**	NO		
MOSS												
Syntrichia laevipila	twisted oak moss	GNR	S3	SC (Nov 2014)	Blue	1-SC (Jul 2005)		CDFmm	**Garry Oak Woodland**	NO		

APPENDIX 3: Field Reference Cards for Amphibians and Reptiles potentially found with NCMFR

Figure 2: Western Toad Field Card

Western Toad (*Anaxyrus boreas*)

Western Toad Adult

Western Toad Egg Strings

Photographs by E. Wind

Western Toad Tadpoles

Western Toad Toadlet

Description

- Adult Western Toads are 10 – 13 cm long,
- Can be a range of colours including brown, grey, green and red,
- Adults have a white or cream stripe down the centre of their backs,
- Bellies and throats are lightly coloured and mottled with black spots,
- They have large, kidney-shaped parotid glands (poison-secreting glands) behind their eyes.
- Their backs are covered in warty glands.

Similar Species

- Great Basin Spadefoot – found in dry lands between the Rocky Mountains and Cascades.

Biology

- Breed in mid-spring congregating in ponds and shallow lakes.
- Males do not call to attract mates.
- Females lay strands of up to 12,000 eggs in single file; multiple females may lay overlapping strands of eggs.
- Although usually silent may vocalize when handled, making a 'peeping' noise.
- Tadpoles are dark brown or black, hatching in about 10 days, and swarm in dense groups (sometimes numbering in the millions) in the warmest and most shallow waters they can find.
- After 6-10 weeks, toadlets metamorphose and migrate out of ponds in huge numbers. They will reach sexual maturity in 3-5 years, and can live up to 11 years in the wild

Habitat

- Live under leaves and in depressions in fields, forests, meadows and wetlands,
- Can tolerate dry environments, during dry spells will be close to streams and ponds, or hiding in damp shelters burrow to hide from predators if confronted will display their paratoidal glands behind their eyes. These glands, in conjunction with the warts on their backs, secrete a bitter toxin that repels most attackers.
- Only Garter Snakes are resistant to this toxin, and they will readily prey on Western Toads.
- The toads eat worms, slugs and insects, but will also eat larger animals when possible.

Occurrence

- In BC, Western Toads are found throughout BC except for the NE, also found on Haida Gwaii.

Status

BC: Yellow-listed (Secure and not at risk)
Canada: Special Concern (Schedule 1)

Action Required

- Document location of verified breeding area.
- Consult a qualified professional (if necessary) to verify identification and breeding.
- Biologist will work with field team staff to design a riparian buffer between and around occupied breeding ponds or wetlands within or adjacent to the cutblock.

Figure 3: Wandering Salamander Field Card

Wandering Salamander (*Aneides vagrans*)

Wandering Salamander adult

Wandering Salamander adult

Egg mass and hatchling

Description

- It is long and slender and grows to a snout to vent length of 3 inches (76 mm) and a total length of 5 inches (130 mm).
- it has sixteen costal grooves on either side of the body.
- The legs are relatively long and the toes have expanded terminal pads with square cut ends.
- The tail is prehensile and is round in cross section and used when the salamander clambers around among the branches of trees.
- The back varies in colour from brown to light grey, mottled or marbled and speckled with bronze flecks. It sometimes has a greenish sheen. The juveniles have a bronze stripe down the spine

Biology

- Climbs up to forty metres in the branches of trees.
- It feeds at night on small invertebrates such as ants, mites, adult beetles and their larvae, snails, springtails and woodlice.
- During the day it hides under fallen trees, under rocks, in crevices, under bark and in rotten wood. It has no lungs or gills, and breathes through its skin.
- Active in summer and hibernate in winter.
- Breeding takes place in spring and early summer. The female lays a clutch of six to nine eggs in some concealed location such as under bark. She guards them as they develop and they eventually hatch directly into miniature adult salamanders with no aquatic larval stage.
- Females lay eggs in large jelly-like clusters of 750-1300, and clusters are attached to stems of aquatic plants just below the surface.
- Eggs are in a grapefruit size mass; individual eggs are black above and white below.

Habitat

- Terrestrial
- Seeks refuge within decaying logs with loose bark and other moist coarse woody debris are retained.

Occurrence

- Found only on Vancouver Island and some of the Gulf Islands.

Status

BC: Blue-listed (Species of Special Concern) Canada: Special Concern

Action Required

- Document location of verified breeding area.
- Maintain large-diameter coarse woody debris and logs on the forest floor.

Figure 4: Red-legged Frog Field Card

Red-legged Frog (*Rana aurora*)

Red-legged Frog Egg Mass

Red-legged Frog Tadpole

Description
- Medium sized brown-reddish frog, with smooth skin and black 'freckles'.
- Males are approximately 7 cm in length; females can be longer, approximately 10 cm.
- They are named after their long slender hind legs, with red colouring on the undersides.
- Usually have a dark mask and upper jaw stripe running back to the shoulder.
- *Tadpoles*: tan to brown color with specks throughout their body. Their bodies look short because they have a long tail that is at least as long as the length of their body. The tail has a dorsal fin with light spots on it. Mouth with 4 teeth rows on the bottom and 3 on the top. They reach a size of 2-7 cm before they metamorphose.

Similar Species
- Oregon Spotted Frog

Biology
- Begin to mate and lay their eggs very early in spring, as early as January in coastal areas.
- Males call underwater to attract females.
- Females lay eggs in large jelly-like clusters of 750-1300, and clusters are attached to stems of aquatic plants just below the surface.
- Eggs are in a grapefruit size mass; individual eggs are black above and white below.

Habitat
- Adults are often found in damp wooded areas.
- During breeding season, which is winter to early spring, they may be found in ponds and streams.
- *Elevations*: 0-850 m

Occurrence
- In BC, Red-legged Frogs are found on the mainland coast, Fraser Valley, Vancouver Island, and other small coastal islands. Outside of BC, range can extend south to California.

Status
BC: Blue-listed (Species of Special Concern) and Identified Wildlife Species in B.C.
Canada: Special Concern (Schedule 1)

Action Required
- Document location of verified breeding area.
- Consult a qualified professional (if necessary) to verify identification and breeding.
- Biologist will work with field team staff to design a riparian buffer between and around occupied breeding ponds or wetlands within or adjacent to the cutblock.

Figure 5: Sharp-tailed Snake Field Card

Sharp-tailed Snake (*Contia tenuis*)

Description

- This small snake reaches a maximum length of only 20 to 45 cm. On average, they are about as thick as a pencil.
- The name "sharp-tailed" comes from the sharply pointed scale at the tip of the short tail. Adults are grey, yellowish brown, or red in colour. Usually this colour is interrupted by a wide yellowish stripe along each side.

Biology

- Snakes are most active in spring and fall.
- They hibernate during the winter, and mate after they emerge from their dens in the fall.
- They are found in relatively high numbers in spring and fall, which may make them more vulnerable to disturbance during these periods.
- Their young develop in eggs outside of their mother's body. Females are thought to lay between 2 and 9 eggs in late spring to early summer, and the young hatch sometime in autumn. The eggs are laid in communal egg laying sites. These sites can be cracks between rocks, underground, or clumps of grass roots.
- The feed primarily on slugs, but will eat a variety of invertebrates.
- The patchy distribution of the sharp-tailed snake suggests that it was previously more widespread and may be limited by the relatively cool environmental conditions of the region. Its small range in the province makes it vulnerable to local habitat loss and fragmentation due to human.

Habitat

- Woodland
- Wetlands
- Talus
- Rock outcrops
- Riparian
- Inhabits open Douglas fir/arbutus forests, usually on south facing rocky slopes, which likely provide both nesting and hibernation sites

Occurrence

- Found only on Vancouver Island and some of the Gulf Islands

Status

BC Red-listed (Endangered) Canada: Schedule 1- Endangered

Action Required

- Document location of verified denning sites.
- Areas where there are dens, important foraging areas or concentrations should be protected. Life history requirements such as nesting and over wintering needs, dispersal routes and potential prey species preferences need to be determined to help establish conservation and stewardship priorities

Figure 6: Western Painted Turtle Field Card

Western Painted Turtle (*Chrysemys picta pop. 1*)

Description

- Pacific Coast population is found on Vancouver Island and the Lower Mainland from Campbell River and Powell River south.
- Significant population declines have occurred on southern Vancouver Island, and in the Fraser, Okanagan, and Similkameen Valleys.

Biology

- The turtles are found in mud-bottomed lakes, ponds and lowland streams with basking sites and aquatic vegetation.
- Adults are omnivores, feeding on aquatic plants, carrion, and live prey, while juveniles feed exclusively on small invertebrates.
- Females dig nests on south facing slopes close to the water in May or June.
- The young hatch in late summer, but often overwinter in the nest.
- Painted turtles are believed to reach 50 years of age.

Habitat

- Adults overwinter underwater, buried in mud sediments.
- Its egg-laying and nursery habitats are specific with respect to exposure (southern aspect), substrate type (dry and light soils with little vegetation cover), and distance from aquatic habitat (within 150 m). requires warm, sparsely vegetated openings on well-drained soils for nesting.
- Vegetation cover hinders nest excavation and lowers soil temperatures for incubation, and plant roots can interfere with hatching

Threats

- The main threats are habitat loss and fragmentation due to agricultural and urban development, roadkill, increased nest predation, and injuries from angling gear.

Occurrence

- Found only on Vancouver Island and Lower Mainland from Powell River south.

Status

BC Red-listed (Endangered)
Canada: Schedule 1- Endangered

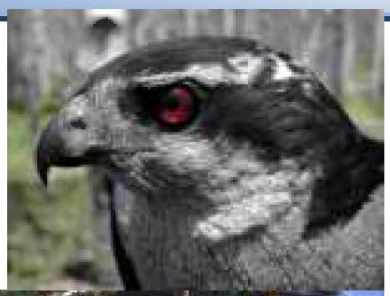
Action Required

- Document location of sighting
- Reduce road mortality during migrations; maintain nesting grounds near permanent ponds and lakes

APPENDIX 4: Field Reference Cards for Birds potentially found with NCMFR

Figure 7: Northern Goshawk Field Card

Northern Goshawk (*Accipiter gentilis laingi*)



Description

- Northern Goshawks are a raven-sized raptor, with short, rounded wings and a long tail.
- Adults (>2 years) have a conspicuous light grey supercilium (feathering above the eye) flaring out behind the eye that separates their black crown from their blue-grey back.
- Adults have a white eye-stripe, chests are white with grey barring, and their tails have prominent alternating black and grey bands.

Similar Species

- Sharp-shinned Hawk (much smaller) and Cooper's Hawk (lacks white eye-stripe) as well as the *Accipiter gentilis atricapillus* subspecies (is usually lighter in colour, and more frequently found further inland).

Biology

- Generally feed on large prey, including squirrels and large birds, (Grouse, woodpeckers, Varied Thrush and Steller's Jay).
- Breeding and brood-rearing season is from April to early August, when the juveniles disperse.

Habitat

- Goshawks are well suited for dense, mature forest stands, and generally require mid to mature stands (> 45 years)
- Prefer habitat containing high levels of coarse woody debris, snags and stumps, where their prey is abundant.
- Nest areas usually contain the active 'nest tree' as well as additional alternate nests.
- Elevation: lower to mid elevations.

Occurrence

Laingi subspecies are found along the coast from South East Alaska, south to Western Washington. In BC, they are found within four designated conservation areas, Haida Gwaii, North Coast, South Coast and Vancouver Island. A recent genetic analysis could potentially change the status of birds found on Vancouver Island.

Status

BC: Red-listed (Threatened or Endangered) and Identified Wildlife Species in B.C.
Canada: Threatened (Schedule 1)

Action Required

If nest or bird is found:

- Document location and occupancy.
- Contact a qualified professional to verify species and nest occupancy and assist in retention design.
- The area within 800 m of original nest should be assessed for alternative nests.
- Retain at least 200 m of forested habitat around all nest trees, where possible.
- Minimize disturbance within 1 km around tan active nest during the breeding season.
- The minimum target size for a breeding area is 176 ha.

Figure 8: Great Blue Heron Field Card

Great Blue Heron (*Ardea herodias fannini*)

Herons in flight have an 'S' shape to neck

Description

- The pacific subspecies is the largest of all herons in Canada, standing at 1 meter tall.
- Tall long-legged, long-necked wader that holds its head in an "S" curve at rest and in flight.
- Long, thick yellow bill, white crown and face.
- Black plume extending from above eye to beyond back of head.
- Black shoulder, shaggy blue-gray body and wings.
- Juvenile has brown-grey back and upper wing plumage and lacking black eyebrow.
- Sexes similar

Similar Species

- Other Great Blue Heron subspecies.

Biology

- Nest in colonies of 2-10 nests (average).
- Nests are reused in successive years.
- Nests, 4-70 m high in trees, are large stick platforms, < 1 m diameter, lined with twigs, bark strips, coniferous boughs and rushes.
- Both the nest and the ground beneath are messy with droppings, old food, and sometimes dead chicks.
- Currently the four main colonies in southern BC contain 45% of the Canadian population.

Habitat

- Populations nest in quiet woodlots within 8 kms of their foraging habitat.
- Nest in undisturbed mature deciduous; less often in mixed, or coniferous forest
- Foraging habitat is usually large eelgrass meadows along rivers and in estuarine and freshwater marshes.
- *Elevations*: 0-1100 m, but mainly near sea level.

Occurrence

- Range extends from the coast of southeastern Alaska (Prince William Sound) south to Puget Sound, Washington. Along the entire coast of BC.

Status

BC: Blue-listed (Species of Special Concern) and Identified Wildlife Species in B.C.
Canada: Special Concern (Schedule 3)

Action Required

If nest or nest trees are found:

- Document occupancy and location.
- Retain the nest tree or trees within a WTRA with a 200m buffer.
- From Jan. 15 – Sept. 15 maintain a quiet buffer within 200m of nest site, if occupied. The most sensitive period is from February 1st to June 30th,

Figure 9: Northern Pygmy Owl Field Card

Northern Pygmy Owl (*Glaucidium gnoma swarthi*)

Description

- Very small owl (maximum 80 g), slightly smaller and darker than the mainland species.
- Yellow eyes; also has pair of vertical black patches (resembling eyes) on nape
- Grey-brown colour with whitish underbelly.
- Length: 6 inches Wingspan: 15 inches
- Large, rounded head , crown spotted with white
- Dark streaking on under parts, long, dark tail with thin, white bars
- Sexes similar
- Predatory bird, more diurnal than other species of owls

Similar Species

- Northern Saw-whet Owl

Biology

- Crepuscular (active during dawn and dusk) hunter
- Preys on small rodents
- Series (60-80/min) of single or double "toot" notes.
- Non-migratory

Habitat

- Habitat generalist
- Secondary cavity nester , using second-growth and mature coniferous forests, mixed riparian forest and deciduous forest
- Prefers edge rather than interior forest
- Limited by suitable habitat, especially the availability of cavities for nesting
- Retention of wildlife trees on the landscape critical
- May reuse cavities for several consecutive years
- Pairs typically spaced 600 m to 1600 m apart
- Will nest in WTPs within logged areas.
- *Elevations*: 50 to < 1700 m.

Occurrence

- Range on Vancouver Island, where suitable habitat exists, from Cape Scott to Sooke.
- Present in CDF, CWH, MH biogeoclimatic zones.

Status

BC: Blue-listed (Species of Special Concern) and Identified Wildlife Species in B.C.
Canada: Not listed

Action Required

If an active nest is found:

- Document location of sighting and/or nest tree.
- Contact a qualified professional (if necessary) to verify species and assist in retention design.
- Retain the nest tree within a WTP with a 200m buffer around the nest tree and leave other snags or trees with cavities within the WTP.

Figure 10: Barn Swallow Field Card

Barn Swallow (*Hirundo rustica*)

Description

- when perched, the sparrow-sized Barn Swallow appears cone shaped, with a slightly flattened head, no visible neck, and broad shoulders that taper to long, pointed wings,
- tail extends well beyond the wingtips and the long outer feathers give the tail a deep fork.to tawny underparts.
- blue crown and face contrast with the cinnamon-colored forehead and throat,
- white spots under the tail can be difficult to see except in flight,
- males are more boldly colored than females.
- fly with fluid wingbeats in bursts of straight flight, rarely gliding, and can execute quick, tight turns and dives,

Similar Species

- Tree Swallow

Biology

- feed on the wing, snagging insects from just above the ground or water to heights of 100 feet or more,
- diet includes flies, beetles, bees, wasps, ants, butterflies, moths, and other flying insects,
- usually take relatively large, single insects rather than feeding on swarms of smaller prey
- pick up grit and small pebbles, or eggshells and oyster shells set out by humans, which may help the birds digest insects or add needed calcium to the diet
- populations of this common and widespread bird have declined steadily in BC over the past 30 or 40 years, and particularly rapidly over the past decade. The causes remain unclear.

Habitat

- feed in open habitats from fields, parks, and roadway edges to marshes, meadows, ponds, and coastal waters,
- their nests are often easy to spot under the eaves or inside of sheds, barns, bridges and other structures.
- range from sea level up to 10,000 feet

Occurrence

- It breeds from southern Alaska across Canada to southern Newfoundland and south to Mexico.
- Birds winter from south Florida through South America to Tierra del Fuego, but typically return to the same North American site to breed each year.

Status

BC: Blue-listed (Species of Special Concern)
Canada: Threatened

Action Required

If nest or nest trees are found:

- Document occupancy and location.
- Retain and protect nest until after the breeding season

Figure 11: Western Screech Owl Field Card

Western Screech Owl (*Megascops kennicottii*

Description

- Small, streaked owl with yellow eyes.
- The Western Screech Owl has tufts over it's ears, and is slightly darker in colouring that the other mainland subspecies, *macfarlanei*.
- Female average Length: 23cm (9.2") Wingspan 56cm (22"). Male average Length: 21cm (8.2"), Wingspan 54cm (21")

Similar Species

- *macfarlanei* subspecies

Biology

- Nocturnal, with activity generally beginning 20-30 minutes after sunset.
- Pairs are monogamous and territorial throughout the year.
- Eggs are laid in natural cavities of large trees, or nest-boxes where available, without any nesting material.
- Flight is noiseless with soft wing beats and gliding. Will become motionless if disturbed at roost.
- is very aggressive when defending a nest site, and may attack humans
- male's most common call is a muted trill "hoo-hoo-hoo...", or bouncing ball song, that speeds up at the end, but maintains a constant pitch. A secondary song is a double trill of rapid bursts. Other calls are a soft "cr-r-oo-oo-oo-oo" given as a greeting call, and a sharp bark given when excited.

Habitat

- They are found in varied habitats throughout their range.
- Typically in lower elevation forested areas close to water.

Occurrence

- In BC, *kennicottii* occur along the entire coast of BC as well as Vancouver Island, excluding the Queen Charlotte Islands.

Status

BC: Blue-listed (Species of Special Concern)
Canada: Special Concern (Schedule 1)

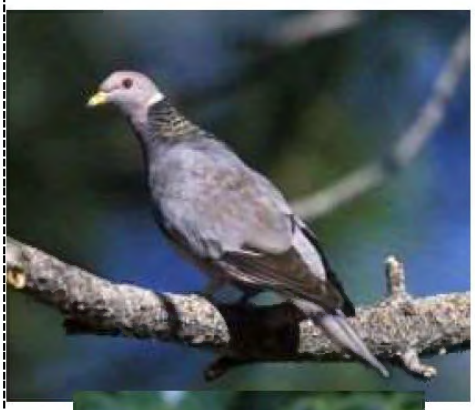
Action Required

If an active nest is found:

- Document location of sighting and/or nest tree.
- Contact a qualified professional (if necessary) to verify species and assist in retention design.
- Retain the nest tree within a WTP with a 200m buffer around the nest tree and leave other snags or trees with cavities within the WTP.
- An active nest should not be disturbed between March 15th and August 31st.

Figure 12: Band-tailed Pigeon Field Card

Band-tailed pigeon, *Patagioenas fasciata*



Description

- Band-tailed Pigeons are large, stocky pigeons with small heads, long, rounded tails, and thick-based, pointed wings.
- Crow size.
- They are soft blue-gray above and purplish-gray below, with a white crescent on the back of the neck. The upper half of the tail is gray, fading to a pale gray band at the tip. The wings are unmarked pale gray with dark wingtips noticeable in flight. The bill and feet are yellow.

Biology

- Band-tail pigeons form nomadic flocks that move in relation to availability of food.
- They feed on fruits, buds, seeds and grain and may be found at bird feeders.
- The species is long-lived (to 22 years), late-maturing and produces few eggs, leaving populations vulnerable to losses of adults.
- Breeding season is prolonged, beginning in March in south to early May in north; breeding reported well into fall in some areas, probably in response to food availability.
- Two broods per season not unusual, and three broods possible
- Clutch size usually one (85-95%), infrequently two. Incubation by both sexes, about 18-20 days. Nestling altricial and downy. Young leaves nest in 25-30 days.
- Will defend nest area and there is evidence of territorial flight displays and defense.

Habitat

- They occupy a variety of habitat types, including residential areas, but favour mature forest with a berry-rich shrub understory.
- Mineral springs and mineral graveling sites are important for mineral intake by adults, especially during the nesting season. Pigeons show strong fidelity to mineral sites

Threats

- Degradation and loss of habitat is considered the major threat now, although over hunting contributed to historical declines

Occurrence

- Currently, only regularly breeds in southwest British Columbia; estimated extent of occurrence is 95,000 km2 (COSEWIC 2008).
- In BC, it is an uncommon to locally abundant resident breeder on the south coast and southern Vancouver Island and becomes an uncommon to a locally common transient farther north along the coast

Status

BC: Blue-listed (Species of Special Concern)
Canada: Special Concern

Action Required

If nest or bird is found:

- Document location of sighting and/or nest.
- Retain a 50m buffer around the nest.
- An active nest should not be disturbed between April 1st and August 15th.

Figure 13: Olive-sided Flycatcher Field Card

Olive-sided Flycatcher, *Contopus cooperi*

Description

- Large, stocky flycatcher. Large head. Relatively short tail.
- White center of breast contrasts sharply with gray sides, giving a vested appearance.
- Juvenile similar to adult, but upperparts more brownish and wing feather edges washed buff.
- Size is between a sparrow and a robin

Habitat

- Considered an indicator species for the coniferous forest biome and are known from primarily mixed and spruce-fir coniferous forest.
- Prefer edges of coniferous forests (both pure and mixed); the edges may be natural or human made, and a preference for edges near water and/or on slopes
- Presence of snags or tall trees with dead tops is a necessary habitat feature used for maintenance, singing and foraging activities.).
- Associated with burned forest likely due to the creation of snags and forest openings and increased edge interfaces (COSEWIC 2007).

Threats

- Widespread breeder across southern BC. Moderate numbers that are thought to be declining, possibly due to loss of suitable breeding and foraging habitats.
- Populations have been in widespread decline over the last 30 years across the species range. In Canada, numbers declined by 79 percent between 1968 and 2006 and 29 percent between 1996 and 2006. The causes remain uncertain.

Occurrence

- Olive-Sided Flycatchers have been recorded from throughout most forested areas of British Columbia, with the exception of the Queen Charlotte Islands

Status

BC: Blue-listed (Species of Special Concern)
Canada: Special Concern

Action Required

If nest or bird is found:

- Document location of sighting and/or nest.
- Retain a 50m buffer around the nest.
- An active nest should not be disturbed between April 1st and August 15th.
- Retain snags, especially close to riparian area.

Figure 14: Purple Martin Field Card

Purple Martin, *Progne subis arboricola*

Description

- largest swallow in North America. The western subspecies (is threatened in British Columbia.
- Clutch Size: 3-6 eggs
- Incubation Period: 15-18 days
- Nestling Period: 27-36 days
- Egg: Pure white and smooth.
- Hatching: Young are born weak, with completely bare pink skin.
- Purple Martin eats flying insects at altitudes higher than other swallows, often exceeding 150 feet and sometimes 500 feet or more off the ground.

Biology

- Adults live to be 9 or 10 years of age.
- They rarely land on the ground except to collect nesting material and pick up grit to aid their digestion.
- Males defend small nesting (but not foraging) territories from other males and females do the same with other females.
- Martins pair up with one male and one female per nest, but sometimes two females may settle into different compartments of one male's territory.
- Both sexes frequently mate outside of their pair bond.
- Adults form flocks as soon as nestlings fledge and congregate in large roosts throughout the winter.

Breeding Habitat

- Historically nested in woodpecker holes in old trees or snags in open woodland areas or near freshwater and likely made extensive use of fire-killed stands
- Resident populations of non-native European Starlings and House Sparrows also provide strong competition for any remaining nest cavities.

Winter Habitat

- Purple Martin wintering grounds are savannas and agricultural fields in Bolivia, Brazil, and elsewhere in South America. At night, wintering martins flock into cities and towns to roost, often in the trees of village plazas

Threats

- As other suitable habitat was lost, martins shifted to nesting in woodpecker cavities in abundant old and decaying untreated wooden pilings remaining from early industrial development around the Strait of Georgia and as these old pilings fell or were replaced with creosote-treated pilings (and later steel and concrete pilings), in which woodpeckers cannot excavate nest cavities, their numbers steadily declined due to lack of usable nest cavity sites. By the early 1980s the BC population of Western Purple Martins was reduced to less than 10 breeding pairs.

Occurrence

- Found in small numbers throughout SW BC.

Status

BC: Blue-listed (Species of Special Concern)
Canada: Not listed

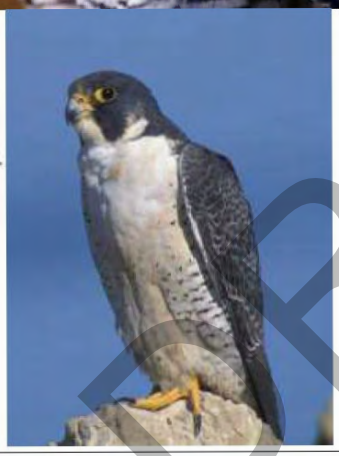
Action Required

If nest or bird is found:

- Document location of sighting and/or nest.
- Retain a 50m buffer around the nest.
- An active nest should not be disturbed between April 1st and August 15th.
- Maintain natural habitat such as snags and wildlife trees with cavities, especially ones by water.
- Participate in a local nest box program.

Figure 15: Peregrine Falcon Field Card

Peregrine Falcon (*Falco peregrinus*)



Description
- Medium to large (crow-sized) falcon; Males are 36-49cm and 650g, females 45-58cm and 950g.
- Adults have blue-grey or darker plumage on upperparts, and underparts are pale, white-grey with dark spotting/barring.
- Have dark "hood" on crown of head with extended malar stripes ("sideburns").
- Immatures have pale, slate or chocolate brown upperparts, and underparts buffy with dark streaks.
- Clinal differences: darker in wet areas, paler in dry, larger in south and west, smaller in north extent of range.

Similar Species
- Gyrfalcon: larger, with pointed and broader wings and a larger tail, lack dark hood and malar stripes.

Biology
- Court in late winter, nest in March or April, clutch size 1s 1-5 eggs (usually 3-4).
- Nestlings leave nest after 40 days, may stay in vicinity of nest for up to 3-6 weeks.
- Nest are simple scrapes located in substrate, 17-22cm diameter and 3-5cm deep. No nesting material is added and nests are often located on ridges, cliff edges, or buildings. May occasionally use abandoned raven or eagle nests.
- Feed primarily on birds and sometimes bats.
- They occasionally pirate prey, including fish and rodents, from other raptors.

Habitat
- Typically, Peregrine Falcons nest on cliffs from about 25–1,300 feet high.
- In places without cliffs, may use abandoned Common Raven, Bald Eagle, Osprey, Red-tailed Hawk, or cormorant nests.
- In the Pacific Northwest they may nest among or under Sitka spruce tree roots on steep slopes.

Occurrence
- *Anatum* subspecies: Found in southern interior of province, also thought to be the subspecies that inhabit the Fraser Valley, southern Vancouver Island and the Gulf Islands. Slightly smaller than the *pealei* ssp.
- *Pealei* subspecies: breeds on Haida Gwaii and northern Vancouver Island. Larger and darker than *anatum* ssp.

Status:
- BC: *Anatum* subspecies Red-Listed, Pealei subspecies Blue-Listed
- Nests (occupied or unoccupied), eggs, and birds of all subspecies are protected under BC *Wildlife Act*.
- Canada: SARA Special Concern (COSEWIC).
- There are 120 known breeding pairs of the *pealei* ssp on the coast mainly in Haida Gwaii and northern VI.
- **Action Required**

If an active nest is found:
- Document location of sighting and/or nest.
- Notify NCMF and contact a qualified professional if you need to verify species and require assistance in retention design.
- Retain a 500 m buffer around the nest.
- Have in place a 1000 m buffer from loud disturbance in the breeding season.
- An active nest should not be disturbed between March 15th and August 31st.

Figure 16: Common Nighthawk Field Card

Common Nighthawk (*Chordeiles minor*)

Description

- The Common Nighthawk is a medium-sized crepuscular or nocturnal bird within the nightjar family, whose presence and identity are best revealed by its vocalization.
- Has a large, flattened head with large eyes, long slender wings that at rest extend beyond a notched tail. There is noticeable barring on the sides and abdomen, also white wing-patches.
- Common Nighthawks give a nasal peent or beer call while flying. During the breeding season, the male makes a booming sound by flexing his wings while diving, making air rush through his primaries.
- Typically, dark (grey, black and brown), displaying cryptic colouration and intricate patterns, this bird is difficult to spot with the naked eye during the day.

Similar Species

- whip-poor-will (found in eastern Canada)

Biology

- Feeds on flying insects (e.g., mosquitoes, moths, beetles, flies, caddisflies).
- Forages at night or during the day. Catches insects high in the air or close to the ground.
- Young are fed insects by regurgitation.
- Breeding and brood-rearing season is from May to August.
- Most active during the early morning and evening and at night but may also be seen during the day.

Habitat

- Habitats include mountains and plains in open and semi-open areas: open coniferous forests, gravel roads, landings, parking areas.
- Nesting occurs on the ground on a bare site in an open area.

Occurrence

- Known to breed throughout most of British.
- They have been labelled uncommon to common summer visitants throughout most of British Columbia, with exceptions being west of the Coast Ranges north of Vancouver, where they are very rare, and on the Queen Charlotte Islands, where they are accidental.
- Potential breeder throughout much of the Seaward Business Area

Status

BC: Yellow-listed in B.C.
Canada: SARA Threatened (Schedule 1)

Action Required

If nest or nest trees are found:

- Document occupancy and location.
- Contact a qualified professional (if needed) to verify species and assist in retention design.
- Protect nest site during the breeding season and maintain a quiet buffer around nest location.
- An active nest should not be disturbed between May and August.

APPENDIX 5: Field Reference Cards for Mammals potentially found with NCMFR

Figure 17: American Water Shrew Field Card

American Water Shrew (*Sorex palustris brooksi*)

Description
- Large water shrew with an average length of 152 mm of which 75 mm is tail; average weight of 10.6 grams.
- The water shrew has a bi-coloured body, with glossy black fur on its dorsal surface and silvery white fur on its ventral surface.

Similar Species
- Pacific Water Shrew, although ranges do not overlap.
- Terrestrial shrews.

Biology
- The water shrew is semi-aquatic, hunting for prey under water and on land.
- Food is consumed on land.
- The shrew feeds every 10 minutes and consumes its own weight in food every 24 hours.
- Lifespan of 18 months.

Habitat
- As the shrews spend up to half of their time hunting underwater, they stay very close to water.
- Habitat includes riparian areas, creeks, streams and possibly bogs and marshes.
- Found at all elevations.

Occurrence
- Assumed to be found throughout Vancouver Island; there are only 67 records from 38 locations. Locations are as far north as Port Hardy, along the east coast at the Quinsam River (near Campbell River), as far inland as Robertson Creek (near Port Alberni), along the west coast at Lost Shoe Creek (near Ucluelet) and as far south as Veitch Creek (near Victoria).
- Often encountered during stream fish surveys.

Status

BC: Red-listed (Threatened or Endangered) and Identified Wildlife Species in B.C.
Canada: Not listed

Action Required
- Contact a qualified professional to verify species and assist in retention design.
- Maintain a 5m buffer along streams in the vicinity of where the shrew was found.

Figure 18: Roosevelt Elk Field Card

Roosevelt Elk (*Cervus elaphus roosevelti*)

Description

- Large member of the deer family.
- Roosevelt Elk have a dark head and neck with a yellow-brown or cream-coloured rump patch with a short tail.
- Large males may reach more than 400 kg, while females are considerably smaller, approximately 250 kg in weight.
- Males grow antlers, which range from simple spikes and forks on yearlings to large branched structures, with up to five or six ivory-tipped tines on mature bulls. Antlers usually have a brownish main beam and can be more than a meter long. Generally, antlers are shed from March through May.

Biology

- Elk are 'ecotonal' species, concentrating their habitat use along edges.
- During calving, optimal for females to have cover and forage areas close together. Cows and new calves usually remain in calving areas (sometimes within a hectare or less) for 10 days to three weeks after birth, before rejoining the larger group.

Habitat

- Optimal habitats can contain the following features; open conifer stands, stands dominated by deciduous trees (>50% deciduous), non-forested wetlands, riparian areas, vegetated slides on summer ranges, and borders of south-facing rock outcrops on winter and spring ranges.
- Also choose stands that provide security and shelter. Coniferous stands at least 10 meters in height with a mean canopy closure of 60-90% are relatively efficient at intercepting snow while providing enough light for understory growth for forage.
- Elevations: will summer from sea-level to the sub-alpine. Will winter at lower elevations.

Occurrence

- The majority of the Roosevelt Elk population in BC resides on Vancouver Island. The smaller mainland population was transplanted to the Sechelt Peninsula, and Powell River. Population estimates are approximately 4,790 in BC, approximately 3,900 of which are on Vancouver Island. On the island there are two main populations, southern and northern. The southern is centered near Cowichan Lake and Nanaimo River watershed. The northern population is found within the loose boundaries of Woss, Gold River, Campbell River and the Tsitika River.

Status

BC: Blue-listed (Species of Special Concern)
Canada: not listed

Action Required

- Document any high use foraging and wintering areas.
- Determine if the area requires a specific management strategy to protect or enhance forage, security cover or winter thermal cover.

Figure 19: Townsend's Big-eared Bat Field Card

Townsend Big-eared Bat (*Corynorhinus townsendii*)

Description

- a medium-size bat with enormous ears - about one half its body length - and two prominent, glandular swellings on its nose.
- Its long dorsal fur varies from pale brown to blackish-grey; hairs in the underfur are paler.
- The tragus is long and pointed - about one third the ear length. The calcar lacks a keel. The skull is relatively narrow and the profile of the brain-case is curved.

Biology

- Mating takes place from November to February, usually at the winter roost.
- yearling females can breed in their first year, usually giving birth later in the season than older females.
- A single young is born after 50 to 100 days.
- The gestation period is controlled largely by temperature.
- Cool temperatures will induce torpor in pregnant females and slow down the development of the foetus.
- In coastal areas the young are probably born in June.
- At birth, the young weigh about 2.4 grams, their eyes are closed and the ears are not erect.
- Young Townsend's Big-eared Bats mature quickly; by three weeks they are capable of flying and at four weeks they are nearly adult size.

Habitat

- A late flyer, they emerge an hour or so after dark. It is an agile bat that is capable of flying at slow speeds.
- small moths (body length, 3-10 mm) form most of the diet.
- It also eats lacewings, dung beetles, flies and sawflies.
- This species feeds several times during the night - it is often near dawn before it returns to the day roost.
- Females form colonies of a dozen to several hundred in dimly lit areas in buildings, caves or mines.
- In August, nursery colonies break up and individuals begin to migrate to caves and mine for hibernation.
- Relatively sedentary, moving 10 to 65 kilometres between the summer roost and the winter hibernaculum.
- Will roost in forested sites during the day, such as cracks in rock or between the loose bark of trees.

Occurrence

- Maternity colonies found in cave features on Mt Tzouhalem and possibly Mt Prevost.
- In Canada, it is restricted to British Columbia. On the coast, it inhabits Vancouver Island, the Gulf Islands and the Vancouver area; in the interior, it has been found as far north as Williams Lake and east to Creston.

Status

BC: Blue-listed
Canada: Not listed

Action Required

If found or suspected in the summer or winter:

- Document location.
- Retain snags as summer roost sites.
- Contact a qualified professional to verify species and assist in retention design.
- Care should be taken around cave site.

Figure 20: Little Brown Myotis Field Card

Little Brown Myotis (*Myotis lucifugus*)

Description

- Cinnamon-buff to dark brown above, buffy to pale gray below;
- hairs on back have long glossy tips;
- ear when laid forward reaches approximately the nostril;
- tragus about half as high as ear;
- length of head and body 41-54 mm, ear 11.0-15.5 mm, forearm 33-41 mm;
- braincase rises gradually from rostrum; greatest length of skull 14-16 mm; length of upper toothrow 5.0-6.6 mm

Biology

- Mating occurs usually in September-October.
- Ovulation and fertilization are delayed until spring.
- Gestation lasts 50-60 days.
- Reproductive females annually give birth to 1 litter of 1 young, late spring-early summer.
- Females produce first young usually in their second year.
- In BC, individuals may delay or forego reproduction in wet years.
- Survival for a decade may be fairly common; a few live as long as 20-30 years; females may be reproductive to an age of at least 12 years.
- Most summer colonies range from 50 to 2,500 individuals (average 400).
- Winter concentrations may include tens of thousands of individuals. Survival rate is low during the first winter, higher in subsequent years.

Habitat

- Use a wide range of habitats and often use human-made structures for resting and maternity sites; they also use caves and hollow trees.
- Foraging habitat requirements are generalized; foraging occurs over water, along the margins of lakes and streams, or in woodlands near water.
- Winter hibernation sites (caves, tunnels, abandoned mines, and similar sites) generally have a relatively stable temperature of about 2-12 C.
- Maternity colonies commonly are in warm sites in buildings (e.g., attics) and other structures; also infrequently in hollow trees. Microclimate conditions suitable for raising young are relatively narrow, and availability of suitable maternity sites may limit the species' abundance and distribution.

Occurrence

- Found throughout BC.
- Susceptible to White-nose Syndrome

Status

BC: Yellow-listed
Canada: Endangered, Schedule 1

Action Required

- Maintain Wildlife Trees with cavities.
- Protect any caves and karst formations.
- No road construction around caves until area checked by a registered professional. Document location.
- Retain snags as summer roost sites.
- Contact a qualified professional to verify species and assist in retention design.
- Care should be taken around cave site.

APPENDIX 6: Field Reference Cards for Molluscs potentially found with NCMFR

Figure 21: Oregon Forestsnail Field Card

Oregon Forest Snail (*Allogona townsendiana*)

Description

- spiral shells are pale brown or straw yellow, have a globe-like shape, and reaches 28 to 35 mm in diameter making it one of the largest snails in southwestern B.C

Biology:

- The dispersal ability of the species is probably poor, based on its scattered distribution pattern, although some dispersal movements may occur during the reproductive period in spring when the animals appear to wander.

Habitat

- occupies a wide variety of habitats but is most commonly found in broadleaf forests dominated by big-leaf maple and red alder with stinging nettle and sword fern in the understory.
- Other requirements are abundant leaf litter and large woody debris, which provide protection from extreme temperatures and drying during winter hibernation.
- typically dominated by Bigleaf Maple almost all the known sites in BC are at elevations below 360 m, (submontane CWH only)
- Major threats include urbanization, agriculture, and logging. Brush burning, trampling and pesticide use are also concerns.

Occurrence

- occurs from western Oregon north to southwestern British Columbia where it is restricted to the Fraser Valley and southern Vancouver Island. Specimen found in Westholme.

Status

BC Red-listed (Endangered) Canada: Schedule 1- Endangered

Action Required

- Document location
- Maintain levels of CWD and leaf litter on the forest floor,
- Both living dying vegetation are important; these conditions help prevent the loss of moisture and extreme fluctuations in temperature that are thought to be particularly detrimental to hibernating snails

Figure 22: Warty Jumping Slug Field Card

Warty Jumping Slug (*Hemphillia glandulosa*)

Description

- recognized by its smaller size, densely papillate dorsal hump, and fleshy horn-like protuberance at the end of the tail.
- A small slug, brown with bluish-grey head and tentacles; dorsal hump/mantle with darker streaks and spots, covered with numerous, close-packed papillae; dorsal keep highly arched and laterally compressed; end of tail with a fleshy "horn".
- Shell Mostly internal (small area exposed dorsally); plate-like, thin.

Biology:

- Thought to have low mobility and dispersal ability

Habitat

- This species occupies moist forests from young seral stages to old growth and from low to mid-elevations.
- Often found in forested riparian areas along creeks or rivers. Moist forest floor conditions appear to be more important than forest age or type.
- Required microhabitat features include coarse woody debris, pockets of deep leaf litter, or other moist shelter sites such as provided by root-masses of sword ferns. It "occurs sporadically in coniferous, deciduous and mixed-wood forests".

Occurrence

Ranges from Vancouver Island, British Columbia through Washington to Multnomah and Clatsop Counties, northwestern Oregon.

Status

BC Blue-listed (Endangered)
Canada: Schedule 1- Special Concern

Action Required

- Document location
- Maintain levels of CWD and leaf litter on the forest floor ,
- Both living dying vegetation are important; these conditions help prevent the loss of moisture and extreme fluctuations in temperature that are thought to be particularly detrimental to hibernating snails

Figure 23: Blue-Grey Taildropper Slug

Blue-Grey Taildropper Slug (*Prophysaon coeruleum*

Description

- A small slug, blue-grey with lighter flecks but no bands on the mantle or tail; sole of foot white.
- adult length up to 45 mm when extended in movement.
- thin, oblique constriction line is usually visible on the tail where self-amputation takes place.

Biology

- species is oviparous and hermaphroditic (each individual possessing both male and female reproductive organs).
- Details of reproductive biology are unknown.
- No eggs or young have been found in BC to date.
- Fungi form a major part of the diet, especially in the autumn.

Habitat

- Inhabits moist, coniferous or mixed-wood forests of varying age classes.
- Only found in CDF.
- Often associated with older forests and required microhabitat features include abundant course woody debris or other cover, a deep forest litter layer.
- Attracted to moist depressions in open Garry oak stands/meadows.

Occurrence

- Documented on Mount Tzouhalem and south to Sooke.

Status

BC Blue-listed (Threatened)
Canada: Schedule 1- Endangered

Action Required

- Document location
- Maintain levels of CWD and leaf litter on the forest floor, retain stumps and snags, logs and bark.
- Both living dying vegetation are important; these conditions help prevent the loss of moisture and extreme fluctuations in temperature that are thought to be particularly detrimental to hibernating snails.
- Control; invasive species such as broom, daphne and English ivy.
- Report to the BC Conservation Data Centre or HAT (hatmail@hat.bc.ca (250 9952428)if found.

Figure 24: Dromedary Jumping Slug

Dromedary Jumping-slug (*Hemphillia dromedarius*)

Description

- A large slug, length up to about 60 mm when extended in movement, with a distinctive appearance.
- The visceral pouch is raised into a pronounced hump.
- The yellowish internal shell plate is partially visible through a slit in the mantle.
- The overall dorsal colouration ranges from grey to tan and brown. The underside (sole of the foot) is pale yellow, orange, or grey.

Biology

- simultaneous hermaphrodite and lays eggs. Details of reproductive biology are unknown.
- The oval, semi-opaque eggs measured ca. 3.3 mm in length and 2.5 mm in diameter. Oviposition took place in wet or moist decaying wood. Nothing is known of the reproductive biology of the species in British Columbia

Habitat

- In BC, associated with older, coniferous forest and old-growth forest attributes).
- Important microhabitat features consist of abundant coarse woody debris, including large-diameter decaying logs, and shaded, moist forest floor conditions.
- Eggs are probably laid in moist microhabitats, such as within large decaying logs.
- All known sites in the interior and eastern Vancouver Island are at higher elevations, whereas sites on the wetter west coast of the island are at low elevations. Higher elevation sites in drier landscapes probably provide required moist conditions throughout much of the growing season.

Occurrence

Closest ones found near Mt Brenton in OG remnant patch.

Status

BC Red-listed (Endangered)
Canada: Schedule 1- Threatened

Action Required

- Document location
- Maintain levels of CWD and leaf litter on the forest floor, retain stumps and snags, logs and bark.
- Both living dying vegetation are important; these conditions help prevent the loss of moisture and extreme fluctuations in temperature that are thought to be particularly detrimental to hibernating snails.
- Control; invasive plant species.
- Report to the BC Conservation Data Centre if found.

APPENDIX 7: Field Reference Cards for Plants potentially found with NCMFR

Figure 25: Deltoid Balsamroot Field Card

Deltoid Balsamroot (*Balsamorhiza deltoidea*)

Description

- Deltoid Balsamroot (*Balsamorhiza deltoidea*) is a perennial herb arising from a deep, fleshy taproot with stems reaching to heights from 20 cm to 100 cm.
- It is a member of the aster family.
- The basal leaves are large, long-stalked and triangular.
- The stem leaves are much smaller and narrower.
- Each flower head consists of a central disk bearing small yellow flowers and a peripheral ring of larger yellow flowers.
- The fruits are small, dry, hairless achenes

Habitat

- It is usually found in rocky, exposed areas containing Garry oak, or in open meadows near the ocean.
- Habitat destruction, aggressive invasion of exotic species, and fire suppression are all threats to the

Occurrence

- In Canada, the deltoid balsamroot only occurs on the southeastern portion of Vancouver Island.
- Restricted to the South Island Forest District.

Status

BC: Red-listed (Endangered).
Canada: Endangered (2003)

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for deltoid balsamroot

Figure 26: Macoun's meadow-foam Field Card

Macoun's meadow-foam (*Limnanthes macounii*)

Description

- Annual herb from a fibrous root; stems decumbent (taller plants) to erect (smaller plants), several to many, unbranched to few branched, glabrous, 2-5 (15) cm tall.
- Basal leaves pinnate with 3-13 toothed or lobed segments, the segments oblanceolate, 4-10 mm long, sometimes again toothed, stalked, the stalks about as long as the leaves, glabrous, stem leaves similar, few.
- Inflorescence of single, terminal flowers on stalks about as long as the leaves; petals usually 4, white to yellowish, egg-shaped, 4-5 mm long; sepals usually 4, egg-shaped, sharp-pointed, with 2 rows of hairs at the base, 3-4 mm long.
- Fruits are Nutlets, 3-4, rarely 1, somewhat cone-shaped, 2.8-3.2 mm long, greyish-green to brown, with small protrusions on the tops and sides.
- Winter annual, which gives it an advantage because it can germinate and produce biomass when other competing species are dormant.
- It is a member of the aster family.

Habitat

- Vernal pools, seepage areas on rocky slopes, wet depressions in open Douglas fir Garry Oak forests.
- No specific legislation exists to protect rare and endangered vascular plants in British Columbia.

Occurrence

- Wet depressions, vernal pools and seepage sites in the lowland zone; infrequent on SE Vancouver Island and adjacent islands; endemic.
- Restricted to the South Island Forest District.

Status

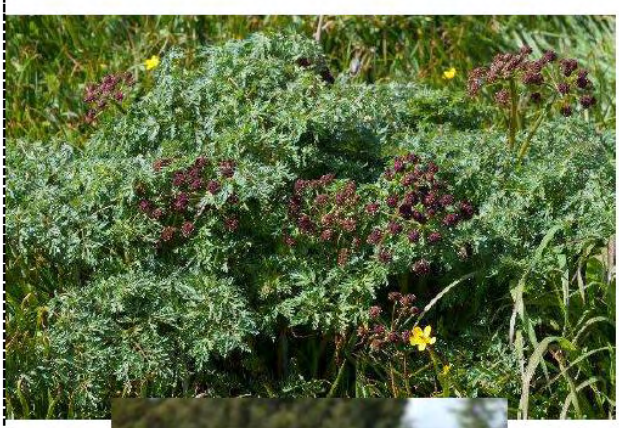
BC: Red-listed (Endangered).
Canada: Threatened(2003)

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Macoun's meadow-foam.

Figure 27: Fern-Leaved Desert Parsley Field Card

Fern-leaved Desert-parsley (*Lomatium dissectum var. dissectum*)



Description

- Stout perennial herb from a taproot; stems several, 0.5-1.5 (2) m tall.
- Leaves mostly basal, finely dissected, fernlike, 1-3 times divided; ultimate segments narrow and scarcely leaflike, usually less than 5 mm wide.
- Flowers inflorescence of compound umbels; flowers yellow or purple; bracts of umbellets very narrow.
- Fruits: Oblong to elliptic, 8-18 mm long, with corky-thickened narrow wings.

Habitat

- Dry grasslands, shrublands, talus and rocky slopes in the steppe and montane zones

Threats

- Threats are overall high and include invasive forbs and shrubs, eroding coastal bluff habitat, trailside disturbances, mowing, development, ungulate herbivory, fire suppression/successional changes, and the picking of flower heads in parks.

Occurrence

- Wet depressions, vernal pools and seepage sites in the lowland zone; infrequent on SE Vancouver Island and adjacent islands; endemic.
- Found on south east coast of Vancouver Island
- Occurs in only 13 locations over a restricted range in SW BC (523 sq km).
- Restricted to the South Island Forest District.

Status

BC: Red-listed (Endangered).
Canada: not listed

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Fern-leaved Desert-parsley

Figure 28: Pine Broomrape Field Card

Pine Broomrape (*Orobanche pinorum*)

Description

- Parasitic herb from an evidently thickened, somewhat tuberous base, soon tapering and becoming more slender, short glandular-hairy throughout; stems one or several, with more or less numerous, short, slender branches above, 10-30 cm tall.
- Leaves: Basal leaves lacking; stem leaves scaly-bracteate, alternate, short glandular-hairy.
- Flowers: Inflorescence loose, panicle-like, the flowers short-stalked or unstalked, subtended by a pair of bractlets at the base of the calyces as well as by a bract at the base of the stalk; corolla 13-20 mm long, yellowish marked with purplish-brown, the lips short, with short-pointed lobes; calyces 5-8 mm long, the slender lobes about equaling the tubes, or a little shorter, with leaves; anthers smooth or nearly so.
- Fruits: Capsules, 2-locular, 2- or 3-valved, breaking open longitudinally; seeds numerous, small.

Habitat

- Parasitic on coniferous species; moist to mesic sites in the lowland zone; rare on S Vancouver Island

Occurrence

- moist to mesic sites in the lowland zone.
- Found on south east coast of Vancouver Island; only specimen found at the Kokisilah River
- Restricted to the South Island Forest District.

Status

BC: Red-listed (Endangered).
Canada: not listed

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Pine Broomrape.

Figure 29: Purple Sanicle Field Card

Purple Sanicle (*Sanicula bipinnatifida*)

Description

- Short-lived perennial that grows from a taproot.
- Perennial herb from a taproot; stems erect, 10-60 cm tall, branching.
- Leaves: Basal and lower stem leaves pinnately divided, toothed or with a winged and toothed leaf axis, the stalks sharply toothed, the blades 4-13 cm long, 3-12 cm wide.
- Flowers: Inflorescence of several to many compact headlike umbels; flowers purple; involucel inconspicuous, of 6-8 lanceolate bractlets.
- Fruits: Egg-shaped to subglobose, 3-6 mm long, covered with stout, hooked prickles. **Location:**
- Mesic to dry meadows and woodlands in the lowland zone; rare on SE Vancouver Island.
- Early seedling mortality may be quite high with only a small proportion of germinants surviving the following dormant season. Pollinators are likely generalist insects. Flowers are protogynous. The seeds (mericarps) have small hooked prickles which allow dispersal via animal fur or human clothing.

Occurrence

- Found in dry to mesic meadows and mesic, open, deciduous woodlands.
- Most populations are found at less than 30 m above sea level, although some populations (Mill Hill, Mount Tzuhalem, Brown Ridge) are found from ca. 100 to 300 m elevation.
- Habitat occurs on nearly level to very steep slopes ranging from southeast to southwest aspect. Meso-slope position is either level, upper slope, or middle slope.
- Sites are well to moderately well drained and are dry in the summer and moist in the winter, although rarely saturated.
- Soil depth is usually more than 30 cm. Trees may be present.

Status

BC: Red-listed (Endangered).
Canada: SARA: Threatened (2003)

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Purple Sanicle.

Figure 30: White-top Aster Field Card

White-top Aster (*Sericocarpus rigidus*)

Description

- Perennial herb from a slender, creeping rhizome; stems erect to ascending, glabrous, 10-30 cm tall.
- Leaves: Basal leaves reduced and soon deciduous; stem leaves oblanceolate, tapering to an essentially unstalked base, somewhat 3-nerved, entire, often slightly stiff-hairy on the midrib below, 2.5-3.5 cm long, 5-9 mm wide, gradually reduced upwards.
- Flowers: Heads with ray and disk flowers, several to many in a terminal cluster or rarely more branched, white and papery below, the light green tip often loose and spreading; ray flowers inconspicuous.
- Fruits: Achenes smooth, densely grey-hairy; pappus white.

Location:

- Dry meadows, woodlands and rocky slopes in the lowland zone
- In North Cowichan found on Maple Mountain, Ecological Reserve on Mount Tzouhalem, Elkington Property on Quamichan Lake.; rare on S Vancouver Island and the lower Fraser Valley; S to OR.

Occurrence

Dry meadows, woodlands and rocky slopes in the lowland zone
In North Cowichan found on Maple Mountain, Ecological Reserve on Mount Tzouhalem, Elkington Property on Quamichan Lake.

Status

BC: Red-listed (Endangered).
Canada: SARA: Special Concern (2003).

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for White-top Aster.

Figure 31: Howell's violet Field Card

Howell's violet (*Viola howellii*)

Description

- Perennial herb from a scaly, thick rhizome, without stolons; stems erect, sparsely hairy, 2-10 cm tall.
- Leaves: Basal leaves heart- to kidney-shaped, toothed, smooth to short-hairy, the blades 2-4 cm long, 1.5-4 cm wide, the stalks 10-15 cm long, smooth; stem leaves similar, the stalks from shorter than to slightly longer than the blades; stipules narrowly oblong, 3-10 mm long, sharp-toothed.
- Flowers: Inflorescence of single, axillary flowers; petals 5, bluish-violet (white at the base) to white, the lower petal 15-20 mm long including the 2- to 4-mm long, pouched spur, the lower 3 strongly purplish-veined, the lateral pair white-bearded; sepals 5, fringed, oblong, with earlike lobes at the base; style heads sparsely bearded.
- Fruits: Capsules, smooth; seeds light brown.

Location:

- Mesic to moist woodlands and forests in the lowland zone; rare on S Vancouver Island and the lower Fraser Valley; S to OR.

Occurrence

- Mesic to moist woodlands and forests in the lowland zone
- In North Cowichan found in Somenos Garry Oak Protected Area.

Status

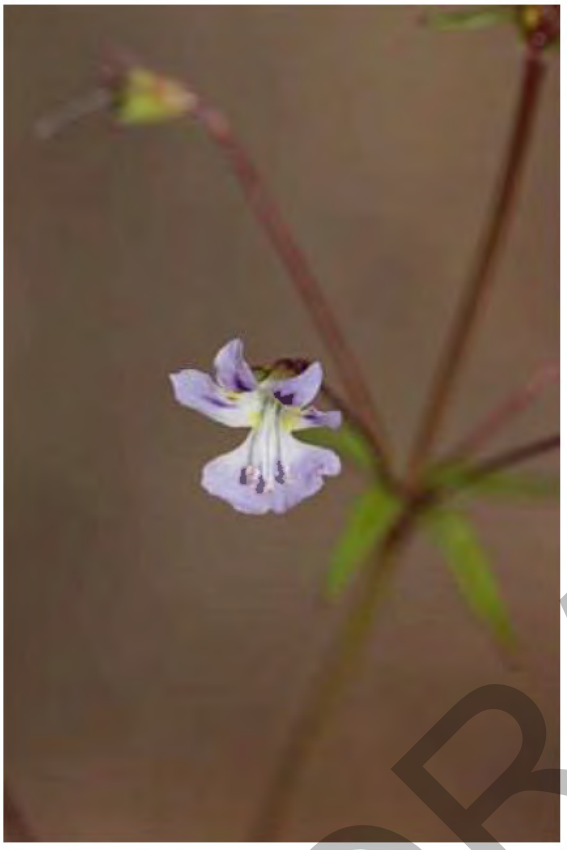
BC: Red-listed (Endangered).
Canada: SARA: Sensitive

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Howell's Violet.

Figure 32: Small-flowered Tonella Field Card

Small-flowered Tonella (*Tonella tenella*)



Description

- small annual herb with an erect stem up to 30 centimeters tall.
- The flowers are very tiny, only a few millimeters wide. The corolla is arranged with four petal lobes on one side and one larger petal lobe on the other. The lobed petals are white with blue or purple spots or streaks, and they surround four white stamens.
- Annual herb from a taproot; stems ascending to erect, 5-25 cm tall, slender, often branched, smooth.
- Leaves: Opposite, smooth or soft-hairy on the upper surface; lowermost leaves stalked, egg-shaped to round, 1-2 cm long, few-toothed; middle and upper leaves becoming unstalked upward, deeply 3-lobed, the segments progressively narrower upward; uppermost leaves reduced and often entire.
- Fruits: Capsules, egg- to globe-shaped; seeds 2 to 4, large, 1-1.5 mm long, wingless.

Location:

- Grows in the forest understory, in Garry oak stands, on moist rocky soil
- In North Cowichan found on Maple Mountain.

Occurrence

- Grows in the forest understory, in Garry oak stands, on moist rocky soil
- In North Cowichan found on Maple Mountain.

Status

BC: Red-listed (Endangered).
Canada: SARA: Endangered (2005).

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Small-flowered Tonella

Figure 33: Lindley's Microseris Field Card

Lindley's Microseris (*Uropappus lindleyi*)

Description

- A taprooted annual with erect glabrous stems that are leafy below and sometimes branched near the base.
- Plants are 10-70 cm tall.
- Basal leaves are 15-30 cm long, linear, and long-pointed at the tip, entire or more frequently with linear swept-back lobes.
- The foliage exudes a milky juice when broken.
- Plants have solitary and terminal heads that are comprised of yellow, strap-shaped flowers.
- Flowers are enclosed in a 15-30 mm tall involucre of lanceolate bracts, the inner ones graduated and outer ones few and somewhat graduated.
- Fruits are slender, blackish, and finely ribbed achenes.).
- Flowering occurs in April and May and is asynchronous (e.g., unopened flowers occur next to flowers in seed).

Location:

- Occurs on sandstone cliffs, steep grassy slopes, and xeric, open deciduous or conifer forests on rocky slopes and cliffs). Grows on dry open forests dominated by Garry Oak and mixed woodland types with an overstory of Douglas fir, Arbutus, and Garry Oak on south- or southwest-facing, steep (70-90%), well-drained, gravelly or rocky slopes at low elevations (0-80 m) .

Occurrence

- Grows on dry open forests dominated by Garry Oak and mixed woodland types with an overstory of Douglas fir, Arbutus, and Garry Oak on south- or southwest-facing, steep (70-90%), well-drained, gravelly or rocky slopes at low elevations (0-80 m).
- Documented in Nanoose and Gulf Islands.

Status

BC: Red-listed (Endangered).
Canada: SARA: Endangered (2010).

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Lindley's Microseris.

Figure 34: Howell's triteleia Field Card

Howell's triteleia (*Triteleia howellii*)

Description

- This perennial species reproduces both by seed and through vegetative reproduction. The latter involves the production of cormlets from the corm, and individuals arising from the cormlets are genetically identical to the "mother" plant.
- The plant's flowering season is in late May and June.
- Perennial herb from a deep, straw-coloured, fibrous-scaly, nearly globe-shaped, bulb-like corm; flowering stems erect, 20-50 cm tall, slender, smooth.
- Leaves: Basal leaves 1 or 2, linear, keeled, 10-40 cm long, 3-8 mm wide, smooth, sheathing at the base, the margins entire; stem leaves lacking.
- Flowers are a compact, terminal umbel of several erect to ascending, more or less equally stalked flowers, above several membranous bracts, the stalks 0.5-3 cm long; flowers whitish to blue, vase-shaped to narrowly bell-shaped, of 6 fused segments.
- Fruits:Capsules, egg-shaped, stalked; seeds rounded, black.

Location:

- Grows in Garry oak stands, on deep, dark soils in rich understories.
- In North Cowichan documented on the Cowichan River Estuary, Somenos Garry Oak Protected Area and the Elkington Property on Quamichan Lake.

Threats

- Habitat change through fire suppression and introduced plant species (particularly Scotch broom) are also major concerns.

Occurrence

- Grows in the forest understory, in Garry oak stands, on moist rocky soil
- In North Cowichan documented on the Cowichan River Estuary, Somenos Garry Oak Protected Area and the Elkington Property on Quamichan Lake.

Status

BC: Red-listed (Endangered).
Canada: SARA: Endangered (2005).

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for Howell's triteleia.

Figure 35: White-lip Rein Orchid

White-lip rein Orchid (*Platanthera ephemerantha)*

Description

- Perennial herb from tubers, 1-2.5 cm long, with a few fibrous roots; stems 20-55 cm tall.
- Leaves: Basal 2 or 3 (4), linear to mostly oblanceolate, 10-18 cm long, 2-3.5 cm wide, dull to glossy green below, glossier above, withering before or during flowering; stem leaves bractlike, mostly 3 or 4 (2-10).
- Flowers: Inflorescence terminal, spikelike, 7-30 cm long, usually densely-flowered, the flowers small, white, sometimes with green, faintly and unpleasantly scented; sepals 2-3.5 mm long, white with a green midvein or green with white margins.
- Fruits: Capsules, ascending to erect, 5-9 mm long; seeds cinnamon brown.

Location:

- Dry forests and forest margins in the lowland to montane zones; rare in coastal BC

Occurrence

- Dry forests and forest margins in the lowland to montane zones; rare in coastal BC
- Documented on Saltspring Island and Saanich.

Status

BC: Red-listed (Endangered).
Canada: Not listed

Action Required

- Document location of occurrence, contact qualified professional to verify identification.
- Prevent direct mortality from road or stream crossing construction or maintenance activities.
- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for White-lip Rein Orchid.