A Field Guide to Species at Risk in the Coast Forest Region of British Columbia

INTERFOR

BRITISH COLUMBIA
Ministry of Water,
Land and Air Protection

A Field Guide to Species at Risk in the Coast Forest Region of British Columbia

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Every attempt has been made to ensure accuracy of the information presented herein. Corrections may be directed to Kathy.Paige@gems4.gov.bc.ca.

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INTRODUCTION

British Columbia is a province rich in native species and plant communities. Some species and plant communities are naturally rare, have a restricted distribution or are associated with specific environmental conditions making them vulnerable to extinction. Others were once widespread or common but now occur over a much smaller area, owing to threats of various origins. The impact of human activities on ecosystems has accelerated the decline of their populations, or the deterioration of their habitats. Collectively these species and plant communities are *species at risk.*

Why this field guide?

Special management attention to species at risk depends largely on the ability of industry and the public to recognize these species and plant communities. The purpose of this field guide is to provide foresters, biologists, naturalists and those interested in biodiversity conservation with a tool to help identify species at risk in the Ministry of Forest's Coast Forest Region (Fig. 1).

Who determines species at risk?

The status of species at risk is assigned to plant and animal species and plant communities by various international, national and provincial organizations.

In order to assess the degree of conservation risk of wildlife populations and habitats, The Nature Conservancy and the Natural Heritage Network jointly established ***NatureServe*** in July 1999 to rank species according to a standardized set of criteria. NatureServe represents an international network of biological inventories in Canada, United States, Latin America and the Caribbean. These ranks are scientifically based, but have no legal implications.

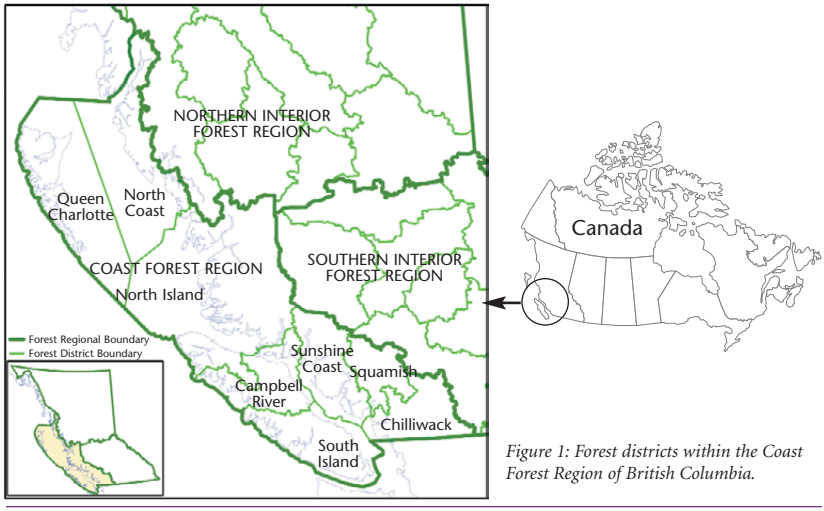


Figure 1: Forest districts within the Coast Forest Region of British Columbia.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assigns a national status to species at risk in Canada. COSEWIC consists of representatives from federal, provincial, territorial and private agencies, First Nations and independent experts; it is given legal status under the *Species at Risk Act (SARA)*. In B.C., the ***Conservation Data Centre (CDC)***, in the Ministry of Sustainable Resource Management, assigns the provincial rank, which is based solely on the status of the species within the province.

Species ranking

The NatureServe ranking of species, including plant communities, is based on factors such as rarity; the size, quality, conditions and viability of the populations; and actual or potential threats facing the species or its habitats. Each species or natural community type is assigned a global (G) *rank* on a scale of 1 (critically imperiled) to 5 (common); a national Canada-wide (N) rank; and a subnational (S) rank that reflects its provincial conservation status. The ranking process also includes *modifiers* (i.e., letters or marks that further define the reason behind the S, G or N ranking) (Appendix I).

For more information on NatureServe, its methods and ranks, visit the NatureServe web page http://www.natureserve.org

For information on ranking in B.C., visit http://wlapwww.gov.bc.ca/wld/documents/ranking.pdf.

Species listing

As of January 2003, the CDC had identified over 1500 animals, plants and plant communities as being at risk in B.C. The CDC separates species into three lists according to conservation risk:

- **Red List** – species legally designated as *endangered* or *threatened* under the *B.C. Wildlife Act,* and species with S ranks of 1, 2, 1-2, 1-3, H or X (Appendix I).
- **Blue List** – species not immediately threatened, but of concern because of characteristics that make them particularly sensitive to human activities or natural events. Species with S ranks of 2-3, 3, or 3-4 (animals only) (Appendix I).
- **Yellow List** – all species not included on the Red or Blue lists. Species with S ranks of 4, 5, 4-5, or 3-4 (plants only).

From 1999 to 2003, a Technical Advisory Committee of the B.C. Identified Wildlife Management Strategy assessed and ranked species at risk on the basis of their relative conservation risk (by combining global and provincial ranks), and relative risk (by assessing habitat protection mechanisms and main threats causing a species or plant community to be at risk). This resulted in the selection of *Identified Wildlife* requiring special planning and management attention under the *Forest and Range Practices Act of British Columbia.*

Selection of species at risk for this guide

This field guide includes Identified Wildlife and species that are ranked endangered or threatened by COSEWIC as of January 2002. The selection of Identified Wildlife and COSEWIC species meets the requirements of today's forestry certification programs.

GUIDE CONTENTS

This guide consists of seven sections: 1) invertebrates, 2) fish, 3) amphibians and reptiles, 4) birds, 5) mammals, 6) mosses, lichens and vacular plants, and 7) plant communities. The following information for each species or plant community is provided:

- English name: the popular name that is generally used for a particular animal[1] or plant[2].
- Scientific name: the scientific name of a species consists of two words; the genus (capitalized) and the species (lower case). If a species is divided into subspecies, a third word indicating the subspecies is added. For example, the scientific name of the northern saw-whet owl is *Aegolius* (genus) *acadicus* (species) *brooksi* (subspecies).
- Description: defining characteristics, photographs, drawings and comparative information about similar species and communities. In the case of animals, field signs (e.g., tracks, scats, burrows, nests) are also described. Plant communities are identified through a combination of site characteristics and common plant species.

  Features may vary slightly within each species. Scientific names of similar species are provided in Appendix VI.
- Distribution: information about the location of species and plant communities.

  Forest districts: distribution according to the Ministry of Forests administrative units (Fig. 1).

  Biogeoclimatic units (Appendix II): units based on geographically related ecosystems defined by local climatic regimes and the vegetation found on a particular site. Many species at risk described in this book are associated with Garry Oak ecosystems, which are described in Appendix III.

1 The nomenclature used in this book diverges from the British Columbia Resources Inventory Standards Committee (RISC), which gives a single common name to each species and does not refer to specific subspecies or populations. For example, while this field guide refers to "Vancouver Island" Common Water Shrew, RISC refers only to Common Water Shrew.

2 Plant species names follow nomenclature used in Douglas et al.'s (1998 to 2002) *Illustrated Flora of British Columbia.*

- Habitat information: places where the species may be encountered. Structural stages, coarse woody debris decay classes and wildlife tree classes are described in Appendix IV.
- Status: the global, national and provincial status of each species and plant community is provided in Appendix V.
- Annual Schedule: a graph representing approximate times for important life history stages.

HOW TO USE THIS BOOK

1. Become familiar with each species or plant community. Consult the first pages of each section for general features of the group of species and plant communities. The Glossary may provide additional information.
2. It is best to identify a species by sight. However, because species at risk are rare and not often observed, focus on recognizing field signs as listed in each account.
3. Revisit the area where you encountered the species, and search for signs such as tracks or feathers that may confirm identification.
4. Reading field signs (nests, tracks, droppings, claw marks, trails) is not easy. For example, some birds may use the old nests of other species. If there is evidence of an old nest being reused, one must see eggs, nestlings or birds to be sure of the resident. Tracks register differently in crusty snow, deep soft snow, mud or dust. On a sunny winter day, a track may become enlarged or distorted. Individual variations may add to the difficulty of identifying a species. When investigating the presence of a species at risk, it is vital to gather as much supporting data as possible. Follow the trail of the animal to establish the track pattern, and look for tracks or droppings. Use a retractable tape to take measurements, and a flashlight and magnifying glass to facilitate close-up examinations.
5. Where possible, photograph a species, habitat, plant community or sign. Colour photography is especially useful in substantiating records. Photographs allow you to compare findings with reference materials.

REPORTING OBSERVATIONS

After confirming the presence of a species at risk, record the following information:

- general description of the habitat, noting any special features; include dominant plants, moisture (inundated, mesic, xeric, etc.); in the case of plants and plant communities, estimate abundance and landscape context
- elevation in metres
- slope gradient (%) and aspect (degrees)
- biogeoclimatic zone, subzone and variant
- location on an air photo, map or GPS reading

Obtain a specimen, if applicable, for verification by the CDC. See Douglas et al. (2002) and the following instructions for collecting and labelling plant specimens for submission to the CDC. Remember to not collect from parks. A permit is generally required for animal collections (e.g., tissue or hair samples). See Proulx (1999) and Powell and Proulx (2003) for more information on trapping technology, and animal capture and handling.

Plant collections

While collection of a plant specimen is usually required to positively identify the species, common sense should prevail when a rare plant species population is encountered. Where limited individual plants are encountered, do not collect a specimen; rather, record the precise site location and submit it to the CDC. Subsequent field visits by an expert botanist can confirm identification.

In the field – if there are numerous individual plants and the population appears stable, collect 1-2 full plant specimens to press and submit to the CDC. Collect the entire plant, including the root system. Minimize bending or folding of the specimen where possible. Place the specimen in a plastic bag and remove as much air as possible from the bag, being careful not to damage or compress any plant structures. If the specimen cannot be pressed the day it is collected, refrigerate it for a period not exceeding five days.

At home – a typical plant press consists of two pieces of plywood, cardboard, newspaper sheets and rope. Place the specimen on one side of the newspaper sheet and fold the other side over it. Place the newspaper between two cardboard sheets and onto a sheet of plywood. When all specimens have been prepared this way, place the remaining plywood sheet on top of the cardboard stack and squeeze the press together using rope. Specimens pressed in this manner usually require 5-10 days to dry. It is important to label each specimen with the plant name, location, date, collector's name, flower colour and description of the plant habitat.

Animal collections

It is generally not required to collect animals for identification. However, for some species, there is no reliable field technique to distinguish species at risk from common ones (e.g., bat species). In these cases, tissue or hair samples may be collected for DNA analysis. A species expert should be consulted. Permits may be required. Contact regional Ministry of Water, Land and Air Protection offices for contacts or more information.

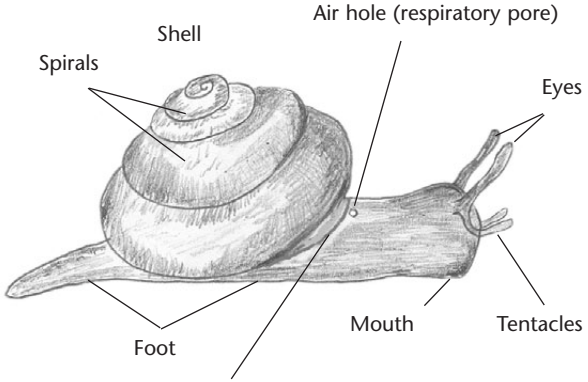
Report observations to CDC

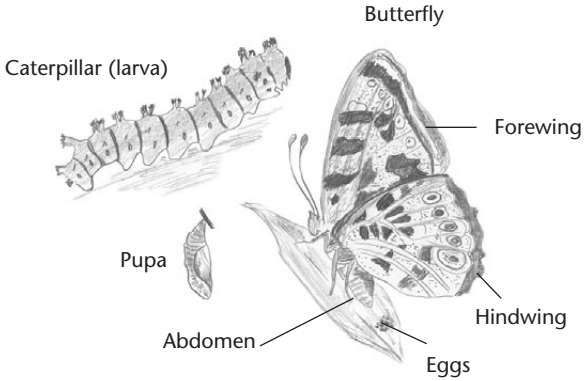
Report observations to the CDC using Field Observation Forms available at: http://srmwww.gov.bc.ca/cdc/contribute.htm.

Copies of these forms should also be faxed to the regional office of the Ministry of Water, Land and Air Protection and to forestry company supervisors in charge of species at risk issues.

Invertebrates

English Name	Scientific Name	Forest District	Biogeoclimatic Unit
Oregon forestsnail	*Allogona townsendiana*	Chilliwack South Island	CDFmm CWH
Puget Oregonian snail	*Cryptomastix devia*	Chilliwack South Island	CDFmm CWH
Quatsino cave amphipod	*Stygobromus quatsinensis*	Campbell River North Coast South Island	CWH
Taylor's checkerspot	*Euphydryas editha taylori*	South Island	CDFmm
Island large marble	*Euchloe ausonides insulanus*	South Island	CDFmm
Dun skipper	*Euphyes vestris*	South Island Sunshine Coast Chilliwack	CDFmm CWHxm1
Johnson's hairstreak	*Loranthomitoura johnsoni*	Chilliwack	CWH: dm, xm1
Island blue	*Plebeius saepiolus insulanus*	South Island	CDFmm


Air hole (respiratory pore)
Shell
Spirals
Eyes
Mouth
Tentacles
Foot
Thickened lip of shell where tooth-like projection occurs


Butterfly
Caterpillar (larva)
Forewing
Pupa
Hindwing
Abdomen
Eggs

OREGON FORESTSNAIL
Allogona townsendiana

K. Ovaska

Oregon forestsnail

Description
The Oregon forestsnail has a large, round pale brown to pale yellow shell with 5-6 whorls and a diameter of 28-35 mm. The whorls have irregular, fine pale lines and spirals. When viewed from below, the white and thickened lip of the adult shell is evident.

Similar species: This species is unlikely to be confused with other land snails within western B.C. (there is another species of *Allogona* in eastern B.C.). The Puget Oregonian is almost the same size, but unlike the Oregon forestsnail, adults have a tooth-like projection in the aperture of the shell. The Puget Oregonian probably no longer exists in the province. The northwest hesperian is smaller (shell diameter <16 mm) and the shell is usually covered with short hairs, which are noticeable when the shell is held up to light. Other large snails within the range of the Oregon forestsnail include the native Pacific sideband, and the introduced grovesnail and brown garden snail. With the exception of the Puget Oregonian, the shells of these species do not have a white, thickened lip.

Distribution
The Oregon forestsnail is native to western North America. In B.C. this snail is restricted to a very small area on southern Vancouver Island and the coastal lowlands in the lower Fraser Valley.

Habitat
The species inhabits low-elevation mixedwood and deciduous forests and riparian areas with a rich and highly productive understory. Microsites where the snail is found include a deep, rich mull-type litter layer, extensive coarse woody debris, cool shade, dense herbaceous vegetation, and most importantly, a continually moist environment. It seeks out sheltered environments during the cold periods of winter and the drought periods of summer. The snail is associated with bigleaf maple, cottonwoods, willow, western redcedar and stinging nettle. The snail is hermaphroditic and lays eggs in the spring. It selects soft and moist soil sites and digs a shallow depression before laying multiple eggs. This snail may be long-lived and probably does not reach sexual maturity for several years.

Elevation: <250 m

Structural stages: 7

PUGET OREGONIAN SNAIL
Cryptomastix devia

Description
The Puget Oregonian snail has a large, round pale yellow to brown shell with a diameter of 18-26 mm and 5-6 whorls. The broadly expanded, flared and thickened lip of the shell is a characteristic feature of adult shells. This lip is pale in comparison to the rest of the shell and has a distinct white tooth-like structure within the aperture. The snail has a light brown body, which is sometimes offset by a lilac colouration.

Similar species: The Oregon forestsnail, pygmy Oregonian and northwest hesperian snails also have an expanded, flared and thickened lip of the shell. However, both the pygmy Oregonian and northwest hesperian are covered with spiral rows of small hairs that can be readily seen when held in the light, and both species are smaller (<10 mm and 16 mm in diameter, respectively). The northwest hesperian and Oregon forestsnail lack the tooth-like structure within the shell aperture. The Oregon forestsnail is typically larger (28-35 mm in diameter). In addition, two large introduced landsnails occur within the potential range of the Puget Oregonian snail in B.C.: the grovesnail and brown garden snail. Both lack the thickened, flared upper lip and apertural tooth of adult Puget Oregonian snails.

Distribution
The Puget Oregonian snail is native to western North America, occurring at the northernmost extent of its range in Canada. Old records suggest it occurred on southern Vancouver Island and possibly in the lower Fraser Valley, but a lack of recent records suggests it has been extirpated from this region.


B. Leonard

Puget Oregonian snail

Habitat
The Puget Oregonian snail inhabits older forests in low- to mid-elevations and is considered a mature forest specialist. Mixedwood forests with a multi-layered understory and a continuous moisture supply are important habitat features. High canopy closure ensures that the forest floor remains moist. Structural associations include bigleaf maple-dominated stands with sword fern understory and an extensive epiphyte component, decaying hardwood logs and other coarse woody debris, deep litter layer and extensive fungal or mycorhizal associations as potential food sources. This species is hermaphroditic but probably exhibits cross-fertilization. Little is known of its reproductive biology. The snails may lay eggs in sheltered locations, such as under or within coarse woody debris. The snails may be slow growing and like other landsnails may not reach maturity for several years. The Puget Oregonian snail is likely a fungivore-herbivore.

Structural stages: 7

QUATSINO CAVE AMPHIPOD
Stygobromus quatsinensis

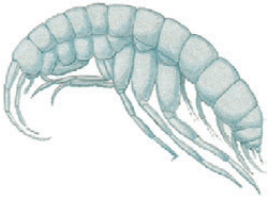
Description
The Quatsino cave amphipod is a minute, translucent cave crustacean that lives exclusively in the darkness of the freshwater that trickles through the cave formations of coastal B.C.
Length: 5-7 mm

Distribution
Restricted to Vancouver Island.

Habitat
Known from karst formations, springs and subterranean systems. Karst formations are a result of water percolating through carbonate bedrock (limestone, marble or dolomite) over thousands of years, creating underground cave and stream networks.

Habitats with karst formations typically have carbonate bedrock, heavy rainfall, steep topography, a diverse epiphytic component and dense vegetation. The amphipod's habitat is located below second growth, mature and old growth forests. Canopy species composition: typically western hemlock, western redcedar, amabilis fir, Sitka spruce and yellow-cedar. Understory with dense epiphytic component. The amphipod disperses through freshwater that flows through the subterranean fissures, cracks and crevices of karst formations.

Elevations: 100-800 m



M. Nyhof

Quatsino cave amphipod

P. Griffiths

The Quatsino cave amphipod feeds on organic matter. Note cave formations with shallow mud-bottom, gravel and cobble, detritus and organic materials.

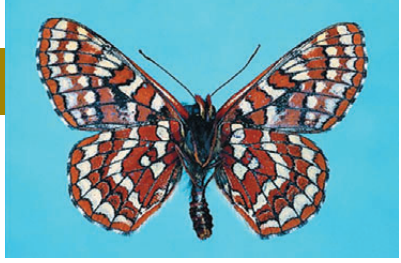
J. Marc

TAYLOR'S CHECKERSPOT
Euphydryas editha taylori

Description
Adults: Bright and eye-catching butterfly with distinct and alternating bright red, orange and black bands on the wing uppersides. Wing undersides show a pattern of orange and white-checkered bands outlined with black and forming a 'stained glass' appearance. Checkered bands are parallel to the black thorax and abdomen. Front wings have rounded tips. Males are slightly smaller than females. *Wingspan:* 3.2-5.1 cm

Eggs: Pale yellow and transparent. There is only one brood per year.

Caterpillars: Black with dorsal and lateral orange bands. Bristles cover the body and the bases of each bristle are orange.



C.S. Guppy

Taylor's checkerspot male

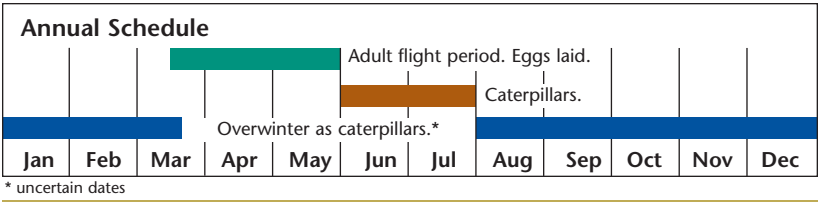
C.S. Guppy

Taylor's checkerspot female

Distribution
The Taylor's checkerspot inhabits Garry oak and associated ecosystems (Appendix III). The last known populations of the Taylor's checkerspot were on Hornby Island, yet it may occur within patches of unsurveyed habitat.

Habitat
Open and dry lowland meadows, open Garry oak woodlands, fields, pastures and foothills. The adult nectar source is spring gold, which prefers full sun and is recorded within oak woodland habitats with little disturbance. Caterpillars feed on plantain species. In spring, caterpillars have also been reported on golden paintbrush and harsh paintbrush. The larval food plant grows in numerous locations; however, the adult nectar source may be the limiting factor in determining the species distribution. Spring gold does not tolerate shade and is recorded within oak woodland habitats with little disturbance. Additional nectar sources include strawberry, camas and sea blush.

Structural stages: 1, 2, 3



* uncertain dates

ISLAND LARGE MARBLE
Euchloe ausonides insulanus

Description

Adults: A white and greyish-black butterfly with a marbled texture on the underside of the hindwings and black markings at the tips of the forewings. The veins on the hindwings are emphasized as yellowish lines, giving the species a marbled appearance. The sexes are similar but the females have darker yellowish marbling on the hindwings. The body is covered with whitish-yellow hairs, giving it a fuzzy appearance. *Wingspan:* 4.1-4.8 cm

J. Miskelly

Adult Island large marble

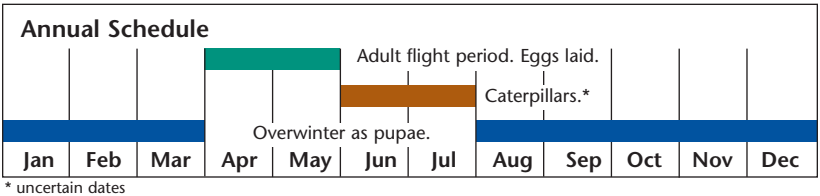
J. Miskelly

Island large marble caterpillar

Eggs: Eggs are at first blue-green, then turn orange within a day, and eventually bright red. Prior to hatching, the eggs turn a drab yellowish-brown. Eggs (only one brood per year) are laid singly on the stems, leaves or flowerheads of the larval foodplant, and caterpillars feed on these until forming pupae sometime in June or July.

Caterpillars: When first hatched, the caterpillars have an overall orange-yellow coloured body and a black head. The caterpillars go through a series of moults and change from greenish to grey-green with a dotted strip of yellow and blue spots running lengthwise down the body. The ventral half of the body is a darker grey-green colour than the upper dorsal half. Just before pupation this strip of dots changes to a distinct line of yellowish spots coupled with light or dark purple spots. Island large marbles overwinter as pupae.

Similar species: No other marble-type butterflies within its range.



* uncertain dates

Distribution

Found in Garry oak and associated ecosystems (Appendix III).

Habitat

Historical populations of the Island large marble occurred in open meadows and woodlands within the Garry oak and associated ecosystems. The availability of caterpillar and nectar foodplants in these ecosystems partially determines the species' distribution. Historically, caterpillars likely fed upon rockcress and other plants in the mustard family. In the San Juan Islands (U.S.A.), adults have been observed laying eggs on patches of introduced European weeds: field mustard and tumble mustard. These plant species have a greater drought resistance than native mustard species.

The adult nectar sources for this species are unknown. Rockcress occurs throughout southern Vancouver Island and the Gulf Islands, and is widely distributed on the coast. It grows in habitat that includes rock slopes and native grasslands, notably areas with gravel soils, beaches, bluffs, disturbed sites and meadows. The plant is either biennial or a short-lived perennial. One or two erect stems grow from a basal rosette and reach heights up to 100 cm. Leaves (12 cm long) with purplish undersides grow alternately along the stem. The small white flowers bloom from May through July.

Structural stages: 1, 2, 3

DUN SKIPPER
Euphyes vestris

C.S. Guppy

Dun skipper

Description

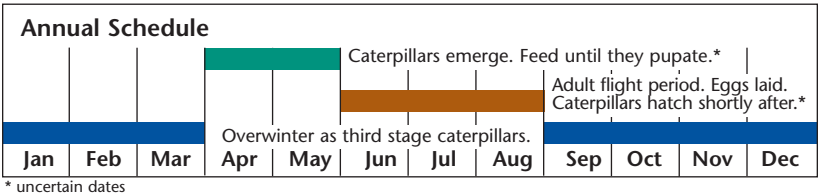
Adults: Large butterfly with purplish-chocolate brown wings and a tan fringe at the outer margins. Yellowish-orange head and thorax. Females and males have slightly different markings on wings. Males have a black blotch called a stigma (scent scale) on the forewings, and the area of wing attachment to the body is a darker brown than the outer wings. Females have small white cloudy spots on both the forewing and hindwing uppersides, and the hindwing undersides have a pale purplish crescent. *Wingspan:* 23-27 mm

Eggs: Pale green, globular and smooth when initially laid on the host plant, but change to a reddish colour before hatching. Eggs are laid singly on host plant leaves and caterpillars hatch shortly thereafter and begin feeding. In September, caterpillars form rolled leaf shelter in which they overwinter.* One brood per year.

Caterpillars: Green body with fine wavy lines. A black vertical stripe surrounds the head; a small dark brown-black spot is on the front of the head and a brown stripe runs lengthwise down each side of the black body.

The western population of the dun skipper is virtually unstudied. Information from eastern subspecies has been integrated into the text to provide additional information, even though the subspecies are separate. The western dun skipper subspecies has never been common and sightings have often been of single individuals.

Similar species: The tawny-edged skipper has an overall olive-brown wing colouration that is much lighter than the dun skipper. The females have distinct white square-shaped markings on their forewings and the males have golden forewing margins followed by black crescent-shaped markings.



* uncertain dates

Distribution

This species is known from populations at scattered locations throughout the lower mainland, southern Vancouver Island and the lower Fraser Valley. It has not been seen on Vancouver Island for several years yet could still exist within patches of unsurveyed habitat in the Malahat region north to Duncan and in other unsurveyed habitats. On the mainland, populations exist at Powell River, Boston Bar, Lillooet and points in-between within the lower Fraser Valley.

Habitat

The dun skipper is found in Garry oak and associated ecosystems (Appendix III). Records are from open moist to dry meadows, open deciduous woods and areas adjacent to swamps and streams; disturbed sites including roadsides, ditches, railway lines and powerline right-of-ways; and areas where spring floods occur, natural hotsprings, seeps and streambanks. The conditions necessary for the larval foodplant will partially determine the habitat preferences for the species. The dun skipper may utilize sedges as food plants, although specific studies need to be completed to confirm the foodplant preferences.

Structural stages: 1, 2, 3

JOHNSON'S HAIRSTREAK
Loranthomitoura johnsoni

Description
Adults: Upper wing surfaces of males are dark rusty brown and the females are a more orange-brown. The under wing surfaces (both sexes) are grey-brown and darker toward the outer wing margins. A distinct thin white line runs parallel to the outer wing margins on the wing undersides.
Wingspan: 2.5-3 cm

Caterpillars: Greyish-blue with lighter bumps down the dorsal edges.

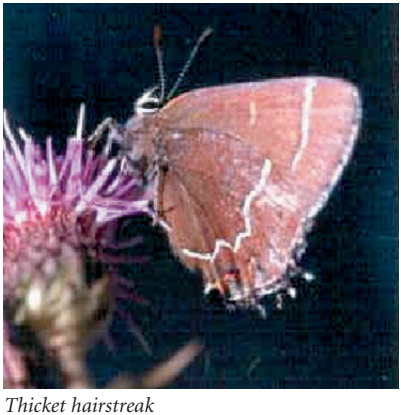
Pupae: dark brown, smooth and round.

Similar species: Thicket hairstreak has grey-blue colouration on the wing uppersides, which is different from the Johnson's hairstreak.

Distribution
Historic records of Johnson's hairstreak are from the lower Fraser Valley and southeastern Vancouver Island. Recent records are from the Lower Mainland region including Stanley Park, Spirit Regional Park, Lynn Canyon Park and the University of B.C. Haney Research Forest. This species may occur within unsurveyed habitats but has been difficult to study due to its arboreal preferences.


C.S. Guppy

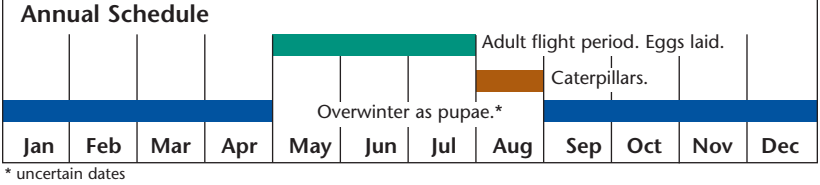
Johnson's hairstreak


L. Ulsh

Thicket hairstreak

Habitat
The Johnson's hairstreak occurs within mistletoe-infected old-growth forests. Adults frequent forest openings, riparian areas and forest edges with abundant wildflowers.

Caterpillar food sources include all plant parts of the exposed mistletoe



* uncertain dates

parasite masses, especially dwarf mistletoe on western hemlock.

Adults get nectar on wildflowers growing in forest and riparian openings.

Elevations: 0-625 m

Structural stages: 6, 7

J.M. Moore

Mistletoe-infected old-growth forest.

ISLAND BLUE
Plebeius saepiolus insulanus

Description

Adults: The wing uppersides of the female are dark brown with a bluish metallic sheen and the hindwing margins have a row of black spots with orange caps. The undersides are pale tan to dark grey. The male has metallic blue wing uppersides and a row of dark spots on the hindwing margins. The undersides are bluish toward the base of the wings and gradually turn silver-grey toward the margins. Both wings have two rows of black spots. The hindwing has orange caps on the second row of spots that are directed toward a partial third row of spots. One spot along this row is distinctly larger. Both sexes have a distinct black bar in the forewing.
Wingspan: 21-28 mm

Caterpillars: Reddish-brown or green.

Similar species: The western spring azure is a widespread similar species. The wing undersides have a row of distinct black spots toward the outer margins. These spots are smaller and not as distinct in the Island blue. The silvery blue and the Boisduval's blue are also similar. The silvery blue underwings have distinct black spots, outlined by a white ring, located toward the outer wing margins. The underwings of the Boisduval's blue have black spots on the forewings, but unlike the Island blue, do not have black spots on the hindwings.

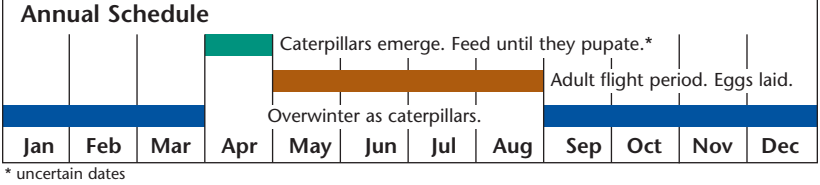
This butterfly has not been recorded since 1979 and thus little is known about it. One generation is produced

C.S. Guppy

Island blue male

C.S. Guppy

Island blue female



* uncertain dates

each year and records indicate the flight period is between early May and mid-August, and sometimes later in the season for higher elevations.

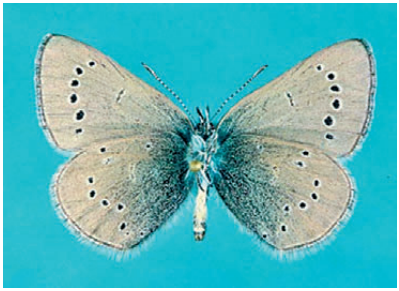
Distribution

The Island blue is native to B.C. The only global records for this species are on eastern Vancouver Island, from Victoria north to Saratoga Beach near Campbell River.

Habitat

This species is known to inhabit open areas, meadows and associated Garry oak grasslands from lowland sites to subalpine areas. The Island blue caterpillar feeds on native clovers, which are widespread and often occupy disturbed sites where there is continuous moisture for growth. Numerous clover species have been introduced to Vancouver Island ecosystems, and the mainland subspecies is known to readily use these clovers as foodplants. It is unknown why the Vancouver Island subspecies does not utilize introduced clovers.

Structural stages: 1, 2, 3



C.S. Guppy

Silvery blue

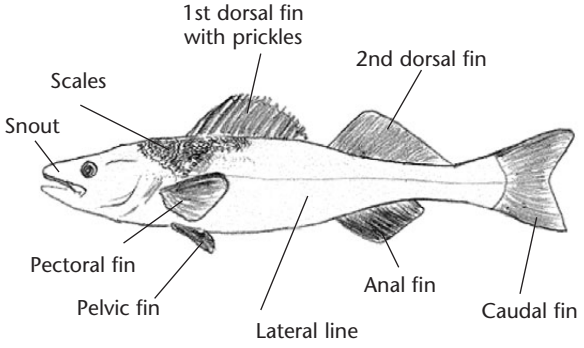
C.S. Guppy

Boisduval's blue

Fish

English Name	Scientific Name	Forest District	Biogeoclimatic Unit
Western Brook lamprey	*Lampetra richardsoni*	Campbell River	CWH
Cowichan Lake lamprey	*Lampetra macrostoma*	South Island	CWH
Bull trout	*Salvelinus confluentus*	Chilliwack North Coast Sunshine Coast Squamish	CWH, ICH, IDF, ESSF, MH
Nooksack dace	*Rhinichthys* sp.	Chilliwack	CWH
Salish sucker	*Catostomus* sp.	Chilliwack	CWH
Cultus pygmy sculpin	*Cottus* sp.	Chilliwack	CWH
Limnetic and benthic sticklebacks	*Gasterosteus* spp.	Sunshine Coast	CWHxm

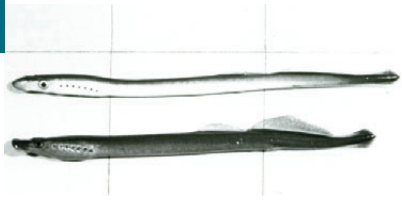
CHARACTERISTICS OF FISH



WESTERN BROOK LAMPREY
Lampetra richardsoni

Description
The Western Brook lamprey (Morrison Creek population) has both a parasitic and a non-parasitic form. Both forms remain in fresh water throughout their entire life cycle. After hatching, the young quickly burrow into the substrate for three to seven years, before metamorphosing into juveniles. The parasitic form becomes distinguishable in the spring of the year following metamorphosis, when it develops countershading with a silver upper body and a white lower body. It has teeth and is almost mature, but without sexual external characteristics such as a shorter tail and larger fins. It does not completely mature until the following year. The non-parasitic form shows advanced signs of sexual maturation and is ready to reproduce after metamorphosis. It spawns and then dies.

Length: 100-150 mm



H. Mcdermott

Western Brook lamprey

Distribution
Restricted to the Morrison Creek watershed on Vancouver Island.

Habitat
The Morrison Creek area is characteristic of interlinking wetlands with meadows, thick brush, beaver dams and open water ponds. The streambed is dominated by compressed till with limited patches of small gravel and an abundance of stream debris, which provide habitat diversity.

COWICHAN LAKE LAMPREY
Lampetra macrostoma

Description
Freshwater lamprey. Almost cylindrical in form, blue-black to dark brown with lighter underparts. Funnel and tongue with many sharp teeth; eyes small and located high on head. One small caudal and one low anal fin.

Length: 680 mm

The larval lamprey stage probably lasts six years. Larvae metamorphose into young adults from July to October; spawning occurs the following year.

Distribution
Found only in Cowichan and Mesachie lakes on Vancouver Island.

H. Mcdermott

Cowichan Lake lamprey

Habitat
Inhabits two oligotrophic freshwater lakes: one 34 km long with a mean depth of 51 m and a maximum depth of 150 m, the other 7 km long with a surface area of approximately 59 ha.

Spawning has been observed from May to August at the mouth of several creeks, where the adults aggregate in shallow, gravel-bottomed areas. It may also occur in deeper waters.

BULL TROUT
Salvelinus confluentus

Description
Freshwater fish, 20-40 cm in length, occasionally larger. Body long and slim with enlarged head and jaws. Olive-green to bluish-grey back, white belly; light yellow, orange, red or pink spots on its silvery sides. Upper jaw is long, extending past eye. Spawning adult males may have shades of red on belly.

Similar species: Dolly varden is almost identical; however, bull trout is more of an interior species than the dolly varden. The bull trout also has a larger, broader head and a somewhat flattened appearance when viewed from the head to the tail. The dolly varden has black spots on its dorsal fin, its upper jaw is somewhat shorter (usually not extending past the eye) and its nose is less pointed than the bull trout.

Distribution
The bull trout is an interior species. They reach the coast only in the Fraser and Squamish river systems.


M. Bahr

Bull trout

Habitat
Bull trout are found in cool, clear mountain streams, typically with an abundance of cobbles, stones and coarse woody debris. High elevation lakes are also utilized throughout the year. They require large, deep pools in streams or lakes for over-wintering. For spawning, bull trout use smaller, slow-moving streams or rivers with a mix of habitats, ranging from deep pools to shallow pools with gravel and cobbles. Juveniles inhabit these areas too.

Elevations: 0 to >1500 m


A. Inselberg

Bull trout habitat

NOOKSACK DACE
Rhinichthys sp.

Description
Small (<10.5 cm) streamlined fish, with a sub-terminal mouth (the snout overhangs the mouth), sometimes a black stripe in front of the eyes, small scales, pale marking at the back and front of dorsal fin when viewed from above, and forked tail. Olive-grey on rounded back; silvery-white on belly; dull brassy stripe along sides. Lower sides often splashed with dusky speckles. Sexes alike, but males tend to have longer and darker pectoral fins.

Juveniles: Very conspicuous black line on sides, from snout to base of tail.

Similar species: Close examination is required to distinguish the nooksack dace from the longnose dace. The nooksack dace has approximately 54 scales along the lateral line and 24 around the caudal peduncle, compared to 67 and 31, respectively, for the longnose dace.

Salish sucker has a more rounded snout and papillae on its lips, and is larger than the nooksack dace.

S. Inglis

Nooksack dace

Distribution
Very restricted distribution in the lower Fraser Valley, in four small streams in the Abbotsford, Aldergrove and Clearbrook areas, within the Nooksack River drainage system.

Habitat
Small lowland creeks (<6 m wide) flowing through farmlands and acreages, housing projects and gravel extraction mines. Adults inhabit riffles and fast glides with loose gravel, where they feed on nymphs of caddishflies and mayflies, dytiscid beetle larvae and adult riffle beetles. Juveniles prefer slow flowing water and pools with mud or sand bottoms, shaded by grasses and emergent vegetation, where they feed on chironomid pupae and ostracods. Spawning in April-May.

Elevations: 50-75 m

SALISH SUCKER
Catostomus sp.

Description
Elongated, cylindral, torpedo-shaped fish with a toothless mouth on the underside of the head, slightly back from the tip of nose, and fleshy lips covered with papillae, designed for sucking up food from the stream bottom.

Length: up to 24 cm

Similar species: The Salish sucker is most likely a derivative form of the longnose sucker, which is found across North America. Both species reside in waterbodies that are about 45 km apart. In the Salish sucker, scales are larger, the head deeper and snout shorter than in the longnose sucker. There is, however, overlap in all counts and measurements. The nooksack dace is smaller, and has a less rounded snout without papillae on lips.

B.C. Government

Salish sucker

Distribution
Found only in a few small streams in the heavily settled lower Fraser Valley, in the vicinity of Langley and Aldergrove.

Habitat
Headwater reaches with slightly cooler water in summer and slightly higher average gradients than lower areas. Spawns at riffles with fine gravel bottoms, with either cover or instream vegetation. Adults prefer deeper waters than juveniles.

Elevations: 16-110 m

Structural stages: 5, 6, 7

CULTUS PYGMY SCULPIN
Cottus sp.

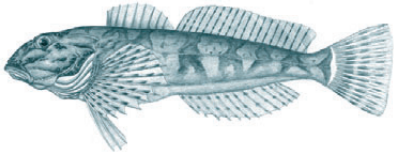
Description
Large-headed, heavy-bodied small fish (<50 mm long) with brown to grey back and white belly.

Fins: Small pelvic, long anal, two soft dorsal and large fan-like pectoral with small prickles. Adult fins are barred. Young fish lack pigmentation on fins.

Blotches: One orange band on the first dorsal of spawning males; one to three saddle-like dark blotches beneath the second dorsal of both sexes.

Length: Up to 50 mm

Similar species: The Cultus pygmy sculpin is a limnetic form derived from the coastrange sculpin, a widespread species that occurs in the fast-flowing streams that drain into Cultus Lake. The Cultus pygmy sculpin is smaller, with large pores on the head.



L. Raptis

The Cultus pygmy sculpin is a dwarf form of the coastrange sculpin (above) that may in fact be a separate species.

Distribution
Endemic to the deep waters of Cultus Lake, in the Fraser River watershed of southwestern B.C.

Habitat
Deeper waters of Cultus Lake, which is a low elevation montane lake.

LIMNETIC AND BENTHIC STICKLEBACKS
Gasterosteus spp.


J.D. McPhail

Vananda Creek sticklebacks

Four species pairs (limnetic and benthic) of sticklebacks are identified in B.C.; the Hadley Lake stickleback species pair is extinct. The remaining three species pairs are identified primarily by the watersheds or lakes they are found in:

- Vananda Creek limnetic and benthic sticklebacks
- Paxton Lake limnetic and benthic sticklebacks
- Enos Lake limnetic and benthic sticklebacks

Description
Sticklebacks are small fish, similar in size to a minnow. They average 45 mm in length, but some benthic sticklebacks can reach up to 90 mm in length. Typical colouring is silvery, greenish or black; males develop noticeable red throats and bellies during the mating season. They have armoured plates along their sides and spines along their back and belly that can be locked in place or retracted against the body.

Limnetic sticklebacks are adapted to feeding on plankton at the surface of the water, resulting in a slender body and a relatively narrow mouth with numerous gill rakers. They are also more heavily armoured than benthic species.

Benthic sticklebacks are adapted to feeding along lake bottoms and have wider bodies and broad mouths with significantly fewer gill rakers than limnetic species.

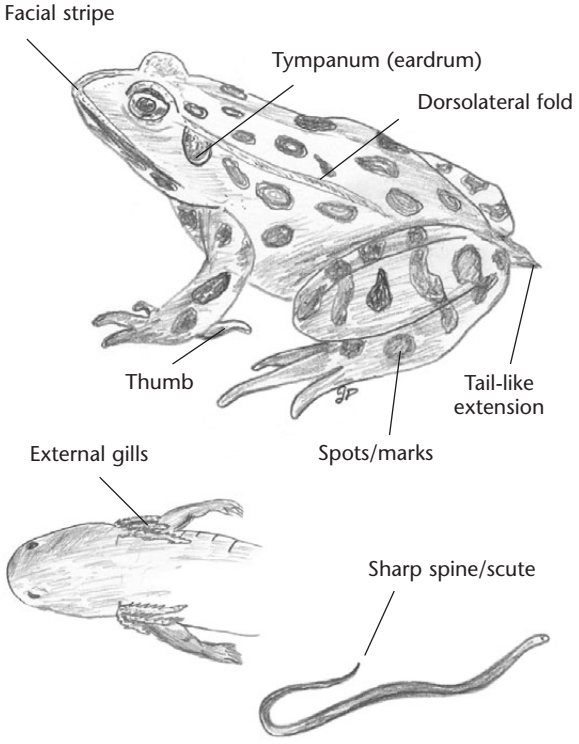
Similar species: All of these sticklebacks look quite similar and are identified primarily by their resident waterbody. Genetic analysis is usually required to identify the proper species outside of their original habitat. There are no other similar fish found in these lakes.

Distribution
Vananda Creek sticklebacks are only found in Spectacle, Emily and Priest lakes on Texada Island. The Paxton sticklebacks are only found in Paxton Lake on Texada Island. The Enos sticklebacks are restricted to Enos Lake on Vancouver Island.

Habitat
Limnetic sticklebacks are usually located near the surface of the lakes, although they disperse to deeper waters during the winter. Benthic sticklebacks spend most of their life cycle near the bottom of lakes. Spawning occurs in shallow, somewhat vegetated areas near lake edges for both limnetic and benthic sticklebacks.

Amphibians and Reptiles

English Name	Scientific Name	Forest District	Biogeoclimatic Unit
Coastal giant salamander	*Dicamptodon tenebrosus*	Chilliwack	CWH: dm, ds1, ms1, vm2, xm1
Coastal tailed frog	*Ascaphus truei*	Campbell River (mainland) Chilliwack North Island (mainland) Squamish Sunshine Coast	CWH: dm, ds1, ds2, ms1, ms2, vh1, vh2, vm1, vm2, wm, ws1, ws2, xm1; ESSF: mw, mwp IDFww; MH: mm1, mm2, mmp1, mmp2
Red-legged frog	*Rana aurora*	Campbell River Chilliwack North Island South Island Squamish Sunshine Coast	CWH, CDF
Oregon spotted frog	*Rana pretiosa*	Campbell River Chilliwack North Island South Island Squamish Sunshine Coast	CWH, CDF
Sharp-tailed snake	*Contia tenuis*	South Island	IDF


Facial stripe
Tympanum (eardrum)
Dorsolateral fold
Thumb
Tail-like extension
External gills
Spots/marks
Sharp spine/scute

COASTAL GIANT SALAMANDER
Dicamptodon tenebrosus

Description
Adults: stout body with wide, wedge-shaped head and fleshy legs. Skin is smooth, dark brown to darkish grey usually with tan, gold or grey mottling on the back and/or head. Adults can reach total lengths of up to 30-35 cm.

Larvae: ≤20 cm long, have gills, few to no mottles dorsally, and lighter underbellies than the adult forms.

Neotenes: uniformly coloured with external gills, reaching lengths of up to 35 cm.

Similar species: Larvae and young adults could be confused with the more common northwestern salamander, which is usually smaller with uniform brown, prominent costal groves along the sides, and noticeable light brown poison glands concentrated behind each eye.

Distribution
Restricted to the Chilliwack River Valley.

Habitat
Larvae and neotenes are found in cold montane streams with suitable structures for hiding (logs, boulders, overhangs). Terrestrial adults are found primarily in mature to old-growth forests adjacent to streams, but are also found in younger forests. As with larvae, adults prefer habitat with substantial cover for hiding.

Elevations: 0-2160 m, usually <1360 m


D. Knopp

Adult coastal giant salamander


K. Mallory

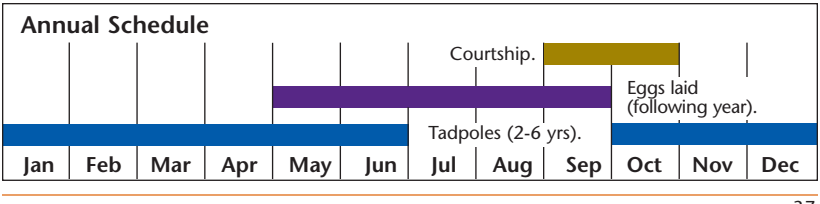
Larval coastal giant salamander


R. Haycock

Neotene coastal giant salamander


R. Haycock

Northwestern salamander



COASTAL TAILED FROG
Ascaphus truei

Description
Adults and *juveniles:* Brown, tan, greyish-green to black; lighter coloured frogs may have irregular dark spots on back. Light-coloured bar or triangle between the eyes and snout is common. Large head without tympanum; vertical pupil. Long legs. Outermost toes on hind feet are flattened and wide. Males have a tail-like extension used for internal fertilization. Do not have ability to vocalize.

Length: 2.2-5.1 cm

Tadpoles: Brownish-grey to reddish-brown or black. Laterally compressed tail, white spot at tip, is unique to coastal tailed frog. Wide, flat head with a sucker-like mouth facing downwards; 2-3 rows of teeth on the top and 8-12 rows on the bottom, allowing tadpoles to anchor themselves to rocks (or even human flesh!) in fast flowing water.

Similar species: No other tailed frogs found in the range of the coastal tailed frog.

Distribution
Mainland and islands on the mid and northern coast.

Habitat
Found in and around cold, clear (unsilted), fast-moving mountain streams. Streams are permanent and remain cool throughout the year, as coastal tailed frogs are especially prone to desiccation. Streams are generally <15 m in width and forested on both sides. Frogs winter under substrates at or near the stream surface, where there is no winter ice. Adults rarely travel far from streambanks, but have been found under logs or other suitable cover in directly adjacent mature to old-growth forests, especially after substantial rainfall or on cloudy, humid days.

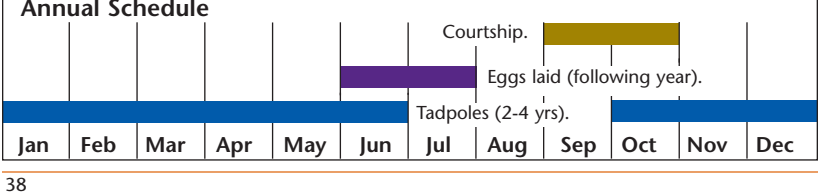
Elevations: 0-2140 m
Structural stages: 6, 7


J. Dulisse

Tailed frog adult


J. Dulisse

Tailed frog tadpole



RED-LEGGED FROG
Rana aurora

J. Hobbs

Red-legged frog

Description

Adults: Smooth skin, partially webbed feet and long hind legs. Skin on the back is brown, grey or red. Two light brown folds of skin run along back, starting from behind each eye. Underside is a translucent red, especially along the hind legs, that deepens in intensity as the frog ages. Sides have a mottled colouration pattern; larger in the groin areas, smaller toward front legs. Dark-coloured mask borders gold-coloured eyes; oriented to the sides.

Length: male 7 cm; female ≤10 cm

Tadpoles: Tan to brown with gold specks throughout their body. Bodies look short because of long tail at least as long as length of body. Tail has a dorsal fin with light spots on it. Mouth with four teeth rows on the bottom and three on the top. Reach 2-7 cm before they metamorphose.

Similar species: Most easily confused with the Oregon spotted frog; ranges only overlap in very restricted areas within the lower mainland. Eyes face up instead of to the sides; back feet have more complete webbing. Have mottled brown skin tones on the underside of the hind legs.

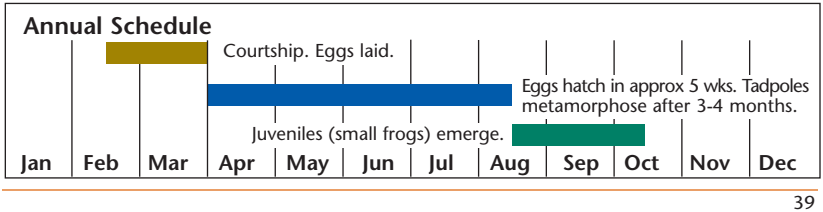
Distribution

Southwestern part of the province, including Vancouver Island and Gulf Islands. Occur on the B.C. mainland west of the Coast Mountains in the Fraser Valley and adjacent to the Strait of Georgia. Recently confirmed as having been introduced to the Queen Charlotte Islands.

Habitat

Often found in and around shallow ponds, lake margins, slow-flowing streams, marshes, bogs or fens, with abundant surrounding vegetation. Tend to avoid open water, inadequate shade or shelter. Adults also found at great distances from water sources, especially moist forests with good cover that keeps them damp and cool. May be attracted to open canopy ponds (e.g., where riparian vegetation has been removed), potentially resulting in creation of sink habitats.

Elevations: 0-920 m
Structural stages: all



OREGON SPOTTED FROG
Rana pretiosa

Description

Adults: Reddish-brown, tan or olive skin with irregular-shaped black spots that have indistinct borders and light centres, relatively short legs, extensive webbing between the toes of the hind feet, a pointed snout, and eyes that are turned slightly upward. There is an extensive light-coloured stripe down the upper lip. Light brown to orange folds extending from behind the eyes to the middle of back. Their belly is light cream-coloured, and may have a mottled or fragmented salmon or red-orange wash.

Length: Up to 6-8 cm

Juveniles: Olive-green or light brown, without the belly mottling.

Tadpoles: Long tail, about twice the length of the body, with a tall, colourless tail fin containing scattered flecks. The belly is white or slate in colour.

Similar species: The Columbia spotted frog differs genetically from the Oregon spotted frog but cannot be reliably distinguished by physical characteristics. However, the Columbia spotted frog occurs in the interior of B.C. and its range does not overlap with that of the Oregon spotted frog. The red-legged frog does not have upturned eyes; it has relatively long legs, and a mottled colouration pattern along the sides that is larger in the groin area and smaller toward the front legs. When viewed from a distance, Oregon spotted frogs have a distinct posture on land – they crouch to the ground, rather than sitting up straight like the red-legged frogs.

R. Haycock

Oregon spotted frog

R. Haycock

Oregon spotted frog ventral

Voice

From 4 to 50 faint, rapid, low-pitched clicks, for 1-10 seconds at a time.

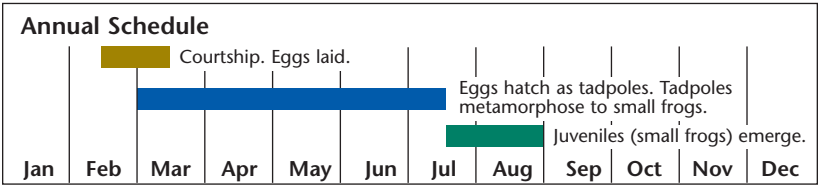
Distribution

Isolated populations in the lower Fraser Valley.

Habitat

This species is more aquatic than other frogs. Large warm-water marshes with emergent vegetation, sometimes with forested landscapes, where they lay their egg masses communally, sometimes on top of each other. Shallow ephemeral pools and small floodplain wetlands associated with permanent water bodies are important habitat features. Oregon spotted frogs rarely leave the water. The eggs and tadpoles are vulnerable to freezing and desiccation. Adults overwinter underwater.

Structural stages: all



SHARP-TAILED SNAKE
Contia tenuis

Description
Small snake with smooth scales. Thickness of a pencil. It derives its common name from a thorn-like scute at the tip of the tail. Scales come in 15 rows around the body.

Adults: Reddish-brown, yellowish-brown or grey above, tending toward reddish on the tail. A conspicuous dark bar on the anterior end of each ventral scute gives a banded appearance to underside. Indistinct yellowish or reddish line on each upper side.

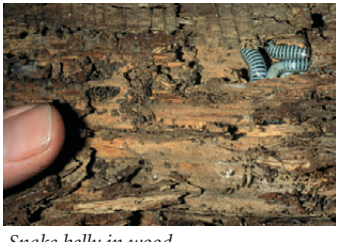
Young: Red above, fine dark lines on side.

Length: 20.5-45.5 cm

Similar species: Not likely to be confused with any other snake.

B. Leonard

Sharp-tailed snake



K. Ovaska

Snake belly in wood

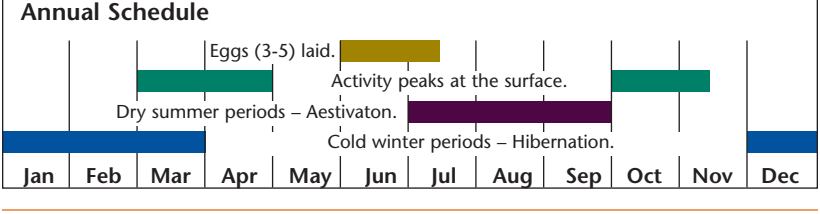
K. Ovaska

Snake tail tip

Distribution
Gulf Islands and southeastern Vancouver Island.

Habitat
Occurs within the Coastal Douglas-fir zone where it prefers Douglas-fir-arbutus stands and forest edges, and adjacent pastures or open meadows. Concentrations of snakes have been found along south-facing rocky slopes, which may provide both hibernation and egg-laying sites. Hides under logs and other objects. Easier to find following rains. Feeds on slugs.

Structural stages: all



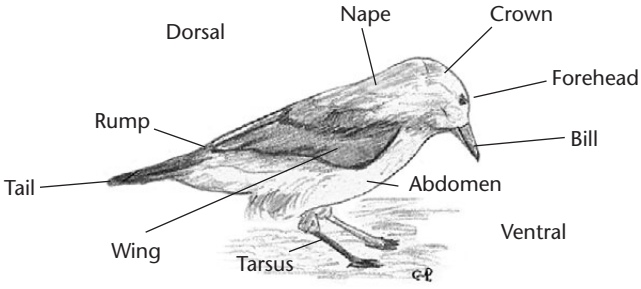
Birds

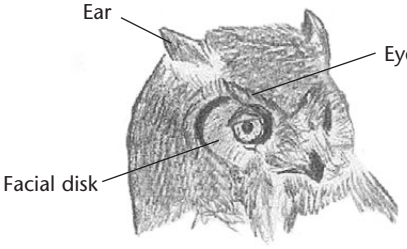
English Name	Scientific Name	Forest District	Biogeoclimatic Unit
Ancient murrelet	*Synthliboramphus antiquus*	Queen Charlottes	CWH: wh1,vh2
Marbled murrelet	*Brachyramphus marmoratus*	Campbell River North Coast Queen Charlottes South Island Squamish Sunshine Coast	CDF, CWH, MH
Cassin's auklet	*Ptychoramphus aleuticus aleuticus*	Campbell River North Coast North Island Queen Charlottes	CWH: wh1, vh2,vm1, vh1
Sandhill crane	*Grus canadensis*	Campbell River Chilliwack North Coast North Island Queen Charlottes South Island	CWH, ICH CDFmm IDF: dk, mw
Great blue heron	*Ardea herodias*	Campbell River Chilliwack North Coast North Island Queen Charlottes South Island Squamish Sunshine Coast	CDFmm CWH: dm, ms1, ms2, vh1, vh2, vm1, vm2, xm ICH: dw, mk1, mk2, mk3, mw2, mw3, xw IDF: dk3, dm2, mw1, mw2, unn, xh1, xh2
"Queen Charlotte" goshawk	*Accipiter gentilis laingi*	Campbell River North Coast North Island Queen Charlottes South Island Sunshine Coast	All except AT
Peregrine falcon	*Falco peregrinus*	Chilliwack South Island	CWH, IDF, SBS

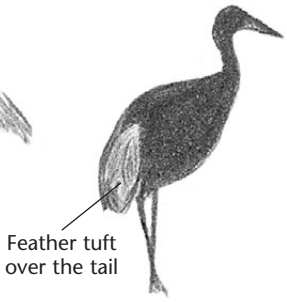
Birds

English Name	Scientific Name	Forest District	Biogeoclimatic Unit
"Vancouver Island" white-tailed ptarmigan	*Lagopus leucurus saxatilis*	Campbell River North Island South Island	MH
"Vancouver Island" northern pygmy-owl	*Glaucidium gnoma swarthi*	Campbell River North Island South Island	CDFmm CWH: vh, xm, dm, mm, vm MH: wh, mmp, mm
Queen Charlotte northern saw-whet owl	*Aegolius acadicus brooksi*	Queen Charlottes	CWH: wh1, wh2, vh1
Short-eared owl	*Asio flammeus*	Campbell River Chilliwack North Island South Island	CDFmm CWH: xm1, xm2, dm, vm1 IDF: xh1, xw, xm, dm, dk1, mw1, mw2, dk1a, dk3, dk4, xh2, xh2a, xh1a, xm, un ICH: xw, mw2 SBS: mh, mk1. AT
Spotted owl	*Strix occidentalis*	Chilliwack Squamish	CWH: vm1, vm2, dm, ds1, ms1, ms2, mm1 ESSFmw IDF: ww, dk2 MHmm1
"Queen Charlotte" hairy woodpecker	*Picoides villosus picoideus*	Queen Charlottes	CWH: wh, vh MH: wh
Lewis's woodpecker	*Melanerpes lewis*	Historically on Vancouver Island	ICH:dw,mk1,mw2, mw3,xw IDF: dk1, dk2,dk3,dk4,dm, dm1, dm2, dw, mw1,mw2, un,xh1a, xh2a, xm, xw,xw2
Yellow-breasted chat	*Icteria virens*	Chilliwack	CWHds

CHARACTERISTICS OF BIRDS







ANCIENT MURRELET
Synthliboramphus antiquus

Description
A chubby seabird.

Adults: Summer plumage of a black head and white eyebrow streak, grey back, white abdomen and barred-white neck sides. Winter plumage of a white face and neck patch and grey back. White bill.

Juveniles: Whiter throat patch.

Sexes: Similar.

Eggs: Olive-green with darker brown lavender spots.

Length: 24-26 cm *Wingspan:* 14 cm
Weight: 200-250 g

Voice
Whistling notes in low shrill tones.

Field signs
Nests: Establishes nest colonies that are reused yearly. Mated pairs excavate burrows or utilize past years' burrows, in mossy covered ground on seaward slopes, under mature coniferous forests with little understory. Burrows are at the base of stumps and thickly rooted trees, under rotten logs or exposed bedrock and in natural cavities. Burrows can reach up to, but not always, 2 m in length.

D.F. Fraser

Ancient murrelet

Distribution
Ancient murrelets have been observed in breeding plumage adjacent to coastal areas and offshore islands in the Queen Charlotte Islands/Haida Gwaii between March and July and there has been one confirmed record from Gander Island. Wintering aggregations occur in the marine waters around Vancouver Island including Queen Charlotte Strait, Strait of Juan de Fuca, Haro Strait and Active Pass.

B.C. Government

Ancient murrelets forage on the open ocean.

Habitat

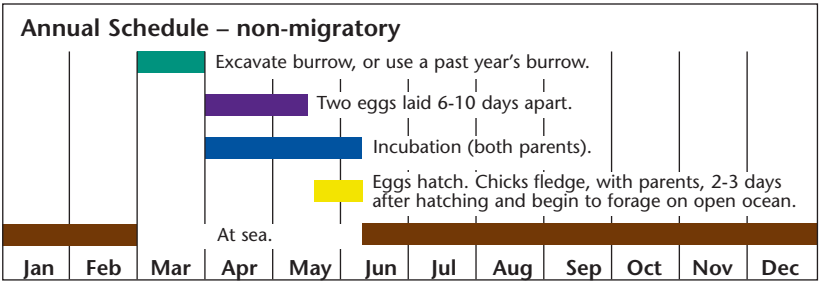
Utilizes old forest to breed and remains at sea the remainder of the year, foraging on the open ocean. Canopy species composition includes Sitka spruce, western hemlock and western redcedar.

Nests: Usually located on slopes >30% but sometimes flat areas are used on sea islands. Canopy closure is usually >50%.

Ancient murrelets forage in the open ocean for zooplankton and small schooling fish.

Elevations: sea level to 450 m

Structural stages: 7



MARBLED MURRELET
Brachyramphus marmoratus

Description
Adults: Chubby, robin-sized seabirds with very short neck and tail. When swimming, tail and black bill are tipped upwards. Summer plumage (breeding season): brown back with marbled light brown sides and stomach. Winter plumage: black back, white sides and stomach with white wing patch and an incomplete white collar.

Juveniles: Winter colouration.

Sexes: Similar.

Length: 25 cm

Voice
Distinct high-pitched *keer, keer, keer* mainly heard at dusk and dawn.

Field signs
Nests: Consist of a shallow mossy depression with a thick substrate of mosses and lichens, on a large, horizontal tree limb, usually near the trunk of the tree. Also known to nest on cliffs, although this is very rare. Frequently seen in pairs. One parent remains at the nest while the other forages, trading incubation duties at dusk and dawn.

Distribution
Murrelets are likely to be found anywhere along the coast of B.C. Precise nesting areas have not been accurately mapped but likely include most suitable old-growth forests within 30 km of the Pacific coast.

G. van Vliet

Marbled murrelet adult winter plumage. Juveniles appear similar to adults in winter plumage.

Habitat
Forage habitat: Includes saltwater bays, inlets, fjords and the open ocean. Food items include small schooling fish (predominantly Pacific sand lance and immature Pacific herring) and large pelagic crustaceans (euphausiids, mysids, amphipods).

Nesting habitat: Generally old (>140 years, but >250 years more suitable) coastal coniferous forests. Moist stands with a well developed epiphytic moss component, often adjacent to talus slopes and natural openings, where trees bordering are gnarly, large limbed and concealing the inner forest. Nest stands are with a closed canopy, open understory and are generally located within 2 km of potential foraging waters. Nest locations have overhead branch coverage.

Canopy species composition includes yellow cedar, western hemlock, Sitka spruce, Douglas-fir and western redcedar.

Nest tree: dbh >55 cm; height >40 m; branch diameter 15-74 cm

Birds need 'runway' space for landing and departure from nest.

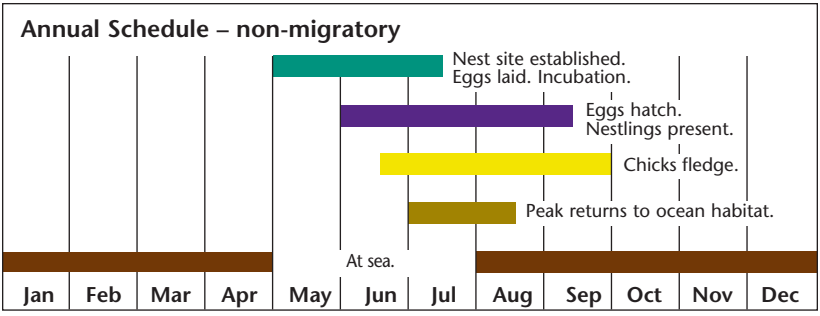
Elevations: 0-1500 m

Slopes: 55-115%

Structural stages: 7

G. van Vliet

Marbled murrelet adult breeding plumage



CASSIN'S AUKLET
Ptychoramphus aleuticus aleuticus

Description
Adults: Stocky, rounded, small colonial seabirds with a slate-grey back fading to lighter grey sides and white underparts. A tiny white dash is above each eye. Black bill with a white spot at the base and blue feet. Plumage same throughout the year.

Juveniles: Pale grey with a white throat.

Sexes: Similar.

Length: 23 cm
Wingspan: 11.0-12.9 cm

Voice
Whistles and croaks given at night with colony members.

Field signs
Nests: In colonies and mated pairs, Cassin's auklets excavate a 1-5 m long convoluted burrow (500 m from the ocean, and 30-100 m from vegetation edge), in soft soil or sometimes using natural cavities in rocks. Burrows are excavated under stumps, fallen logs, large tree roots, grass tussocks, forbs, salmonberry bushes and ferns. Birds defecate at burrow entrance. Eggs are smooth, non-glossy, white and frequently nest-stained.

B.C. Government

Cassin's auklet

Distribution
The Cassin's auklet breeds at 61 known colonies on offshore islands along the western and northern coasts of Vancouver Island, the northern mainland coast and the Queen Charlotte Islands/Haida Gwaii.

Habitat
Colonial *burrow-nests* within forested and non-forested areas with grasses, forbs and shrubs; in steep seaward cliffs and slopes.

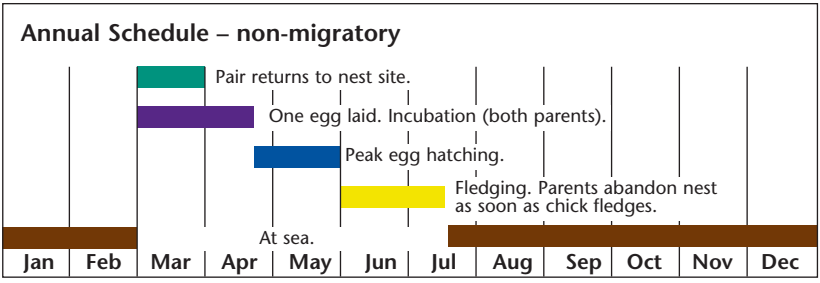
Canopy species composition includes Sitka spruce, western hemlock and western redcedar.

A. Inselberg

Cassin's auklet burrow

Establishes nest colonies, reused yearly, on marine islands and mainland slopes with no access by mammalian predators and little chance of human disturbance.

Structural stages: 2, 7



SANDHILL CRANE
Grus canadensis

Description
Adults: Tall, grey migratory birds with a red forehead and long neck that is curved when at rest. Head held straight out in front of body when in flight. Black bill. Plumage usually grey but sometimes showing rust stains from iron-rich waters where it has foraged.

Juveniles: Brownish and lacking the red forehead. Feather tuft over the tail is characteristic of cranes.

Sexes: Similar.

Height: 100-120 cm

Wingspan: 45 cm long, with black tip. The sandhill crane flies with both a fully extended neck and quick wing upstrokes.

Eggs: Usually 1-3, are olive-buff with lavender spots and are approximately 9.5 cm x 6.1 cm.

Similar species: Great blue heron has a black eyebrow stripe, unlike the sandhill crane, which has a red patch above the eye. The heron flies with its neck in a loop and the head drawn back to the shoulders.

Voice
Low, loud rolling *garooo-a-a-a.*

Field signs
Nests: Located within wetland habitats; concealed within emergent vegetation. They consist of a mound (0.9-1.5 m diameter) raised 15-20 cm above the water, and are constructed with sticks, emergent sedges, reeds, grasses, mosses and hummock. Sandhill cranes show strong site fidelity, returning yearly to the same wetland habitats to breed.

D. Knopp

Sandhill crane

Distribution
Widespread distribution with known breeding grounds in the Queen Charlotte Islands/Haida Gwaii and along the mainland coast.

Habitat
Large isolated and undisturbed wetland habitats (>1 ha) surrounded by some form of forest cover. Emergent wetland vegetation composition includes cattail, bulrushes, willows, hardhack, Labrador tea, sedges and grasses. Forage habitat includes all forms of wetland habitats, similar to those used as nesting habitat but also intertidal areas, agricultural fields and grasslands. Forage species include invertebrates and plants such as grasses. The sandhill crane is also

known to feed on agricultural crops, carrion and small animals such as rodents and amphibians.

Nesting habitat: secluded freshwater wetlands with abundant emergent vegetation to conceal the mound nests. Seasonal and permanent swamps, marshes, bogs, meadows, ponds, tundra and prairies are all utilized as breeding habitats. Mound gives them an unobstructed view of surrounding areas. Avoids forested uplands. Occasionally nests in clearcuts, although this is not considered a suitable habitat alternative. *Escape cover:* forested areas adjacent to wetland nesting habitats are used as escape cover and are critical for birds nesting in small wetlands (1-10 ha). Will also use this habitat for roosting.

Elevations: breeding <1220 m, non-breeding <1510 m

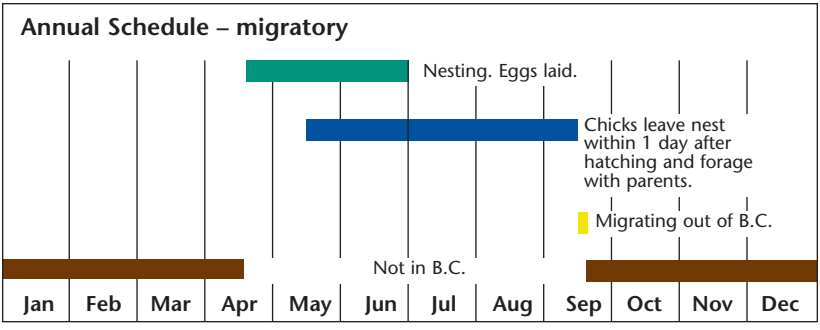
Structural stages: 1-3 (nesting), 5-7 (escape)

B.C. Government

Sandhill cranes in flight

Don McPhee

Nest of a sandhill crane



GREAT BLUE HERON
Ardea herodias

The great blue heron is two separate subspecies in B.C.: *Ardea herodias fannini* (coastal) and *A. h. herodias* (interior). Both subspecies are similar in appearance although their nesting schedules differ slightly.

Description

Adults: Tall, long-legged waders with long neck 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-grey body and wings.

Juveniles: Brown-grey back and upperwing plumage and lacking black eyebrow.

Sexes: Similar.

Height: 60 cm

Wingspan: 97-137 cm

Weight: 2.1-2.5 kg

Eggs: 3-5 smooth, non-glossy and pale greenish-blue.

Similar species: The great blue heron resembles the sandhill crane. Unlike the heron, the crane has a red patch above the eye; also, it flies with a fully extended neck.

Voice

Hoarse, deep, guttural squawk sounding like 'FRANK!'. Clucking, snapping beaks or mooing like a calf.

J. Hobbs

Great blue heron

Field signs

Nests: Great blue herons are known to nest in colonies of up to 169 nests. Colonies are reused in successive years. Small nesting colonies are more common, and >50% of colonies are >11 nests. Nests are located at 4-70 m heights in trees and consist of large stick platforms, <1 m diameter. Nests are lined with twigs, bark strips, coniferous boughs and rushes. Both the nest and the ground beneath are messy with droppings, discarded food and occasionally dead chicks.

Distribution

A. h. fannini is found throughout the mainland coast from southwestern B.C. to Alaska, and adjacent Vancouver Island and Queen Charlotte Islands/Haida Gwaii. *A. h. herodias* is the subspecies found throughout the interior southern portion of B.C.

R. Vennesland

A great blue heron nest colony

Habitat

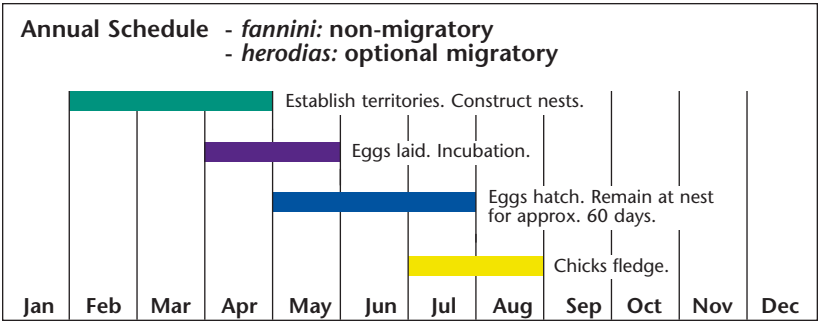
Nesting habitat: Nests within 8 km (usually within 3 km on the coast) of wetlands and riparian foraging habitats, in undisturbed, mature coniferous, deciduous or mixed forests. The canopy closure of the colony nesting habitat is usually >80% but the birds have been known to use less. Nesting habitat canopy species composition includes red alder, black cottonwood, big leaf maple, lodgepole pine, Sitka spruce and Douglas-fir.

Foraging habitat (especially during breeding season): riparian areas, tidal mud flats with large eelgrass meadows, estuaries, slow-moving rivers, sloughs and marshy lakes. Also wet and dry agricultural fields, kelp forests, wharves, shallow beaches and irrigation ditches.

Food items: primarily fish, but also invertebrates and small terrestrial vertebrates.

Elevations: 0-1100 m but mainly near sea level.

Structural stages: 5, 6, 7



"QUEEN CHARLOTTE" GOSHAWK
Accipiter gentilis laingi

Description
Adults: Robust diurnal forest raptors with a long narrow tail and relatively short rounded wings. Black crown with a white eyebrow streak; red eyes; blue-grey body, pale grey belly.

Juveniles: Brown body with a dirty white streaked belly and yellow eyes.

Sexes: Similar.

Height: 51-66 cm

Wingspan: 1.1 m

Similar species: The Cooper's hawk does not have a white stripe above the eye. The back is brown and the breast is rusty reddish-brown. The wings are short and rounded and the tail feathers have distinct bars. The juveniles are hard to distinguish from those of the goshawk, other than by their size – Cooper's hawks are smaller.

Voice
Loud *kak-kak-kak-kak-kak* when nest disturbed or approached.

Field signs
Nests: Large stick nest with a 1 m diameter and thickness of 0.4 m, lined with fresh sprigs of evergreen boughs. It is located in the main fork of a deciduous tree, or the lowest branches below the canopy and near the main stem in a coniferous tree. Goshawks build multiple (3-9) nests and alternate amongst these nests in successive years.

M. Stini

"Queen Charlotte" goshawk

E.T. Jones

The white eyebrow streak is a characteristic feature of the goshawk.

E.T. Jones

Cooper's hawk

Distribution
Occurs on Vancouver Island, and smaller coastal islands between Vancouver Island and mainland B.C. Most likely, "Queen Charlotte" goshawks also inhabit forests on the west side of the Coast Mountains throughout coastal mainland B.C.

Habitat

Hunting and nesting: Late-seral mixed conifer forests with open forest understory, high canopy cover, open forest floor, larger trees and natural edge habitats. This habitat is prime for goshawk prey items (medium-sized forest birds and small mammals), which factors highly into goshawk distribution. Dense young second growth is avoided.

Habitat features: Coarse woody debris, windthrow and downed snags, stumps, large and low thick-limbed trees.

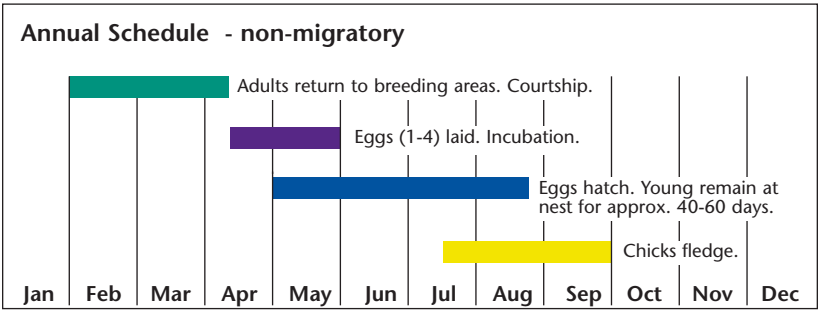
Canopy species composition includes almost every combination.

Dbh: >40.6 cm

Canopy closure: ≥ 50%

Slope: <30%, always <60%

Structural stages: 6, 7



PEREGRINE FALCON
Falco peregrinus

The peregrine falcon is divided into two separate subspecies: *Falco peregrinus pealei* and *F. p. anatum*. Both subspecies are at risk.

Description
Adults: Large robust slate-grey birds with a lighter-coloured chest that has fine black bars and spots. Black head with wide black "sideburns." Fast flier with narrow tail and tapered wings.

Juveniles: Brown with extensive barring on the chest. Comparable to the size of a large crow.

Height: 38-53 cm

Wingspan: 1 m

Similar species: The prairie falcon is described as a sandy-coloured peregrine falcon, although this species has a white eyebrow stripe, and the peregrine does not.

Voice
Generally a silent bird, a repeated *wechew* can be heard when calling between each other. A rasping *kack-kack-kack-kack* can usually be heard when defending the nest.

Field signs
Nests: Peregrine falcons place their nests on high and inaccessible vertical cliff ledges. Nest heights vary between 12-24 m from the base of a cliff and 3-9 m from the top.

E.T. Jones

Peregrine falcon

E.T. Jones

Prairie falcon

However, nest heights have been found on cliffs up to 366 m high. An overhang shelters the actual nest which is a slight depression or scrape on a ledge 0.3-4.6 m deep and 0.3-2.4 m wide. Sometimes peregrines will occupy an abandoned bird's nest (bald eagle or pelagic cormorant).

Distribution

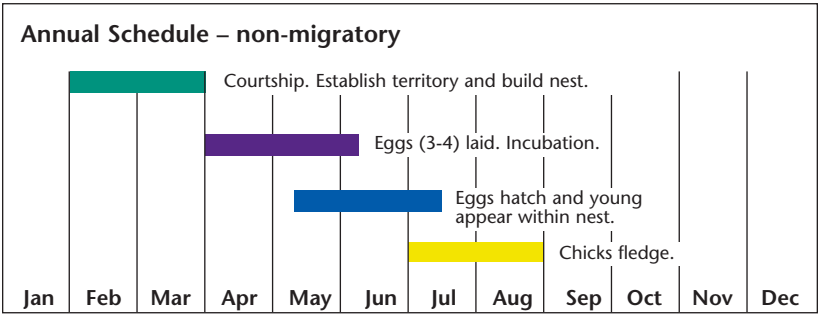
F. p. pealei occurs on the central coast mainland, northern part of Vancouver Island and all of Queen Charlotte Islands/Haida Gwaii. The subspecies *anatum* is known to migrate south. Subspecies *F. p. pealei* juveniles are known to migrate south to California; however, once they become adults they are mainly resident year-round in B.C.

Habitat

Nest site selection is closely tied with optimal foraging habitat. *F. p. pealei* usually nests adjacent to seabird colonies, as colonial nesting seabirds, such as ancient murrelets, are their primary food source. Other seabirds are also taken while on the wing.

E.T. Jones

Nest of a peregrine falcon



"VANCOUVER ISLAND" WHITE-TAILED PTARMIGAN

Lagopus leucurus saxatilis

Description

Adults: Chubby, round, grouse-sized birds. Summer plumage is a cryptic mottled-grey brown head, chest and back. Wings, belly and tail white. Very small red patch above eye. In winter they are all white. Black bill and black eyes. Distinct from similar species because the tail flaps are always white.

Height: 30-33 cm

Similar species: The rock ptarmigan is similar in size and shape to the white-tailed ptarmigan, but the tail margins are distinctly black and there is a red patch above the eyes.

The willow ptarmigan is slightly larger than the white-tailed ptarmigan, with a reddish head and distinctly black tail margins.

Voice

Soft low clucks and hoots, and high-pitched cackles. In breeding season males give a "flight scream" consisting of *ku-ku-KIII-KIIER* while in the air, and *duk-duk-DAAK-duk-duk* after landing.

Field signs

Nests: Always nest on the ground and within a hollow; located in rocky exposed areas or under trees and shrubs. Hollow is lined with feathers, leaves, grasses and other alpine vegetation. Warm buff eggs (4-7) with small, dark-brown spotting.

M. Stini

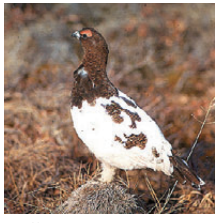
White-tailed ptarmigan in summer plumage

S. Ogle

White-tailed ptarmigan in winter plumage

E.T. Jones

Rock ptarmigan



E.T. Jones

Willow ptarmigan

Distribution

Endemic to Vancouver Island.

Habitat

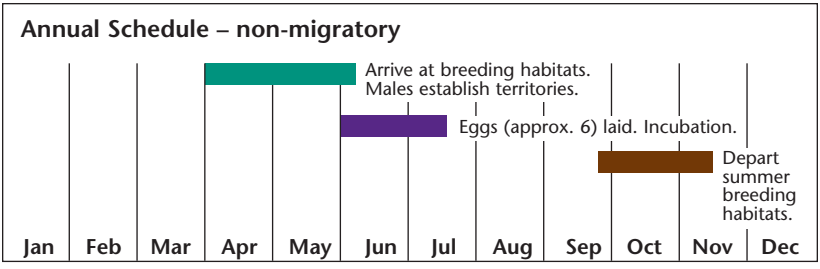
Summer: At or above the timberline in alpine, subalpine and upper montane areas. Moist and rocky alpine meadows, tree islands and conifers with krummholz.

Trees (4 m): subalpine fir and mountain hemlock. Shrubs: pink mountain heather and white mountain heather.

Winter: When plumage is changing, birds occupy snowfields, which provide camouflage and forage vegetation. Short elevational migrations to habitat below the treeline and into or at the edge of forested areas. Cedar and hemlock forests, alpine bowls, clearcuts, cliffs, rocky outcrops and unvegetated areas are all used as winter habitat. Forage on vegetation such as stems, buds, seeds, leaves and fruits from sedges, grasses, vaccinium species, willows and flowering plants.

Elevations: summer 1200-2200 m, winter 800-1900 m

Structural stages: mainly 1 and 2



A COMPARISON OF OWLS

Small owls (17-23 cm tall)

Pygmy-Owl

Saw-whet owl

Screech owl

Medium owls (>23-53 cm tall)

Short-eared owl

Barn owl

Long-eared owl

A COMPARISON OF OWLS

Large owls (>43 cm tall)

Great horned owl

Barred owl

Great gray owl

Spotted owl

"VANCOUVER ISLAND" NORTHERN PYGMY-OWL

Glaucidium gnoma swarthi

J. Hobbs

"Vancouver Island" northern pygmy-owl

Description

Adults: Very small "earless" owls with barred tail extending beyond the wing tips and held at perky angle. Black patches on nape mimicking eyes; blackish-streaked flanks. Spots on crown, and yellow eyes.

Length: 15.5-18.0 cm

Similar species: Saw-whet owl with large head, stubby tail and blotchy streaks.

Voice

Series (60-80/min) of single or double "toot" notes.

Field signs

Diurnal flier; undulating and flight with an audible humming of wings that is slightly noisier than that of most owls. Large trees (>60 cm dbh) with cavities.

Distribution

Endemic to Vancouver Island and the Gulf Islands.

Habitat

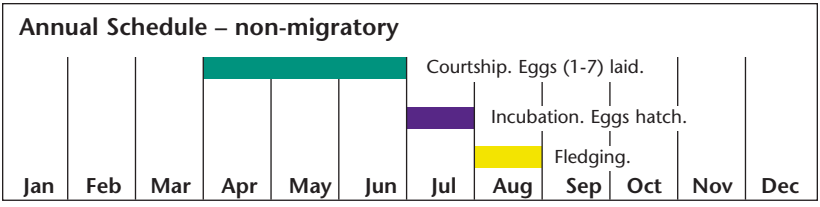
Inhabits a variety of forest stands. Secondary cavity-nester; uses tree cavities or woodpecker holes in stands with large trees, near the edge of forest openings. Nests in stands or in wildlife tree patches within harvested areas. Forages in a variety of forest types, often at forest edge, along roads and in disturbed sites. Feeds on small mammals, birds, reptiles and insects; often kills prey larger than itself.

Elevations: 50 to <1700 m

Structural stages: 3-7 (foraging), 5-7 (foraging and nesting)

J. Hobbs

Habitat of "Vancouver Island" northern pygmy-owl



"QUEEN CHARLOTTE" NORTHERN SAW-WHET OWL

Aegolius acadicus brooksi

J. Hobbs

"Queen Charlotte" northern saw-whet owl

Description

Adults: Small "earless" reddish owls with streaks on chest and stubby barred tail. Narrow black and white half-collar around back of neck. Yellow eyes.

Juveniles: dark-brown in summer, with white "eyebrows."

Sexes: Alike.

Length: 17.5-21 cm

Field signs

Large trees (≥80 cm dbh) with cavities.

Voice

Series of short whistles.

Distribution

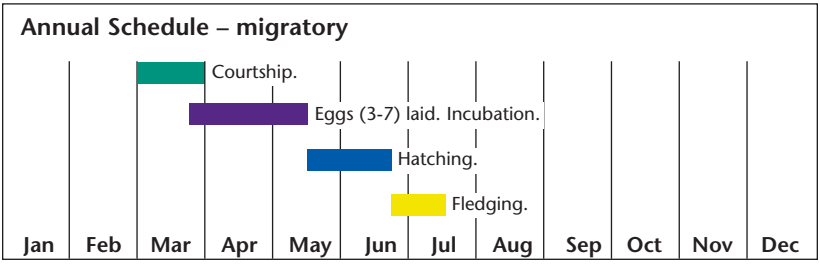
Non-migratory resident of the Queen Charlotte Islands.

Habitat

Nests in late seral stages; forages (small mammals, birds, insects and intertidal invertebrates) at forest edges and in openings. Secondary cavity-nester using tree cavities or woodpecker holes.

Elevations: 0-1220 m

Structural stages: 3 (foraging), 6-7 (nesting)



SHORT-EARED OWL
Asio flammeus

Description
Adults: Crow-sized, tawny-brown owls with dark areas (like sunglasses) surrounding yellow eyes. A very round facial disc and tawny brown colouration are its most noticeable characteristics. "Ears" are hard to see. Boldly streaked chest; light belly without horizontal barring. Noticeable black patch near bend ("wrist") of underwings; pale buffy patch on upperwings. Usually observed before dark, in open areas such as fields, sloughs and marshes.

Length: 32-43 cm; *Wingspan:* 30 cm

Voice
Usually silent. On nesting grounds, a variety of high-pitched barks, hisses and squeals.

Field signs
Irregular floppy (moth-like) and low flight. Short-eared owls construct nests, although very rudimentary ones. Females make a nest by lining a scrape in the ground with a few leaves, feathers or bits of grass.

Distribution
South mainland coast and southeastern Vancouver Island.

E.T. Jones

Short-eared owl

Habitat


J. Hobbs

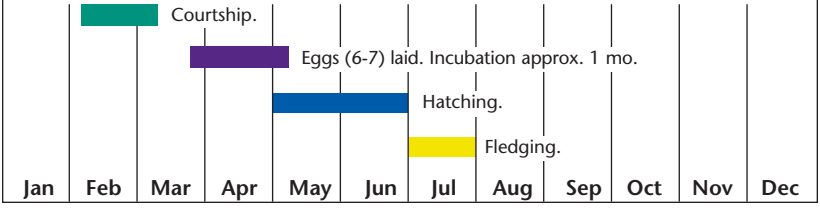
The short-eared owl frequents open areas.

The short-eared owl prefers tall grass (30-50 cm) and open country such as grassland, grassy or bushy meadows, marshlands, sloughs, beaches, sedge fields and previously forested areas that have been cleared. Suitable winter habitat (marine foreshores, grasslands, fallow fields, etc.) with a sufficient prey base and adequate roost sites may be a limiting factor.

Winter roost sites must be within close proximity to hunting areas, and provide protection against harsh weather and predators.

Structural stages: 2, 3 or old-growth field

Annual Schedule – migratory



SPOTTED OWL
Strix occidentalis

Description
Adults: Large owls with dark eyes, and white spots on head, chest and belly.

Sexes: Alike; however, females slightly larger than males.

Similar species: Barred owl with barring on chest, streaking on belly.

Voice
Series of four dog-like barking hoots most commonly used vocalization. Call of females notably higher pitched than males. Near nest sites, females will emit several high-pitched vocalizations referred to as 'co-weep' calls.

Distribution
Southwest mainland of B.C., extending as far north as Carpenter Lake and as far east as Manning Park.

Habitat
Nests: In large (>30 cm dbh, but preferably >50 cm dbh) trees in old-growth stands within tree cavities or abandoned hawk or crow nests. Trees with broken tops, tree cavities resulting from heart rot, and platform nests built by other species are important habitat features.


J. Hobbs

Spotted owl


J. Hobbs

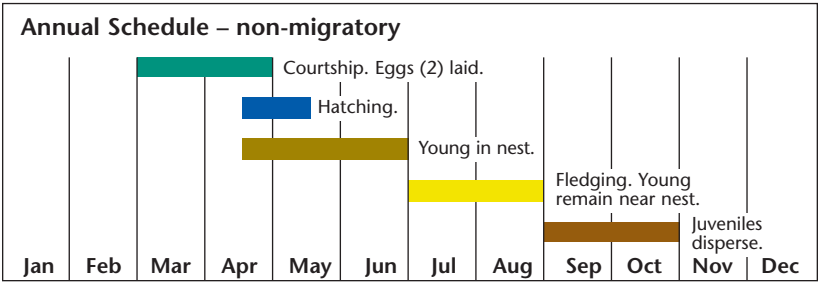
Barred owl


J. Hobbs

Spotted owl with prey

Forages and roosts: In old-growth or mixed-aged stands of mature and old-growth trees. Late seral stands used by owls are ≥ 2 canopy layers, multi-species, and have >50% canopy closure. Spotted owls feed primarily on small mammals: northern flying squirrels, woodrats, voles and mice.

Structural stages: 6, 7



"QUEEN CHARLOTTE" HAIRY WOODPECKER

Picoides villosus picoideus

Description

Adults: Robin-sized birds. Males have a distinct red nape; females have a black nape. Underparts generally brownish; upperparts black with barred pale area in centre of back. Wings are black with white spotting above, white stripes below. Tail feathers are black with barred outer feathers. Bill almost as long as the head.

Length: 16-25 cm

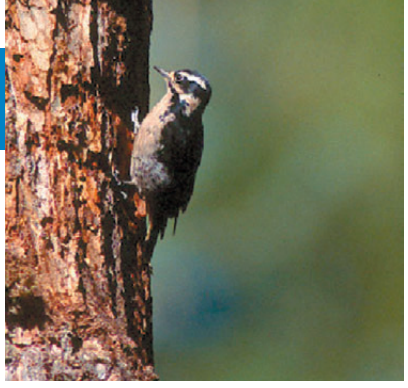
Similar species: Can be confused with downy woodpecker, which has a substantially smaller body (15 cm) and smaller bill (half the length of head).

Voice

Very loud, sharp *peeek* call. Downy woodpecker call is noticeably quieter (but still loud) with a higher pitched *pik* call.

Field signs

Excavate cavities in live or dead coniferous or deciduous trees,



J. Hobbs

"Queen Charlotte" hairy woodpecker

1 m or more off the ground (mostly between 2-6 m). Males share brooding duties at night; females brood during day.

Distribution

Endemic to the Queen Charlotte Islands.

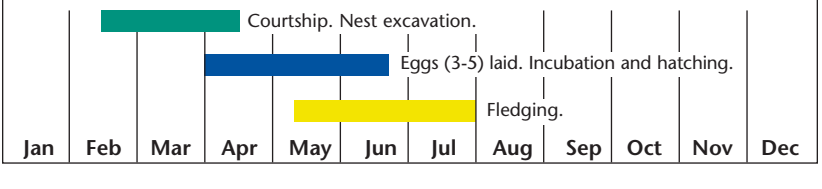
Habitat

Coniferous, deciduous or mixedwood stands with mature to old-growth structural stage. Often found adjacent to or at the edges of riparian areas, burns and meadows.

Elevations: 0-1830 m

Structural stages: variable, but mostly 6 and 7

Annual Schedule – non-migratory



LEWIS'S WOODPECKER
Melanerpes lewis

E.T. Jones

Lewis's woodpecker

Description

Adults: When in flight, appear crow-like because of their large size and how they beat their wings. Head with a red face patch and grey collar; glossy greenish-black back and wings; greyish-rose abdomen, flanks and sides. Black eyes.

Sexes: Similar.

Juveniles: Lack red face patch and grey collar.

Height: 26-29 cm *Wingspan:* 50 cm

Similar species: A very distinct species, not likely confused with other birds.

Voice

Usually silent or a harsh *churrr* or *chee-ur* call.

Field signs

Nests: Excavates a cavity (up to 30 m above ground) or uses abandoned woodpecker holes, natural cavities or hollows in wildlife trees. Nests >1000 m elevation, usually in burns.

Distribution

Historically found in coast forest region.

J. Hobbs

Lewis's woodpecker

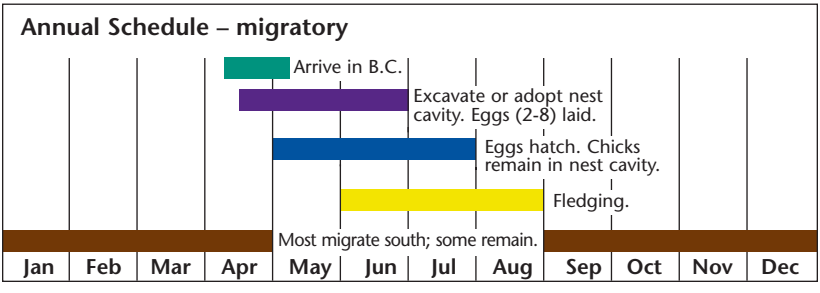
Habitat

Nests and *roosts* in late seral stands with snags. Forages in open mature mixed species forests, riparian areas and burned forests. High shrub density and diverse understory provide ideal habitat for forage species (e.g., flying insects) and seasonal nuts, seeds and berries.

Canopy species composition includes ponderosa pine, lodgepole pine, Douglas-fir, spruce, black cottonwood.

Elevations: 250-1160 m

Structural Stages: 2-5 (foraging), 3 (when insects are abundant), 6-7 (nesting and roosting)



YELLOW-BREASTED CHAT
Icteria virens

Description
Adults: Small, chubby migratory birds with thick black bill, fairly long tail, dark legs, and characteristic bright yellow throat and breast. Olive-green underparts, whitish abdomen and undertail, and black facemask bordered by distinct white "spectacles" leading from the bill and arching over the eye.

Sexes: Similar.

Length: 17-19 cm

Similar species: Unlikely to be confused with other birds due to its yellow throat and breast, and white "spectacles."

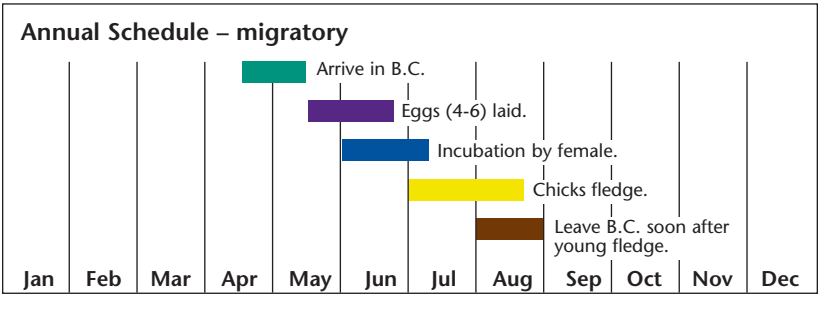
Voice
Very elusive bird. Its song is often the only sign of its presence in an area, and it often sings at night. Considered unmusical with its loud sounds of repeated short, harsh whistles.

J.S. Dunning/VIREO

Yellow-breasted chat

Field signs
Nests: (diameter: 12.7 cm; height: 6.6 cm) composed of plant stems, straw, shredded leaves and bark; inside lined with grasses. Nest location concealed within brushy dense shrubs, low trees and thickets, 0.08-10 m from edges, 0.4-1.8 m above ground.

Eggs: (3-6) oval, smooth creamy-white shell with purplish-brown spots (2.2 x 1.6 cm).



Distribution

Recent unconfirmed reports suggest a small breeding population has become established near Mission and Chilliwack.

Habitat

Nesting and *forage habitats:* Include dense shrubbery (shrub patch size: 9-195 m^2; shrub height: 3.5 m) within all types of riparian habitats, brushy hillsides and shrubbery adjacent or within boulder or talus slopes, ditches or seepage areas, forest edges and forest scrub. If trees are present in the nest or forage patch, their height is typically <6 m.

Canopy species composition includes cottonwood, water birch, rose, willow, hawthorn, cherry, aspen and snowberry. Density of thicket is most important.

Forage species: Insects and berries within the foliage of these shrub and herb thickets. Not usually found near areas frequented by cattle, or areas with continuous noise (e.g., highway traffic).

Elevations: 0-70 m

Structural stages: 3

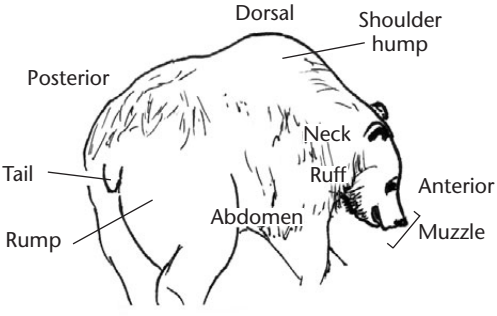
Mammals

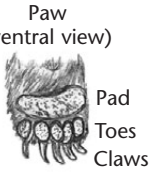
English Name	Scientific Name	Forest District	Biogeoclimatic Unit
"Vancouver Island" common water shrew	*Sorex palustris brooksi*	Campbell River North Island South Island	CDFmm CWH: xm1, xm2, vm1, vm2, vh1, mm1, mm2, dm MHmm1
Pacific water shrew	*Sorex bendirii*	Chilliwack Squamish	CDFmm CWH: xm1, dm, vm1, vm2
Keen's long-eared myotis	*Myotis keenii*	Campbell River Chilliwack North Coast North Island Queen Charlottes South Island Sunshine Coast	CDFmmCDFmm CWH: wm1, wm2, vh1, vh2, xm1, xm2, dm, mm1, mm2, wm, vm1, vm2 MH: mm1, wh1, wh2
Townsend's mole	*Scapanus townsendii*	Chilliwack	CWH
Vancouver Island marmot	*Marmota vancouverensis*	Campbell River South Island	AT CWHmm2 MH: mm1, mmp1
"Queen Charlotte" ermine	*Mustela erminea haidarum*	Queen Charlottes	CWH
Fisher	*Martes pennanti*	Campbell River North Coast North Island Squamish Sunshine Coast	CWH, ICH, IDF, MH, SBS
Wolverine	*Gulo gulo*	Campbell River North Coast North Island Squamish Sunshine Coast	AT, CDF, CWH, ESSF, ICH, IDF, MH, SBS

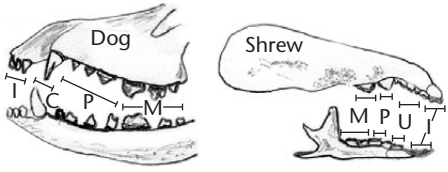
Mammals

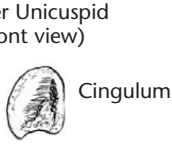
English Name	Scientific Name	Forest District	Biogeoclimatic Unit
Badger	*Taxidea taxus jeffersonii*	Chilliwack	AT ICH: dw, mk1, mk2, mk3, mw1, mw2, xw IDF: dk1, dk2, dk3, dm1, dm2, mw, mw1, mw2, un, xh1, xh2, xm, xw, xw2 SBS: dw1, dw2, mc1, mm, un ESSF: dc1, dc2, dcp, dk, dkp, mw, mwp, wc1, wc4, wcp, wm, wmp, xc, xcp
Grizzly bear	*Ursus arctos*	Campbell River Chilliwack North Coast North Island Squamish Sunshine Coast	AT, CDF, CWH, ESSF, ICH, IDF, MH, SBS

CHARACTERISTICS OF MAMMALS

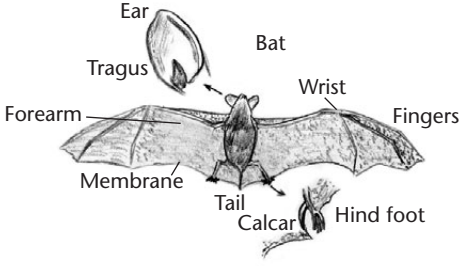








I: Incisors; C: Canines; P: Premolars; M: Molars; U: Unicuspids



"VANCOUVER ISLAND" COMMON WATER SHREW
Sorex palustris brooksi

Description
Large shrew with blackish-grey to black dorsal fur, smoky-grey or brown belly, bicoloured tail, and a long, conspicuous fringe of hairs (1.5 mm) on whitish feet. Skull has a short, ventrally straight rostrum and 32 teeth. Five upper unicuspid teeth, with the third distinctively smaller than the fourth. First upper incisor has indistinct, medial tine.

Total length: 133-179 mm
Tail: 64-76 mm *Hind foot:* 16-28 mm
Weight: 7.5-16.4 g

Similar species: Similar to the Pacific water shrew; however, their ranges do not overlap.

Distribution
On Vancouver Island, from Victoria to Port Hardy, as far inland as Robertson Creek and the Lowry Lake area (near Port Alberni), and along the west coast at Lost Shoe Creek near Ucluelet.

Habitat
This semi-aquatic insectivore inhabits riparian vegetation along slow- and swift-flowing streams and lakes.


B. M. Peterson

Common water shrew


V. Craig

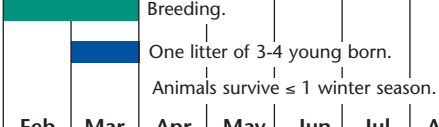
"Vancouver Island" common water shrew habitat

Streams vary in width (1-26 m), and may be permanent or intermittent. Water shrews swim well, and air bubbles trapped beneath the feet provide enough buoyancy to enable them to run on the surface of the water for several seconds. Habitat features include vegetated riparian habitats with well-developed litter layer, decomposed coarse woody debris and an abundance of rocks and boulders. Feed on terrestrial and aquatic invertebrates, slugs and snails.

Elevations: records at 30-558 m, possibly up to 2900 m

Structural stages: all

Annual Schedule – active year-round



PACIFIC WATER SHREW
Sorex bendirii

B.C. Government

Pacific water shrew

Description

Largest shrew of the *Sorex* genus in North America. Fur velvet-like, dark brown to black; summer pelage more brownish than winter coat. Unicoloured dark brown tail. Skull large with ventrally curved rostrum, 32 teeth. Five unicuspid teeth; the third is distinctively smaller in size than the fourth. The upper unicuspids have a pigmented ridge that extends to the cingulum. The upper incisor has a large medial tine that is positioned within the pigmented region of the face of the incisor. Brown feet. Hind feet usually with a stiff fringe of hairs about 1 mm long (adaptation for swimming) bordering toes.

During reproduction, males have a pungent odor originating from scent glands located on the flanks.

Total length: 137-176 mm *Tail:* 64-81 mm *Hind foot:* 16-21 mm *Weight:* 10-20 g

Similar species: Similar to the "Vancouver Island" common water shrew; however, their ranges do not overlap.

Distribution

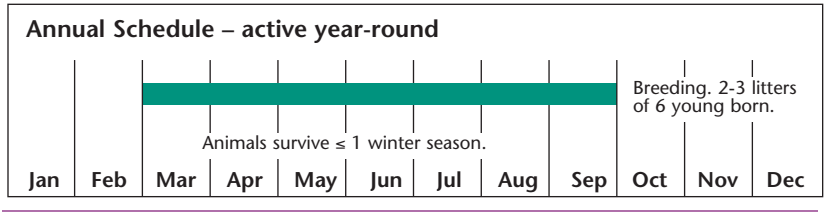
Restricted to the extreme southwest corner of B.C., in the Lower Fraser Valley. It has been observed as far east as the Chilliwack River and Agassiz, and north to the north shore of Burrard Inlet.

Habitat

This semi-aquatic insectivore is found in heavily wooded areas along slow-moving creeks and wetlands, usually <50 m from the edge of water. Pacific water shrews swim well, and air bubbles trapped beneath the feet provide enough buoyancy to enable them to run on the surface of the water for up to 5 seconds. Important habitat features include slow-moving waters, forested riparian habitats with well-developed litter layer and decomposed coarse woody debris. Prey include terrestrial and aquatic invertebrates, including slugs and snails.

Elevations: <850 m

Structural stages: 5, 6, 7



KEEN'S LONG-EARED MYOTIS
Myotis keenii

Description
Dull olive to rich, glossy brown dorsal fur with darker indistinct spots on the back of the shoulder; underside paler. Long ears extending about 4 mm beyond the tip of the nose when pressed forward; long, narrow and pointed tragus. Ears and wing membranes dark brown. Fringe of tiny hairs on the outside edge of tail membrane visible with hand lens. Calcar with indistinct keel. Skull with steep forehead; rostrum short and rising abruptly. Distance from the last upper premolar to the last upper molar is less than 4.2 mm

Total length: 63-94 mm
Tail: 34-40 mm *Hind foot:* 8-10 mm
Ear: 16-20 mm *Tragus:* 9-12 mm
Wingspan: 209-262 mm
Weight: 4.0-5.9 g

Similar species: Western long-eared myotis (total length: 92-103 mm) with ears extending 5 mm or more beyond the tip of the nose when pressed forward. Tragus long and slender with small lobe at its base. Ears and flight membranes are nearly black. Skull with gradually sloping forehead. Positive identification can only be made from cranial characterstics (i.e., the distance from the last upper premolar to the last upper molar is > 4.2 mm in the western long-eared myotis). The western long-eared myotis does not occur on the Queen Charlotte Islands.

E. T. Jones

Keen's long-eared myotis

Distribution
Coastal mainland as far north as the Stikine River, on the Queen Charlotte Islands and on Vancouver Island.

J. M. Heron

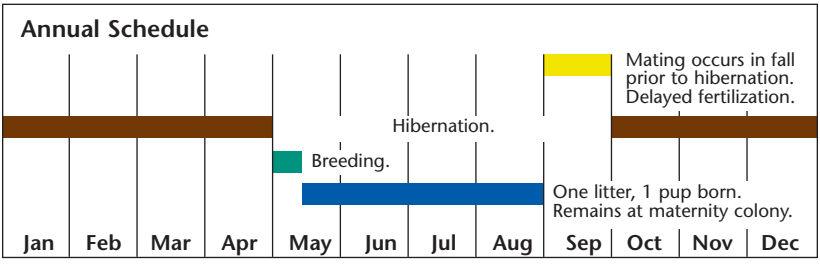
Keen's long-eared myotis (left) and western long-eared myotis. Body size cannot be used to differentiate one species from the other.

Habitat
Cool, wet coastal montane forests and karst features. The best studied maternity colony is located among geothermally heated boulders and crevices on Hotspring Island, Gwaii Haanas National Park. Its small size, low wing-loading ratio and very low intensity echolocation call makes the Keen's long-eared myotis well adapted for flying and foraging on arthropods within structurally complex late seral

stands. Important habitat features include tree cavities (decay class 2 or greater), bark (on trees with decay class 4 or greater) and rock crevices, and caves more than 100 m in length and above 400 m elevation, with stable 2.4-4˚C temperatures and 100% humidity. In general, *Myotis* show high site fidelity to maternity roost and hibernation sites.

Elevations: 0-1100 m

Structural stages: 6, 7



TOWNSEND'S MOLE
Scapanus townsendii

Description
Largest North American mole. Velvet-like dark grey to black fur, with pronounced sheen. Stocky, cylindrical body. Flat, broad front feet with five strong, straight claws for digging; whitish and almost hairless palms facing outwards. Both conical snout and short hairless tail are pink. Tiny blue eyes hidden by fur. No ears. Forty-four teeth; unicuspids crowded and uneven.

Length: 17.9-23.7 cm *Tail:* 3.5-5.5 cm
Weight: males 142 g; females 119 g

Similar species: Other western moles are smaller.

Field signs
Constructs extensive tunnel systems (diameter: 5.2 cm) with mounds (18 x 44 cm) significantly larger than those of coast moles (diameter: 3.6 cm; mound: 11 x 30 cm).

Distribution
Restricted to small area along international border near Huntingdon in the lower Fraser Valley.

Habitat
Inhabits manured pastures, hayfields, moist meadows, lowlands, fir forests, cultivated fields and open brushland where soil is deep and fairly loose with little gravel content, in the dry subzone of the coastal western hemlock biogeoclimatic zone. Townsend's moles spend much of their lives burrowing through the soil. They can burrow beneath highways and buildings, and swim across rivers and canals. Earthworms are their primary food source and comprise over 70% of their diet. They require a daily intake of food roughly equal to 70% of their body weight.

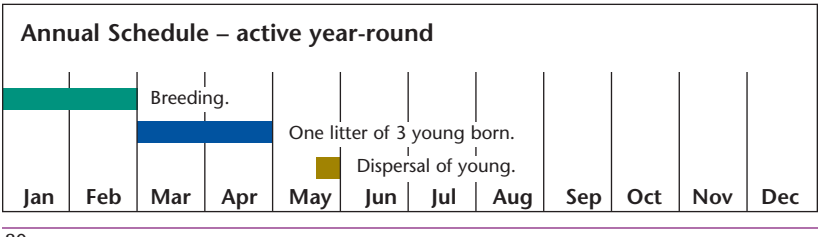
Structural stages: 2, 3


T. Sheehan

Townsend's mole


J.M. Heron

The mole has strong claws for digging



VANCOUVER ISLAND MARMOT
Marmota vancouverensis


J. Hobbs

Vancouver Island marmot

Description
Lustrous chocolate-brown coat, fading to deep ebony to light walnut through summer (due to sunbathing), with white spotting on nose, chin, forehead and abdomen. Adults with mottled appearance in July (due to molt), distinguishing them from pups and yearlings. Incisors pale yellowish-white. Bushy tail.

Total length: 63-72 cm

Tail: 19-30 cm *Hind foot:* 9-10.5 cm

Weight: 2.9-6.4 kg. Marmots lose about one-third of their body mass during winter hibernation.

Similar species: Not likely to be confused with any other kind of mammal on Vancouver Island.

Voice
Most frequent call is a high-pitched whistle, which warns colony members of danger. Hence local nickname, "whistle pig."

Field signs
Scats: 3-6 cm long, 1-1.5 cm wide, pinched at both ends, green when fresh, often in large numbers at latrines.

Burrow: Entrances (30-45 cm diameter) underneath a boulder or tree root. Those used as hibernation or birth sites usually have some dirt mounded on the low side of the entrance.

Hibernacula: Can be identified either by grass and mud "plugs" found at tunnel entrances in late autumn, or by emergence tunnels through the snowpack in May or early June.

Lounging spots: Include boulders, logs and stumps, which are identified by mud stains.

Distribution
Restricted to south-central Vancouver Island at the headwaters of the adjacent drainages of the Nanaimo, Chemainus, Nitinat, Cameron and Cowichan rivers. One small isolated colony occurs on Mount Washington in east-central Vancouver Island.

Habitat
Vancouver Island marmots live in colonies, in alpine and upper sub-alpine meadows that provide a variety of grasses and forbs to eat, deep colluvial soil for burrow construction (including hibernacula underneath

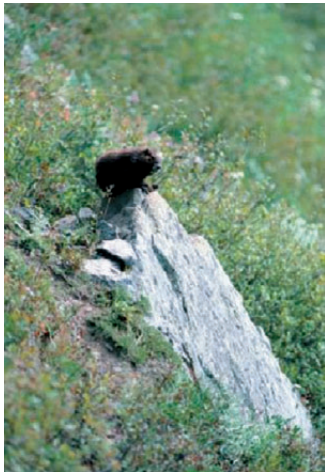
the frost layer) and suitable lookout spots. Burrows provide protection against inclement weather and predators, and are reused year after year.

Habitat features include grasses and forbs, colluvial soil, boulders, logs and stumps.

Elevations: 800-1600 m (natural colonies), 700-1200 m (clearcuts)

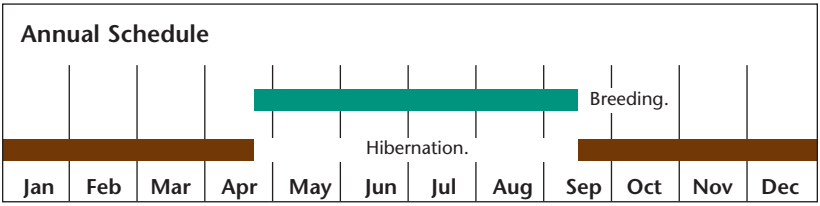
Aspect: mostly south- to west-facing slopes.

Structural stages: 2, 3



M. Stini

Habitat of the Vancouver Island marmot



"QUEEN CHARLOTTE" ERMINE
Mustela erminea haidarum

G. Proulx

Radio-collared ermine

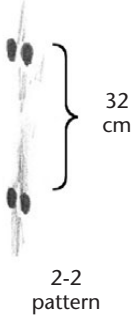
Description
Also known as "Queen Charlotte" short-tailed weasel. Small, slender, short-legged carnivore with long, almost cylindral body. Dark brown with white underparts and feet in summer. White in winter. Always with a black tip on tail. Head small with inconspicuous rounded ears. Strong musky odor. The subspecies *haidarum* is distinguished by having two-thirds of underside of tail coloured like underparts. Males are larger than females.

Total length: males 27.5-29.0 cm; females 25.0-25.2 cm

Tail: males 6.5-7.5 cm; females 6.1-6.3 cm

Field signs
Scats: 0.3-0.5 diameter, 2-3 cm long, twisted, dark brown or black. Found on rocks or prominent objects.

Tracks: 2-2 pattern is common. Short strides may be connected by drag marks; the resulting pattern is two dots, a dash and two dots.

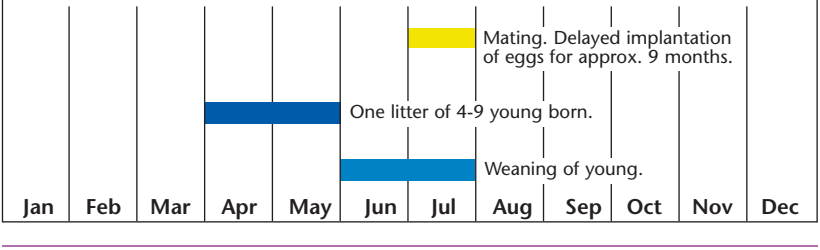


Distribution
Found only in the Queen Charlotte Islands.

Habitat
This subspecies uses a variety of habitats, particularly at low elevations near ocean, rivers, creeks and estuaries. Habitat features include coarse woody debris, sea-beach debris, rock piles.

Structural stages: 1-7

Annual Schedule – active year-round



FISHER
Martes pennanti

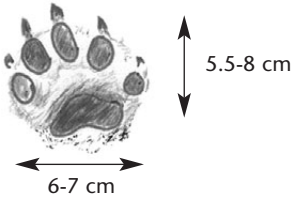
Description
Long and slender body. Dense, dark brown to black fur coat with considerable grizzling patterns around the shoulders and back. Pointed face, rounded ears, strong short legs, and bushy tail.

Head and body: 51-63 cm
Tail: 33-38 cm
Weight: males 2.7-5.4 kg; females 1.4-3.2 kg

Similar species: American marten is 2-3 times smaller. Prominent ears. Yellowish-brown to dark brown pelage, and pale buff patch on throat and breast.

Field signs
Scats: Dark in colour and twisted.

Tracks: Front and rear feet have five digits, with a C-shaped palm pad curving away from the toes.



Trail patterns:

The fisher has three basic trail patterns.


G. Proulx

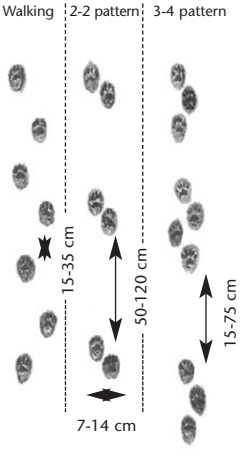
Fisher


G. Proulx

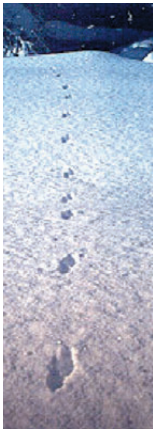
American marten

G. Proulx

Scat



Walking, 2-2 and 3-4 trail patterns


G. Proulx

2-2 pattern

Distribution

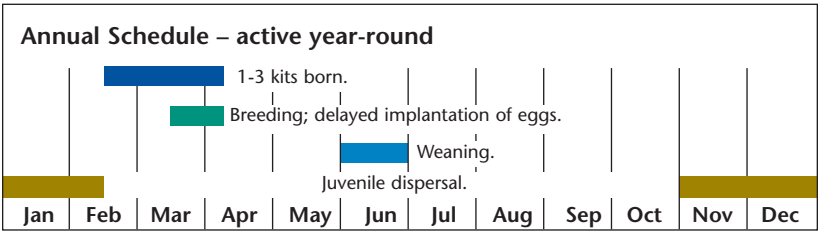
Although present throughout B.C., fishers are rare in coastal ecosystems and are likely found in habitats resembling boreal forests.

Habitat

Landscapes with young and mature forests interspersed with early seral stages. Late seral forests usually have >30% canopy closure and >20m^2/ha basal area in mature trees. Important habitat features include large coarse woody debris (≥ 28 cm in diameter), snags (≥ 50 cm dbh for denning) and ≥ 20% shrub cover, particularly in riparian and dense wetland forests.

Elevations: ≤ 1000 m

Structural stages: 5, 6, and 7 in winter. All stages during other seasons.



WOLVERINE
Gulo gulo

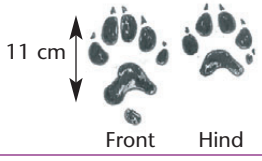
Description
The wolverine looks like a small bear with a bushy tail. It has a broad head, short neck, short legs and large feet. Fur varies from dark brown to almost black, with a lighter facial mask and throat patch, and two yellowish stripes extending from the shoulders to the rump and merging into the tail. The fur is short on the head, but longer posteriorly.

Head and body: 65-107 cm
Tail: 17-26 cm

Weight: males 11-16 kg;
females 6.5-15 kg

Similar species: Fisher is 2-3 times smaller. Pelage without yellowish stripes.

Field signs
Tracks: A dog-like track with five digits and a palm pad curved across the front. The thumbprint does not always register. The front heel pad usually imprints as an oblong dot behind the palm pad; the rear heel pad does not leave a marking. Wolverine feet are extremely furry, and hair marks may be present in clear tracks. Some wolverine tracks are large and may be mistaken for wolf or bear tracks; confirmation of species is through an examination of gaits and strides.



V. Banci

Wolverine

Trail patterns: Wolverine trails are similar to those of fishers, and they tend to zigzag. In deep snow, wolverines sink considerably and belly drag marks are noticeable.

Tracks in deep snow

G. Proulx

Scats: Dark in colour and twisted, sometimes measuring more than 12 cm long. Tapered at both ends, often with bones and hair.

5 in (12.5 cm)

Distribution

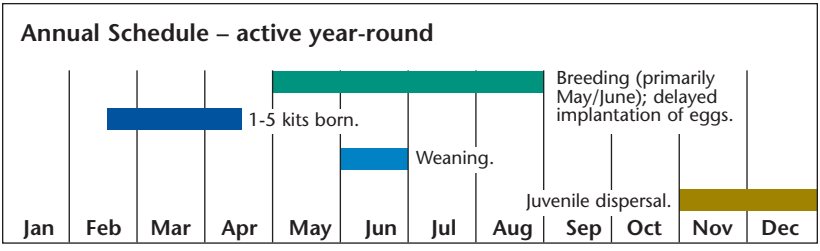
Wolverines are widely distributed throughout much of B.C. Wolverine populations do not occur on the Queen Charlotte Islands. Given the lack of recent records, their density may be very low on Vancouver Island and in the lower Fraser Valley. If present on Vancouver Island, they are likely restricted to mountainous areas.

Habitat

At landscape level, wolverine habitat is best defined in terms of adequate year-round food supplies (ungulates, small mammals, ground-dwelling birds, fruits, etc.) in large, sparsely inhabited wilderness areas. At stand level, important structural characteristics are those that favour an abundance of food and an avoidance of humans. Females tend to inhabit higher elevations with early successional (alpine-type) and late successional (coniferous forests) stands in summer, during the rearing season; females in winter, and males all year-round, tend to use lower elevations with late-successsional stands. Habitat features include dens associated with coarse woody debris and rock piles, deep snow cover and small-scale (<100 m across) forest openings, with proximity to food resources.

Elevations: Valley bottoms to alpine meadows.

Structural stages: 1-2 (food), 6-7 (food, thermal cover and security)



BADGER
Taxidea taxus jeffersonii

Description
Stocky, flattish, short-legged mustelid with a shaggy, multi-coloured coarse pelage with an overall yellow-grizzled-grey effect and a white dorsal stripe. The *jeffersonii* subspecies has a reddish-brown colouration and a short dorsal stripe. Short, bushy tail. Wedge-shaped head with alternating black and white bands ("badges"), the median white stripe extending from slightly upturned nose to nape. Muscular forelegs with black feet with extremely long claws (>5 cm) and partially webbed toes to remove loose soil. Males larger than females.

Total length: 50-80 cm
Weight: 3.6-11.0 kg

Similar species: The wolverine is larger, bulkier and browner, and lacks facial stripes.

J. Hobbs

Badger

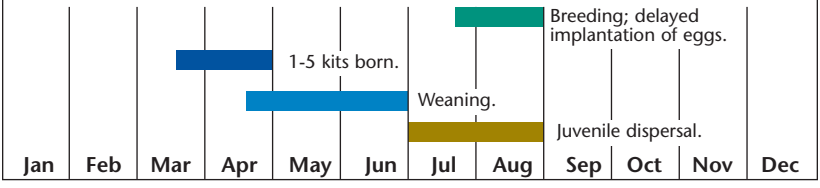
Field signs
Tracks: 5 cm long tracks, turned in as though badgers are walking pigeon-toed; five toes and conspicuous claws.

Scats: cylindral with hair and bones.

Burrows: with large entrances.

Large *disturbed areas* where badgers dug for small mammals.

Annual Schedule – active year-round, reduced activity in winter



Distribution

Extreme eastern portion of the Chilliwack forest district.

Habitat

Most badger activity is at low elevations in dry regions, within native or non-native grasslands, open forests of Douglas-fir or ponderosa pine and disturbed sites such as roadsides and agricultural fields. They also inhabit cut blocks, burns, early seral forests and other open sites. Badgers use a variety of soil types.

T. Hall

Badger in the entrance of its burrow

Most common types are moderately coarse-textured brunisols with low-moderate (<35%) coarse fragment content, originating from glaciofluvial and glaciolacustrine parent material. Badgers sometimes burrow along disturbed road right-of-ways, but mortality risks are high. Badgers feed on a wide variety of animals, and are adapted to capturing fossorial prey.

Structural stages: 1, 2

GRIZZLY BEAR
Ursus arctos

Description
Sturdy with prominent shoulder hump (muscle mass covered with long guard hairs), massive head with upturned muzzle (dishface profile), pig-like nose, short round ears, and a slight ruff around the back portion. Very short tail. Shaggy coat. Colour ranges from pale yellowish-brown to dark brown, nearly black. Silvery white tips on hairs give a frosted or grizzled appearance. Very long claws (front paw: 3.5-10 cm; back paw: 1.5-4.5 cm).

Total length: 1.8-2.1 m

Weight: males 250-350 kg; females 100-175 kg

Similar species: Black bears have a smooth, uniform coat, dog-like nose, straight facial profile, no face ruff, no shoulder hump and short claws.

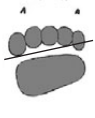
G. Proulx

Grizzly bear

G. Proulx

Black bear

Field signs
Tracks: Both black and grizzly bears have short, broad feet with five toes on both front and back feet. However, front-foot tracks seldom show the imprint of the front heel. The hind foot typically shows both toe and heel imprints. Grizzly tracks may be differentiated from black bear tracks on the basis of the criteria shown in the accompanying chart.

Feature	Grizzly bear	Black bear
Size	Width of front pad can be greater than 15 cm.	Width of front pad rarely over 13 cm.
Claw imprint	Difficult to see, and well ahead of the toe marks. 	Sharply incised and close to toe marks. 
Arc of the toes	Toes are more in a straight line; toe imprints are joined.	Toes arc more; toe imprints are separate.

Trail patterns: Grizzly bears have a normal alternating gait when walking leisurely, or 2-2 and galloping patterns when moving faster. Tracks are turned in as though bears are walking pigeon-toed.

Scats: Bear scats may be round and firm (5-8 cm in diameter) or soft and pie-like (when bears feed on fresh greens).

Dens: Grizzly bear dens are found in snow accumulation areas, usually on 25-60˚ slopes.

Bedding area: The presence of 3-10 bear scats all within a 10-m radius, and flattened vegetation or a smooth hollow, may be indicative of a nearby bedding area.

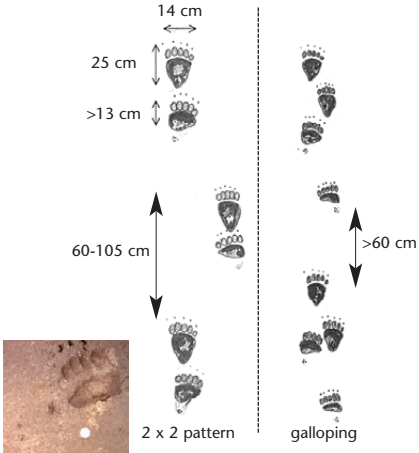
Rub-marking trees: Careful examination may reveal the presence of hair, or bite and claw marks.

Trails: Tracks and droppings are usually found along well-used paths.

Digging areas: Large disturbed areas where bears dug for small mammals or roots.

Distribution

Grizzly bears are found throughout the coast forest region except the islands, and the southwest portion of the province.



B. Swan

Grizzly bear tracks

G. Proulx

Scat

V. Banci

Den entrance

V. Banci

Digging area

Habitat

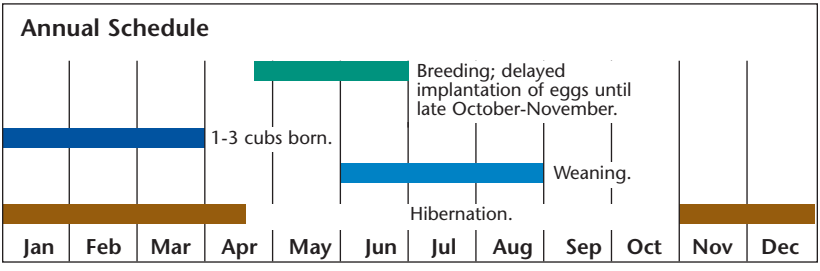
Landscapes with mosaics of young and mature forests interspersed with immature stands and non-forested sites. Wet areas such as streams and river bottoms, seep areas and lakeshore provide the bulk of the food for bears in some regions, because plant productivity in such areas is high and the vegetation is succulent or high in protein. Grizzly bears are attracted to large food supplies such as salmon streams and berry crops. Important habitat features include dens at high elevations on steep north-facing slopes, with dry, stable soil conditions that remain frozen during the winter. Landscapes with a diversity of habitat patches rich in food (roots and green vegetation, berries, small and large mammals, fish, insects).

Elevations: Valley bottoms to alpine meadows

Structural stages: 1-3 (food), 4-7 (food, thermal cover and security)

J. Hobbs

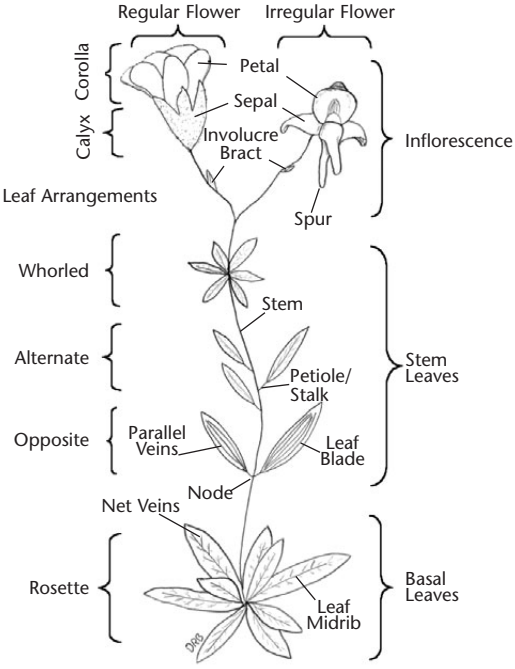
Grizzly bear



English Name	Scientific Name	Forest District	Biogeoclimatic Unit
Seaside centipede	*Heterodermia sitchensis*	South Island	CWHvh1
Rigid apple moss	*Bartramia stricta*	South Island	CDFmm
Poor pocket moss	*Fissidens pauperculus*	Chilliwack	CWHdm
Phantom orchid	*Cephalanthera austiniae*	Chilliwack South Island	CDFmm CWH: dm, xm1, xm2
Water-plantain buttercup	*Ranunculus alismifolius* var. *alismifolius*	South Island	CDFmm
Scouler's corydalis	*Corydalis scouleri*	South Island	CWH: vh1, vm1, xm2
Prairie lupine	*Lupinus lepidus*	South Island	CDFmm CWH: mm2, xm1
Seaside birds-foot trefoil	*Lotus formosissimus*	South Island	CDFmm
Yellow-montane violet	*Viola praemorsa* ssp. *praemorsa*	South Island	CWHxm2
Purple sanicle	*Sanicula bipinnatifida*	South Island	CDFmm
Bear's foot sanicle	*Sanicula arctopoides*	South Island	CDFmm
Golden paintbrush	*Castilleja levisecta*	South Island	CDFmm
Bearded owl-clover	*Triphysaria versicolor* ssp. *versicolor*	South Island	CDFmm
White-top aster	*Aster curtus*	South Island	CDFmm CWHxm1, xm2

Mosses, Lichens and Vascular Plants

English Name	Scientific Name	Forest District	Biogeoclimatic Unit
Deltoid balsamroot	*Balsamorhiza deltoidea*	Campbell River South Island	CDFmm CWHxm1
Tall bugbane	*Cimicifuga elata*	Chilliwack	CWH: dm, xm1 MH mm2
Tall woolly-heads	*Psilocarphus elatior*	South Island	CDFmm CWHvh1


Regular Flower
Irregular Flower
Corolla
Calyx
Petal
Sepal
Involucre
Bract
Inflorescence
Spur
Leaf Arrangements
Whorled
Alternate
Opposite
Stem
Petiole/
Stalk
Parallel
Veins
Leaf
Blade
Stem
Leaves
Node
Net Veins
Rosette
Leaf
Midrib
Basal
Leaves

SEASIDE CENTIPEDE
Heterodermia sitchensis

Description
This arboreal cushion-forming lichen is semi-erect, with irregularly branched lobes averaging 2 cm across. Stiff lobes are short to slightly elongated, and are quite thin (0.5-2 mm wide). The top surface is usually a faint greenish-white colour but can also have a deep blue appearance. The smooth upper surface is strongly convex, with occasional warts and whitish spots. The lower surface is characterized by its white colouration and cottony appearance. Urn-shaped reproductive formations and minute hair-like structures are present on the upper edges of this lichen.

Similar species: The seaside centipede's unique characteristics – hair-like structures, urn-shaped outgrowths, pale greenish lobes and cottony lower surface – differentiate it from other lichens. It may be confused with elegant centipede, which has distinctly elongate lobes without the urn-shaped outgrowths of the seaside centipede.

B. Reader

Seaside centipede

Distribution
West coast of Vancouver Island.

Habitat
This lichen appears to have very specific and intricate habitat requirements. Moderate ventilation, fortified nutrients, moderate temperature, high humidity and protection from direct exposure are all seemingly essential habitat requirements for this very rare lichen. The seaside centipede is restricted to the lower branches of Sitka spruce trees found in undisturbed old-growth western hemlock-dominated forests along the west coast of Vancouver Island.

Elevations: 0-200 m

Structural stages: 7

RIGID APPLE MOSS
Bartramia stricta

Description
Ranging in height from 1-3 cm, this moss has male and female reproductive organs on the same leafy structure. Dense clumps of this moss are pale green to yellow, or a bright green colour. The base of the moss has no sheathing. The leaves are relatively long, tomentose below, and tapering to a point at the tip of the leaf, where it is toothed. Leaf margins are flat or slightly curled under. When dry, the leaves tend to stand upright and straight. Capsules are spherical/symmetrical in shape.

Similar species: Can be confused with the common apple moss. The easiest way to tell the two apart is by looking at the capsules. The common apple moss has asymmetrical capsules that are not as round as the symmetrical capsules of rigid apple moss. As the name implies, when moist, the leaves of the rigid apple moss are more erect than the common apple moss.


M. Ryan

Rigid apple moss

Distribution
Limited to southern Vancouver Island.

Habitat
Restricted to lower elevations with warm, somewhat humid climates. This moss is usually found on moist, humus-rich soils that are virtually free of vascular plants and lichens. It will also grow on soil veneers between rocks or directly on rock outcrops. The rigid apple moss is usually found on south-facing slopes.

Elevations: 0-150 m

Structural stages: 1, 2


M. Ryan

Rigid apple moss

POOR POCKET MOSS
Fissidens pauperculus

Description
This is a relatively small moss with male and female reproductive structures on the same plant. It has 6-10 leaves arranged in 3-5 pairs. The leaves are small, ranging from 0.3-0.4 mm wide and 1.5-2.3 mm long. The stalk of the capsule (2-3 mm long) is often yellow in colour, although it may turn red with age.

Distribution
This moss has only been found at one location in Canada, in a Douglas-fir/western Hemlock stand in North Vancouver.

R. Belland

Poor pocket moss

Habitat
Very little is known about the habitat of this moss due to its extreme rarity. It grows on bare, silty, moist patches of soil, likely adjacent to slow-moving or seasonal streams.

PHANTOM ORCHID
Cephalanthera austiniae

Description

General: Perennial saprophytic and mycoparasitic orchid. Grows from a short rhizome. Smooth leafless white stalk clasped by white sheaths up to 10 cm long. The plant gets its name from its ghostly appearance; also, it feels clammy and wax-like.

Height: 20-65 cm

Flowers: Five to twenty aromatic flowers with a conspicuous yellow throat, on a terminal raceme. Flowers are bilaterally symmetric with three sepals, three petals and a one-chambered fruit capsule.

Similar species: Indian pipe is a snow-white species with a single bell-shaped flower hanging downward.

G. Monroe

Phantom orchid

Close-up of flowers on terminal raceme

G. Monroe

E.T. Jones

Indian pipe

Distribution

Occurs on southeast Vancouver Island, the Gulf Islands, and the lower Fraser Valley.

Habitat

Colonies occur in moist to mesic coniferous forests, deciduous forests dominated by big-leaf maple, and mixed forests with mature paper birch trees. When growing conditions are less favourable, the plant can survive underground in a dormant state. Important habitat features include sparse ground cover, calcareous sites (limestone) on south- and west-facing slopes.

Structural stages: 6, 7

Annual Schedule

May remain dormant underground when growing conditions are unfavourable.

Flowering.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

WATER-PLANTAIN BUTTERCUP

Ranunculus alismifolius
var. *alismifolius*

G. Monroe

G. Monroe

Water plantain buttercup

Description

General: Erect perennial herb with one to several spreading, soft-hairy and hollow stems growing 30-60 cm tall. The roots are fibrous and tuberous, and yellow flowers grow from the middle stalk within a cluster of large smooth basal leaves. The plant does not produce runners.

Leaves: Leaves grow both from the base and the stems of the plant. Basal leaves are large, deep green, narrow, and egg-shaped, 2-14 cm long and 0.7-3 cm wide. The leaf margins are smooth or slightly toothed; the tips are broadly tapered with blunt to pointed tips and situated on stout stalks as long or longer than the leaf blades. Stem leaves are much smaller than the basal leaves, with shorter stalks, alternate or opposite positioning and increasingly reduced farther up the hollow stem. The stems can be branched within the flower clusters.

Flowers: few to several inflorescences contain one to many shiny yellow flowers. Each flower has five somewhat hairy petals, 5-14 mm long and 2-8 mm wide. Flower stalks grow to 15 cm long in fruit.

Fruit and seeds: Globe-shaped flower head produces 30-50 one-seeded fruits that are 3-7 mm long and 4-8 mm wide. Each plump one-seeded fruit, 1.6-2.8 mm long and 1.2-2 mm wide, is smooth or covered with short stiff hairs.

Less than 50 plants occur in each known plant population.

Similar species: Easily distinguished from other species by its large, shiny yellow flowers.

Distribution

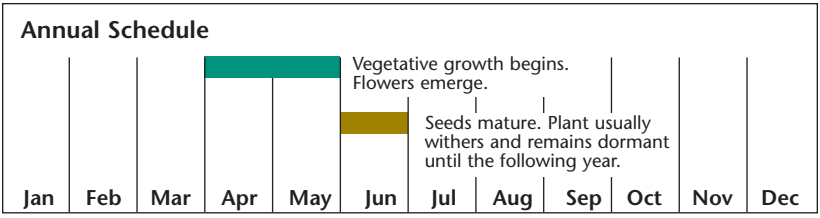
In B.C., this species is found only in Uplands Park on southern Vancouver Island and on Ballenas Island just north of Nanaimo.

Habitat

Wet to moist lowland meadows, grasslands, wet ponds and pond margins, shorelines, streambanks, muddy sites, rock outcrops and deep soils often associated with Garry oak stands. The plant can also withstand periodic flooding and summer drought, and periodic fires at one time would have created new habitat for this species.

Often associated with open stands of Garry oak trees and other grassland plants native to the Garry oak ecosystems, including western buttercup, white hyacinth and common camas. Dominant associated grasses include sweet vernalgrass, orchardgrass, bromus species and various sedges. Dominant understory shrub species, which tend to shade out the herb species, include Scotch broom and snowberry.

Elevations: 150-700 m
Structural stages: 1, 2, 3



SCOULER'S CORYDALIS
Corydalis scouleri

Description

General: Herbaceous perennial arising from a rhizome, reaching heights of 40-120 cm. Hollow stems are branched or unbranched (simple). Often forms raised mats along forest floor.

Leaves: Usually 3-stem leaves with light blue hue, alternate arrangement, arising from above middle point of stem. Leaves are strongly dissected to create many rounded, lance-shaped to oblong segments. Leaves are 2-8 cm long and 5-12 mm wide.

Flowers: Stunning, branched inflorescence consists of 15-35 pink flowers in a long cluster atop the stem. Irregular flowers have 20-30 mm spurs: long, hollow and narrowing.

Fruit and seeds: Pear or egg-shaped capsule, 10-15 mm long and 3-4 mm wide, containing shiny black seeds. Capsules burst open when ripe, propelling the seeds a great distance.

Similar species: May be confused with pink corydalis, which has significantly smaller (2-4 mm long) pink spurs with distinct yellow tips. Pink corydalis arises from a taproot. Scouler's corydalis emerges from a rhizome.

S. Flynn

Scouler's corydalis

H. Roemer

Pink corydalis

Distribution

In B.C., this species is restricted to extreme southwestern Vancouver Island. It is found in the valley of the Nitinat River and the northeast shore of Nitinat Lake, four sites in the valley of the Klanawa River, and two sites in the Kissinger Lake area, immediately west of Cowichan Lake.

Habitat

Found in moist to wet shaded forests, adjacent to waterways of varying size, from small creeks to large rivers. Nutrient-rich, silty soils are ideal but the plant is also found on coarser fluvial deposits. Typically grows in young, mature and old-growth mixedwood or deciduous forests. Deciduous components of the forest usually include big-leaf maple or red alder.

Elevations: 0-200 m

Structural stages: 5, 6, 7

Annual Schedule

Reproduces well vegetatively, generating annual stems apically from the rhizome.

PRAIRIE LUPINE
Lupinus lepidus

Description

General: Perennial herb with multiple stems arising from a thick, woody stem-base, 20-45 cm tall. May be erect or laying somewhat flat along ground. Stems are slender and covered in fine white hairs, which give them a silky-textured appearance.

Leaves: Mostly basal leaves with 10-16 cm long stalks. Occasional stem leaves in alternate arrangement. Leaves divided into 6-10 leaflets, diverging from a single point. Leaflets silky on both sides, pointed at the tip and typically upward folded, measuring 1-5 cm long and 2-7 mm wide.

Flowers: Terminal inflorescence ranging from 10-16 cm long; flowers in whorled arrangement. Corollas blue, light purple or sometimes white, 10-13 mm long.

Fruit and seeds: Stiff, hairy pods, 1-3 cm in length, containing 2-4 seeds each.

Similar species: Unlikely to be confused with other lupine species, which grow in different habitat types, occur at higher elevations or in northern or south-central B.C., and may have different flowering times.

H. Roemer

Prairie lupine

Distribution

The prairie lupine is associated with Garry oak ecosystems (Appendix III). Known only to occur on southeast Vancouver Island.

Habitat

Found in areas susceptible to extreme drought conditions, especially rock outcrops and grassy meadows with coarse, gravelly soils.

Elevations: 0-200 m

Structural stages: 1, 2

Annual Schedule

The hard seed coat of the prairie lupine may delay germination by several months or even years.

Flowering.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

SEASIDE BIRDS-FOOT TREFOIL
Lotus formosissimus


M. Fairbarns

Seaside birds-foot trefoil

Description

General: Perennial herb growing from a rhizome, reaching 20-50 cm tall, usually sprawling but occasionally erect. Stems are multi-branched and without hairs.

Leaves: Stem leaves alternate in arrangement, divided into five (occasionally three or seven) oppositely arranged leaflets. Leaflets egg- or spoon-shaped, 6-20 mm long. Large, triangular stipules present.

Flowers: Inflorescence has a long stalk with a compact cluster of 3-9 pea-like flowers; a delicate bract divided three times is present just below the flowers. Corollas generally yellow with distinct pink to purple wings.

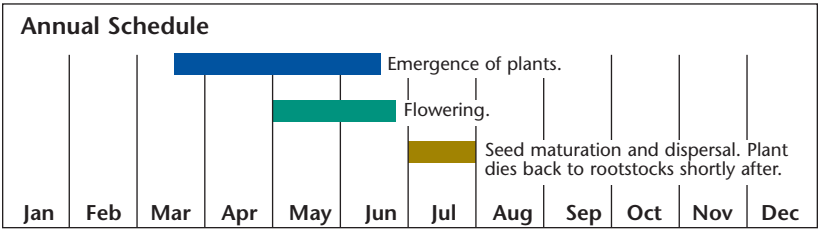
Fruits and seeds: pea-like pod, 2-4 cm long, with up to 15 dark brown or black seeds.

Similar species: May be confused with the more common meadow birds-foot trefoil. It can be distinguished from the seaside birds-foot trefoil by the fine hairy stems and leaves, the creamy-white and purplish corollas, and the presence of a taproot instead of a rhizome.

Habitat

Found along seaside fringes.

Structural stages: all



YELLOW-MONTANE VIOLET
Viola praemorsa ssp. *praemorsa*

Description

General: Perennial herb that develops from a rhizome. Stems between 6-30 cm tall, usually somewhat hairy. After spring the plant is difficult to locate as it dies back to a rhizome in summer.

Leaves: Stem leaves few or lacking. Basal leaves, dark green, slightly to densely hairy, egg- to lance- shaped; margins usually entire, occasionally subtly toothed to wavy. Stalks 3-15 cm long, leaves quite small, 2-10 cm long and 1-3.5 cm wide. Stipules joined to stem, also somewhat hairy; margins toothed to entire.

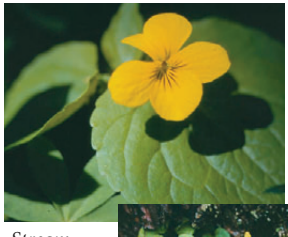
Flowers: Inflorescence consists of single flowers appearing to arise from basal leaf nodes. Flower has five yellow petals, with the bottom petal the longest (12-20 mm) with a spur. The lower three petals have brown vein-like striations. Five sepals are arranged around the petals.

Fruits and seeds: Smooth to hairy capsule (6-11 mm long) containing dark brown seeds.

Similar species: Yellow-montane violet could be confused with two other yellow-flowered violets found in its range: stream violet and trailing yellow violet. The yellow montane violet may be distingued by the leaves. Both the stream violet and the trailing yellow violet have hairless, kidney-shaped to heart-shaped leaves, whereas yellow montane violet has hairy leaves that are egg-shaped.

G. Monroe

Yellow-montane violet



H. Roemer

Stream violet

H. Roemer

Trailing yellow violet

J.L. Penny

Habitat of the yellow-montane violet

Distribution

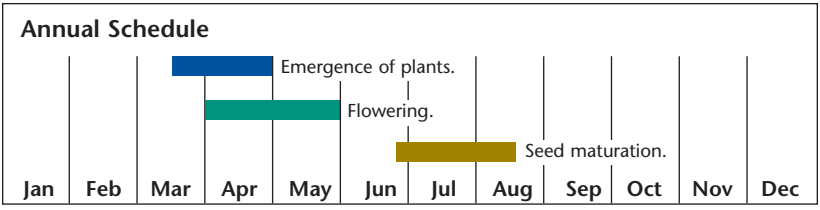
Southern Vancouver Island.

Habitat

Open, moist Garry oak stands or grassy meadows. Also known to grow on rocky, Garry oak-dominated slopes. This is a very shade-intolerant species, unable to compete in shrubby stands, as it requires extensive light levels.

Elevations: 0-200 m

Structural stages: 1, 2, 6, 7



PURPLE SANICLE
Sanicula bipinnatifida

Description
General: Perennial herb with branched stems, reaching erect heights of 10-60 cm, growing from a taproot.

Leaves: Basal and stem leaves are pinnately divided (somewhat resembling a feather), toothed, measuring 4-13 cm long and 3-12 cm across. Leaf axis is distinctly sharply toothed or winged.

Flowers: Inflorescence is made up of several to many purple flower heads. These flowers arise from a single point (umbel). Bracts are small and difficult to see.

Fruits: Fruits are dry and egg-shaped, 3-6 mm in length, splitting open when mature. They are coated in robust, hooked prickles.

Similar species: Purple sanicle is most likely to be confused with the sierra sanicle. The sierra sanicle has yellowish flowers (instead of purple) and the leaf axis is smooth, not distinctly toothed.

Distribution
The purple sanicle is associated with Garry oak ecosystems (Appendix III). Found on southern Vancouver Island.

J.L. Penny

Purple sanicle

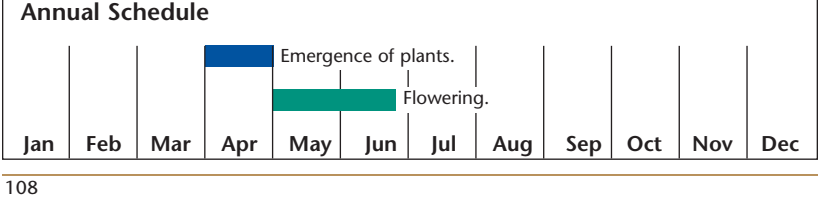
Habitat
This species grows in low-elevation grassy meadows, on shrubby or grassy hummocks and somewhat open woodlands. Purple sanicle is also found on cliffs near the ocean. It prefers dry, sunny sites that are rich in nutrients. Climate preferred by this species is Mediterranean, with warm, dry summers and mild, wet winters.

Elevations: 0-100 m

Structural stages: 1, 2, 3

G. Monroe

Sierra sanicle



BEAR'S FOOT SANICLE
Sanicula arctopoides

Description
Also referred to as snake-root sanicle.

General: Herbaceous wildflower emerging from a taproot that flowers in its second year and has a lifespan of two years. This branched sanicle usually grows level to the ground or erect up to 30 cm tall.

Leaves: Basal leaves are arranged in a rosette, are yellowish to yellowish-green and are somewhat fleshy. Stem leaves are three-lobed and have irregularly toothed margins. Leaf size is from 2.5-6 cm long and 2.5-9 cm wide.

Flowers: Inflorescence is made up of several to many tiny bright yellow flower heads. These flowers arise from a single point (umbel). Bracts protrude out past the flower head, forming a star-like ring around the umbel.

Fruits: Dry and egg-shaped, 2-5 mm in length, splitting open when mature. They are coated in robust, hooked prickles.

Similar species: Can be mistaken for Pacific sanicle. However, the Pacific sanicle does not have basal leaves in a rosette and it lacks the long distinctive bracts of the bear's foot sanicle.

M. Fairbarns

Bear's foot sanicle

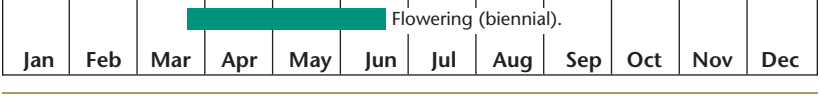
Distribution
Associated with Garry oak ecosystems (Appendix III). Found on southern Vancouver Island.

Habitat
The bear's foot sanicle is found on grassy coastal bluffs associated with dry, rocky outcrops and shallow soils. It is often associated with spring seeps exposed to ocean spray, wind and direct sunlight. Climate preferred by this species is Mediterranean, with warm, dry summers and mild, wet winters.

Elevations: 0-100 m

Structural stages: 1, 2, 3

Annual Schedule



GOLDEN PAINTBRUSH
Castilleja levisecta

Description

General: Clumped perennial herb branching from a woody stem base into 5-15 semi-erect, clustered or sometimes creeping stems, 10-50 cm tall. The stems and leaves are covered with dense soft hairs.

Leaves: Grow alternately; soft hairs to rough bristles cover the leaf and stem surfaces, which are also sticky, especially on the topsides. Upper stem leaves are broad and have one to three pairs of short lateral lobes near the top. These leaves are egg-shaped and narrow at the base. The lower stem leaves are long, pointy and tapered at each end.

Flowers: Inflorescences are green and completely enclosed or hidden by whorls of bright golden-yellow bracts and together form elongated terminal spikes. Each bract has 3-5 narrow lobes covered with short, sticky, soft hairs rounded margins; bracts are the same width as the upper stem leaves. The plant appears to have bright yellow flower spikes at the stem tips.

Fruits and seeds: Capsules contain more than 100 seeds and will persist on the plant long after the growing season has ended and the plant has withered. The seed-set depends on cross-pollination and is the only known means of reproduction.

Golden paintbrush may be a hemiparasite and require a host plant for seedling development. Although golden paintbrush has not been specifically researched, studies indicate that plants without a hemiparasitic connection wilt faster than those with such a connection.

M. Fairbarns

Golden paintbrush

Similar species: May be confused with harsh paintbrush, which can be red, orange or yellow. Golden paintbrush is distinguished by bright yellow floral bracts.

H. Roemer

Harsh paintbrush

Distribution

Golden paintbrush is associated with Garry oak ecosystems and similar habitats (Appendix III). In B.C. it occurs only on Trial Island and Alpha Islet, with documented populations of between 3 to 2500 plants.

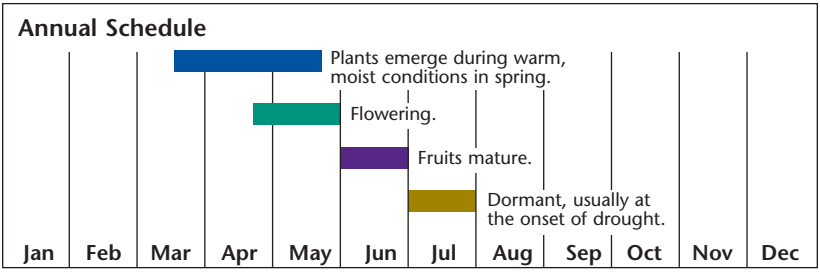
Habitat

The species occupies grass-dominated meadows and openings with dry to mesic conditions. This species thrives in open sunny environments and will tolerate partial shade. Periodic low intensity fires at one time would have created new habitat for this species.

Associated species include Idaho fescue, red fescue, early hairgrass, orchardgrass, hedgehog dogtail, sweet vernalgras and other weedy-type species that grow in association with golden paintbrush.

Elevations: under 100 m

Structural stages: 1, 2, 3



BEARDED OWL-CLOVER
Triphysaria versicolor ssp. *versicolor*

Description

General: Erect annual herb, 10-60 cm tall, with smooth surfaces or fine hairs covering the greenish brown stems and foliage.

Leaves: Grow alternately along the main stem, each tapered leaf branching into 5-9 pinnate lobes, 2-8 cm long, and at evenly spaced intervals along the individual leaf stem. Leaves decrease to small bracts toward the upper parts of stems.

Flowers: Dense inflorescence of small whitish yellow fading to rose-coloured flowers forms a terminal spike 5-20 cm long. Flowers are club-shaped and tubular, 12-22 mm long, two-lipped and surrounded by leaf-shaped bracts 8-18 mm long. The bottom lip of the flower is slightly longer than the upper lip, distinctly hairy and with purple dots along the margins.

Fruits and seeds: Capsules 6-9 mm long produce 30–50 dark brown seeds per capsule. Pollination is likely by out-crossing but B.C. pollinators are unknown.

Similar species: Dwarf owl-clover is a small plant with distinctly separated dark reddish leaves and smaller flowers. It only grows 5-20 cm and when not in bloom can be confused with bearded owl-clover. Thin-leaved owl-clover has a distinctly narrow corolla compared to the club-shaped corollas of bearded owl-clover.

H. Roemer

Bearded owl-clover

H. Roemer

Dwarf owl-clover

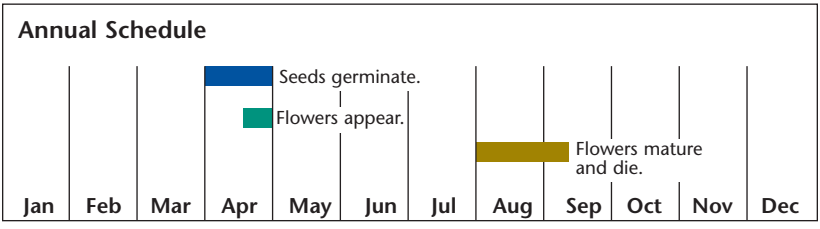
Distribution

In B.C. known from Garry oak ecosystems (Appendix III) on southeastern Vancouver Island. Populations range between 20 and 1000 plants.

Habitat

Recorded in open meadows, grasslands and headlands near the ocean, usually at elevations <10 m. Usually occurs within shallow damp to wet soils and vernal seepages on slightly sloping exposed rocky outcrops along the shoreline that dry up toward the end of summer. Plants favour southern, eastern or northeastern aspects, and are tolerant of continuous sun, wind and salt spray. Plant is shade intolerant. Associated species include harvest brodiaea, sea blush, poverty clover, broad-leaved shooting star; camas in upper slopes in draws with deep soil, and scouler's popcornflower in wet seeps. In drier areas with well-drained soil associated grasses include western fescue, early hairgrass, annual bluegrass and brome. The bearded owl-clover is a root hemiparasite possibly with habitat-associated grasses, although host species or degree of parasitism are unknown.

Structural stages: 1, 2, 3



WHITE-TOP ASTER
Aster curtus

Description

General: Erect perennial herb, 10-30 cm tall. Unbranched, hairless stems emerge from a mass of rhizomes.

Leaves: Stem leaves alternate, reduced upward, averaging 3.0 cm long and 0.7 cm wide. Toothless leaves taper at both ends with widest part above the middle and usually appear unstalked at base.

Flowers: Clusters of 5-20 flower heads are located on unbranched stems. Individual flower heads contain one to three very small (average 2 mm long) white ray flowers. Nine to 21 disk flowers are light yellow and have somewhat purple anthers. A series of bracts located below the flower head are white below with light green tips. Flowering occurs from July to August.

Fruits: Smooth, grey achenes, densely hairy, with a cluster of white hairs at tip.

Similar species: Not likely to be confused with other species. The common California aster has significantly larger blue or purple ray flowers and multi-branched flower heads. The two other B.C. species with white flowers, *A. englemannii* and *A. paucicapitatus*, are bigger and have longer ray flowers.

M. Fairbarns

White-top aster

Distribution

The white-top aster is associated with Garry oak ecosystems and similar habitats (Appendix III) of southern Vancouver Island.

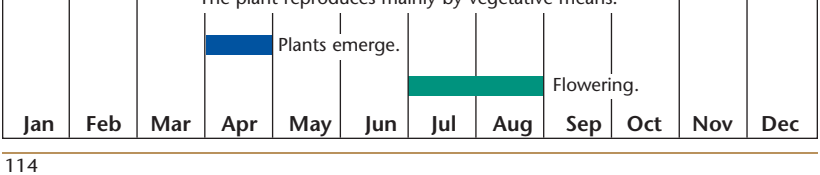
Habitat

Found on dry, grassy meadows as well as wooded stands of Garry oak. Known to occur on rocky slopes and shallow soils, possibly shaded by nearby woodlands.

Elevations: 0-200 m

Structural stages: all

Annual Schedule



DELTOID BALSAMROOT
Balsamorhiza deltoidea

Description

General: Slow-growing perennial herb with characteristic large and prominent yellow flower heads that grow from glandular, prominent veined and rough-haired stems. Deep woody taproot. Height: 20-100 cm.

Leaves: Large triangular and green leaves grow from both the base and the stem of the plant. Basal leaves are large, 20 cm wide and 30 cm long, heart-shaped or triangular. Distinct nerves branch from a main vein through the middle of the leaf and the margins are round-toothed. The tear-dropped stem leaves are greatly reduced but with the same glandular, rough-haired texture and venation.

Flowers: One to four bright yellow flower heads grow from thick stems, the central flower larger than the lateral flowers. The flower head is 2.5 cm wide and composed of a central disk of 13 or 21 tiny ray flowers that together give the appearance of a 'sunflower'-type head. Leaf-like and slightly woolly bracts surround the flower head, the outer bracts sometimes growing past the flower disk.

Fruits and seeds: Small, 7-8 mm long, and dry one-seeded fruits are smooth and lack bristles or hairs. Seed production is generally low.

P. Slichter

Deltoid balsamroot

P. Slichter

Similar species: This species is not likely to be confused with other species on the coast. Its prominent yellow flower head makes it a relatively easy species to identify.

Distribution

The deltoid balsamroot is at the northernmost limit of its range. It is associated with Garry oak ecosystems and similar habitats (Appendix III). It is known from only 10 occurrences within B.C., all of them on Vancouver Island between Victoria and Comox.

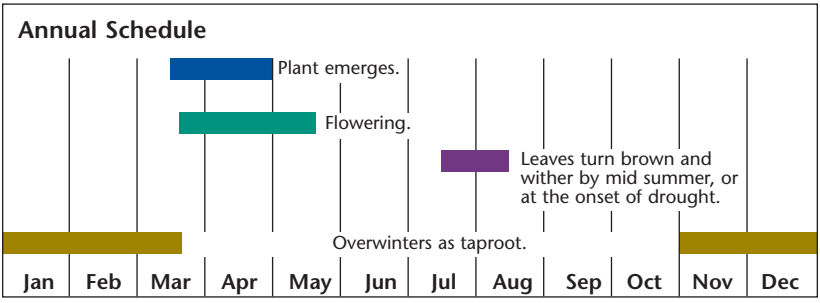
Habitat

Open woodlands, grassy areas and meadows in association with Garry oak ecosystems. Dry, exposed and rocky areas in deep, well-drained sand or gravel soils.

Associated species: Common overstory tree species include Garry oak and arbutus. Shrubs commonly found include snowberry, hairy honeysuckle, oceanspray and Oregon grape. Naturally occurring herbs include Idaho fescue, sea blush, fern-leaved desert-parsley, broad-leaved stonecrop, meadow death camas, Menzies' larkspur, blue wildrye, woolly sunflower and great camas.

Elevations: 25-260 m

Structural stages: all



TALL BUGBANE
Cimicifuga elata

Description

General: Tall perennial wildflower, 120-200 cm tall.

Leaves: Alternate arrangement of large, compound leaves up to 80 cm long; long stalk up to 40 cm long. Twice divided into three leaflets, each leaflet with three lobes, subdivided into irregularly toothed lobes. Smooth on top of leaflets, fine-hairy below.

Flowers: Narrow, raceme inflorescence contains between 50 and 900 tiny white flowers. Mature racemes resemble bottle brushes.

Fruits and seeds: 9-12 mm long follicle fruits dry to a flattened capsule, holding about 10 small reddish seeds.

Similar species: Most likely to be mistaken for baneberry, which has smooth leaves above rather than hairy; its inflorescence is rounded, and its fruits are red berries instead of flattened capsules.

D. Knopp

Tall bugbane

D. Knopp

Tall bugbane flowers

D. Bernier

Baneberry

Distribution

Known from near Chilliwack, southwestern B.C.

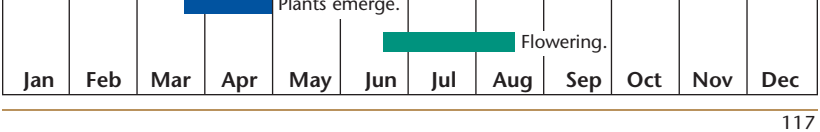
Habitat

Damp, shaded, low elevation old-growth forests. Also found in mature mixedwood or deciduous forests; especially associated with big-leaf maple, red alder or with numerous canopy gaps. As it is also found along roads and in clearcuts, it is not considered old-growth dependent.

Elevations: 0-1000 m

Structural stages: 1, 2, 3 (along roads and in clearcuts), 6, 7

Annual Schedule



TALL WOOLLY-HEADS
Psilocarphus elatior

Description
General: Erect, annual herb, emerging from a taproot, from 5-15 cm tall. Moderately branched stems have a woolly or silky appearance from its fine hairs.

Leaves: Stem leaves only, in opposite arrangement, with overall silky to woolly appearance. Leaves slender and long, averaging 20 mm long and 4 mm wide, with toothless margins.

Flowers: Usually a single flower head, sometimes several, borne at the tips of branches or from stem nodes. Flower heads are spherical in shape with extended receptacular bracts, from 2.5-3.8 mm long.

Fruits: Achene, 10-17 mm long, without hairs.

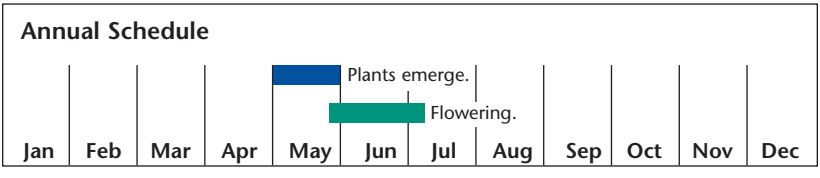
Similar species: Can be confused with slender woolly-heads. Slender woolly-heads are more extensively branched and become prostrate at maturity. Receptacular bracts are smaller in the slender woolly-heads and leaves are often spoon-shaped instead of straight, long and slender.

M. Fairbarns

Tall woolly-heads

Distribution
Tall woolly-heads are associated with Garry oak ecosystems and similar habitats (Appendix III). They are found on southern Vancouver Island.

Habitat
Occur primarily in exposed, moist to wet sites that are seasonally flooded, especially dried spring pools. They can also be found in disturbed sites, moist meadows and muddy ditches.
Structural stages: 1, 2, 3



Plant Communities

English Name	Scientific Name	Forest District	Biogeoclimatic Unit
Douglas-fir/Alaska oniongrass	*Pseudotsuga menziesii/Melica subulata*	South Island Sunshine Coast	CDFmm/03
Douglas-fir/dull Oregon-grape	*Pseudotsuga menziesii/Mahonia nervosa*	Chilliwack Squamish Sunshine Coast North Island	CWHds1,ds2
Western hemlock – Douglas-fir/ electrified cat's-tail moss	*Tsuga heterophylla – Pseudotsuga menziesii/ Rhytidiadelphus triquetrus*	Chilliwack Squamish Sunshine Coast	CWHds1/01
Western redcedar – Douglas-fir/vine maple	*Thuja plicata – Pseudotsuga menziesii/Acer circinatum*	Chilliwack Squamish Sunshine Coast North Island	CDFmm1

DOUGLAS-FIR/ALASKA ONIONGRASS

Pseudotsuga menziesii/Melica subulata

Description

The Douglas-fir/Alaska oniongrass community is a dry, open forested ecosystem found on dry, warm sites, often on southerly aspects. Occurrences are patchy across the landscape. Shallow (<1 m), sombric brunisol soils are typical, derived from colluvial or morainal surficial materials.

This community occurs in the Moist Maritime subzone of the Coastal Douglas-fir zone (CDFmm), in site series 03. Sites have a very xeric to xeric relative soil moisture regime and a rich to very rich relative nutrient regime. It is a sensitive ecosystem, highly susceptible to degradation from invasion of exotic plant species as well as soil erosion and compaction.

Elevations: 0-150 m

H. Roemer

Mature forest

H. Roemer

Herb layer

Common Vegetation	
Trees	Douglas-fir, Garry oak
Shrubs	Hairy honeysuckle
Herbs	Alaska oniongrass, big-leaved sandwort, broad-leaved shootingstar, fairy-slipper, long-stoloned sedge, Pacific sanicle, tall trisetum
Mosses	Electrified cat's tail moss

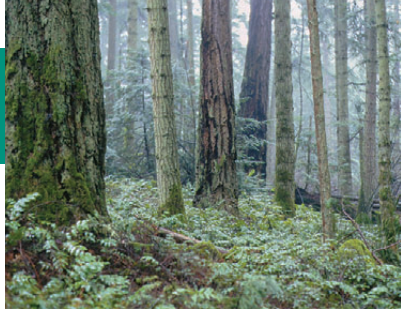
DOUGLAS-FIR/DULL OREGON-GRAPE

Pseudotsuga menziesii/Mahonia nervosa

Description

The Douglas-fir/dull Oregon-grape plant community is the typical (zonal) ecosystem of the Moist Maritime subzone of the Coastal Douglas-fir zone (CDFmm). Historically, this community was widespread across the CDFmm in B.C. Today, mature and old stands have been significantly reduced due to urbanization, agriculture and timber harvesting.

Sites occur on upper to lower slope positions or on level areas. Relative soil moisture regimes range from subxeric to mesic with very poor to medium relative nutrient regimes. Orthic dystric brunisol soils are common, developing on coarse to medium-textured moraines, colluvium or marine deposits.



H. Roemer

Mature forest

These ecosystems are susceptible to invasion from exotic plants species, especially after logging or in areas adjacent to human developments.

Elevations: 0-250 m

Common Vegetation	
Trees	Douglas-fir, grand fir, western redcedar
Shrubs	Dull Oregon-grape, oceanspray, salal
Herbs	Bracken fern, sword fern, vanilla-leaf
Mosses	Electrified cat's tail moss, Oregon beaked-moss, step moss

WESTERN HEMLOCK – DOUGLAS-FIR/ELECTRIFIED CAT'S-TAIL MOSS

Tsuga heterophylla – Pseudotsuga menziesii/Rhytidiadelphus triquetrus

J. Pojar

Mature forest

Description

This historically widespread plant community is the typical (zonal) forest type of the Southern variant of the Dry Submaritime subzone of the Coastal Western Hemlock zone (CWHds1). Extensive logging, urban developments and agricultural activities have made mature and old occurrences of this community rare.

Sites usually occur on middle slopes, but also on upper, lower and level slope positions. Parent material is quite variable but colluvium or moraine is typical. Soils have a mesic to submesic relative moisture regime with a medium to very poor nutrient regime. The moderately well to well-drained soils vary from coarse to loamy textures.

Elevations: 0-650 m

Common Vegetation	
Trees	Douglas-fir, western hemlock, western redcedar
Shrubs	Black huckleberry, dull Oregon-grape, falsebox, red huckleberry
Herbs	Prince's pine, Queen's cup, sword fern, twinflower
Mosses	Electrified cat's-tail moss, pipecleaner moss, red-stemmed feathermoss, step moss

WESTERN REDCEDAR – DOUGLAS-FIR/VINE MAPLE

Thuja plicata – Pseudotsuga menziesii/Acer circinatum

Description

The Western Redcedar – Douglas-fir/Vine Maple community is a productive, forested ecosystem. Historically, it was widespread across the landscape, with somewhat patchy occurrences.

This community is typically found on lower to level slope positions on fluvial or colluvial deposits, and occasionally on moraine. Deep loamy to sandy soils, with moderate to abundant coarse fragments, are usually moderately well drained.

This community occurs in the southern and central variants of the Dry Submaritime subzone of the Coastal Western Hemlock zone (CWHds1 & CWHds2), in site series 05. Sites are mesic to submesic with rich to very rich relative nutrient regimes. Good timber productivity has made this ecosystem a prime candidate for logging, resulting in reduced numbers of mature and old stands remaining on the landbase.

Elevations: 0-650 m

H. Roemer

Mature forest

Common Vegetation	
Trees	Bigleaf maple (CWHds1), Douglas-fir, paper birch (CWHds2), western redcedar
Shrubs	Vine maple, western hemlock
Herbs	Broad-leaved starflower, clasping twistedstalk, false solomon's-seal, one-leaved foamflower, Queen's cup, spiny wood fern, sword fern
Mosses	Coastal leafy moss, electrified cat's-tail moss, step moss

Appendix I

Conservation Status Ranks and Modifiers

CDC Status Ranks (G = Global, N = National, S = Provincial)	
Ranks	**Description**
X - Presumed extirpated or extinct	Not located despite intensive searches and no expectation that it will be rediscovered.
H - Historical	Not located in the last 50 years, but some expectation that it may be rediscovered.
1 - Critically imperiled	Especially susceptible to extirpation or extinction. Occurrences: 5 or less.
2 - Imperiled	Very susceptible to extirpation or extinction. Occurrences: 6 to 20.
3 - Vulnerable	Found only in a restricted range (even if abundant at some locations), or susceptible to extirpation or extinction. Occurrences: 21 to 100.
4 - Apparently secure	Uncommon but not rare, and usually widespread in the province. Occurrences: more than 100 existing.
5 - Secure	Common to very common, typically widespread, abundant, and not susceptible to extirpation or extinction under present conditions.
? - Unranked	Rank not yet assessed.
U - Unrankable	Due to current lack of available information.

Modifier	Description
E	Exotic – a species introduced by man to the province.
?	Inexact or uncertain rank due to limited information; qualifies the immediately preceding character.
Q	Taxonomic status is not clear or is in question.
T	A rank for a subspecies or variety.
B	A rank for breeding occurrence of mobile animals.
N	A rank for non-breeding occurrences of mobile animals.
Z	Reported in province as a diffuse, usually moving population.
R	Reported from province, but without persuasive documentation for either accepting or rejecting the report.
RF	Reported in error, but this error has persisted in the literature.

Appendix II

Biogeoclimatic Unit Codes

Code	Zone
AT	Alpine Tundra
CDF	Coastal Douglas-fir
CWH	Coastal Western Hemlock
ESSF	Engelmann Spruce – Subalpine Fir
ICH	Interior Cedar – Hemlock
IDF	Interior Douglas-fir
MH	Mountain Hemlock
SBS	Sub-Boreal Spruce

Code	Subzone
1st letter: precipitation regime	
x	Very dry
d	Dry
m	Moist
w	Wet
v	Very wet
2nd letter: coastal zones (CDF, CWH, MH, AT) - continentality	
h	Hypermaritime
m	Maritime
s	Submaritime
2nd letter: interior zones (ESSF, ICH, IDF, SBS AT) temperature regime	
h	Hot
w	Warm
m	Mild
k	Cool
c	Cold
v	Very cold

1,2,3…= subzone variants reflecting further differences in regional climate. The variant label "p" denotes the parkland variant of a subzone (e.g. MHmmp1 = Mountain Hemlock moist maritime parkland 1 (Windward Parkland Variant).

Appendix III

Garry Oak Ecosystems

Garry oak ecosystems have a natural occurrence of Garry oak trees, and can range from an open meadow, dense or patchy shrub cover to closed woodland with a mixture of arbutus, Douglas-fir and Garry oak trees. Associated ecosystems may not have Garry oak trees but may still contain many of the same plants and animals. These include vernal pools, grasslands, rock outcrops, transitional forests and maritime meadows. Garry oak and associated ecosystems occur within southeast Vancouver Island, the Gulf Islands and as small remnants in the lower Fraser Valley.

Appendix IV

Stand Structural Stages, Coarse Woody Debris Decay Classes & Wildlife Tree Classes

Stand Structural Stage	Description
1	Sparse/bryoid
2	Herb
3	Shrub/herb
4	Pole/sapling
5	Young forest
6	Mature forest
7	Old forest

Decay classes for coarse woody debris					
	Class 1	Class 2	Class 3	Class 4	Class 5
Wood texture	Intact, hard	Intact, hard to partly decaying	Hard, large pieces, partly decaying	Small, blocky pieces	Many small pieces, soft portions
Portion on ground	Elevated on support points	Elevated but sagging slightly	Sagging near ground, or broken	All of log on ground sinking	All of log on ground, partly sunken
Twigs <3 cm (if originally present)	Present	Absent	Absent	Absent	Absent
Bark	Intact	Intact or partly missing	Trace	Absent	Absent
Shape	Round	Round	Round	Round to oval	Oval
Invading roots	None	None	In sapwood	In heartwood	In heartwood

Classes of Wildlife Trees	
Class	**General Description**
1	Live/healthy – no decay.
2	Live/unhealthy – internal decay or growth deformities.
3	Dead – hard heartwood, needle and twigs present, roots stable.
4	Dead – hard heartwood, no needles/twigs, 50% of branches lost, loose bark, top usually broken, roots stable.
5	Dead – spongy heartwood, most branches/bark absent, internal decay, roots stable for larger trees, roots of smaller trees beginning to soften.
6	Dead – soft heartwood, no branches or bark, sapwood/heartwood sloughing from upper bole, lateral roots of larger ones softening, smaller ones unstable.
7-8	Dead – soft heartwood, stubs, extensive internal decay, outer shell may be hard, lateral roots completely decomposed, hollow or nearly hollow shells.
9	Debris – downed stubs or stumps.

Appendix V

Species at Risk Ranking

Species	NatureServe (G: Global, N: National, S: Provincial)	COSEWIC	British Columbia
Invertebrates			
Oregon forestsnail	G2 N3N4 S1S2	Endangered	Red
Puget Oregonian snail	G3G4 N2 SX	Extirpated (Nov. 2002)	Red
Johnson's hairstreak	G2G3 N1N2 S1S2	Not determined	IWMS / Red
Quatsino cave amphipod	G2G3 N1N2 S2S3	Not determined	IWMS / Blue
Island large marble	G5T1 SX	Extirpated (May 2000)	Red
Taylor's checkerspot	G5T1 N1 SH	Endangered	Red
Dun skipper	G5 N5 S3	Threatened	Blue
Island blue	G5 NH S1	Endangered	Red
Fish			
Western Brook lamprey	G5T1Q N1 S1	Endangered	Red
Cowichan Lake lamprey	G1 N1 S1	Threatened	Red
Nooksack dace	G3 N1 S1	Endangered	Red
Salish sucker	G1 N1 S1	Endangered	Red
Cultus Lake sculpin	G1 N1 S1	Threatened	Red
Vananda Creek limnetic and benthic sticklebacks	G1 N1 S1	Endangered	IWMS / Red
Amphibians and Reptiles			
Coastal giant salamander	G5 N2 S2	Threatened	IWMS / Red
Coastal tailed frog	G4 N3N4 S3S4	Special concern	IWMS / Blue
Red-legged frog	G4 N3N4 S3S4	Special concern	IWMS / Blue
Oregon spotted frog	G2 N1 S1	Endangered	Red
Sharp-tailed snake	G5 N1 S1	Endangered	Red

Species	NatureServe (G: Global, N: National, S: Provincial)	COSEWIC	British Columbia
Birds			
Ancient murrelet	G4 N3B, N3N S2S3B, S4N	Special concern	IWMS / Blue
Marbled murrelet	G3G4 N3 S2B, S4N	Threatened	IWMS / Red
Cassin's auklet	G4 N4 S2S3B; S4N	Not determined	IWMS / Blue
Sandhill crane	Georgia Depression G5T1Q N? S1 Other populations G5 N5B S3S4B, SZN	Not determined Not at risk	IWMS / Red IWMS / Blue
Great blue heron	G5T4 N? S3B, S5N	Special concern	IWMS / Blue
Lewis's woodpecker	G4 N3B S3B	Special concern	IWMS / Blue
"Queen Charlotte" goshawk	G5T2 N2 S2	Threatened	IWMS / Red
Peregrine falcon	G4T3 N3B, N3N, S2B,SZN	*anatum:* Threatened *pealei:* Special concern	Red
"Vancouver Island" whitetailed ptarmigan	G5T3 N3 S3	Not determined	IWMS / Blue
"Vancouver Island" northern pygmy-owl	G5T3Q N3 S3	Not determined	IWMS / Blue
"Queen Charlotte" northern saw-whet owl	G5T3 N3 S3	Not determined	Blue
Short-eared owl	G5 N3N, N5B S3B, S2N	Special concern	Blue
Spotted owl	G3T3 N1 S1	Endangered	IWMS / Red
"Queen Charlotte" hairy woodpecker	G5T3 N3 S3	Not determined	IWMS / Blue
Yellow-breasted chat	G5 N5 S1B, SZN	Endangered	IWMS / Red

Species	NatureServe (G: Global, N: National, S: Provincial)	COSEWIC	British Columbia
Mammals			
"Vancouver Island" common water shrew	G5T2 N2 S2	Not determined	IWMS / Red
Pacific water shrew	G4 N1N2 S1S2	Threatened	IWMS / Red
Keen's long-eared myotis	G2G3 N1N3 S1S3	Special concern	IWMS / Red
Townsend's mole	G5 N1 S1	Threatened	Red
Vancouver Island marmot	G1 N1 S1	Endangered	IWMS / Red
"Queen Charlotte" ermine	G5T2 N2 S2	Threatened	Red
Fisher	G5 N5 S3	Not determined	IWMS / Red
Wolverine	Vancouver Island G4T1 N1 S1 Mainland G4T4 N4 S3	Special concern	IWMS / Red IWMS / Blue
Badger	G5 N4N5 S1	Endangered	Red
Grizzly bear	G4T3T4 N3 S3	Special concern	IWMS / Blue

Species	NatureServe (G: Global, N: National, S: Provincial)	COSEWIC	British Columbia
Mosses, Lichens and Vascular Plants			
Seaside centipede	G2G3 N2N3 S2S3	Endangered	-
Rigid apple moss	G2G4 N1 S1	Endangered	Red
Poor pocket moss	G3? N? S1	Endangered	Red
Phantom orchid	G4 N2 S2	Threatened	Red
Water-plantain buttercup	G5T5 N1 S1	Endangered	Red
Scouler's corydalis	G4 N2 S2	Threatened	IWMS / Red
Prairie lupine	G5 N1 S1	Endangered	Red
Seaside birds-foot trefoil	G5 N2 S1	Endangered	Red
Yellow-montane violet	G5T3T5 N2 S2	Threatened	Red
Purple sanicle	G5 N2 S2	Threatened	Red
Bear's foot sanicle	G5 N2 S1	Endangered	Red
Golden paintbrush	G1 N1 S1	Threatened	Red
Bearded owl-clover	G5T5 N2 S1	Endangered	Red
White-top aster	G3 N2 S2	Threatened	Red
Deltoid balsamroot	G5 N2 S1	Endangered	Red
Tall bugbane	G2 N2 S1	Endangered	IWMS / Red
Tall woolly-heads	G4Q N2 S1	Endangered	Red

Plant Communities			
Douglas-fir/Alaska oniongrass	G? N? S1	Not determined	IWMS / Red
Western hemlock – Douglas-fir/electrified cat's-tail moss	G? N? S2	Not determined	IWMS / Red
Douglas-fir/dull Oregon-grape	G? N? S2	Not determined	IWMS / Red
Western redcedar– Douglas-fir/vine maple	G? N? S1S2	Not determined	IWMS / Red

Appendix VI

Scientific Names *(not provided in text)*

English name	Scientific name
Invertebrates	
Boisduval's blue	*Icaricia icariodides blackmorei*
Chalcedon checkerspot	*Euphydryas chalcedona*
Edith's checkerspot	*Euphydryas editha*
Northwest hesperian	*Vespericola columbianus*
Pygmy Oregonian	*Cryptomastix germana*
Silvery blue	*Glaucopsyche lygdamus columbia*
Tawny-edged skipper	*Polites themistodes*
Thicket hairstreak	*Callophrys spinetorum*
Western spring azure	*Celastrina echo*
Fish	
Coast range sculpin	*Cottus aleuticus*
Dolly varden	*Salvelinus malma*
Longnose dace	*Rhinichthys cataractae*
Longnose sucker	*Catostomus catostomus*
Pacific herring	*Clupea harengus*
Pacific sand lance	*Ammodytes hexapterus*
Salmon	*Oncorhynchus sp.*
Amphibians	
Northwestern salamander	*Ambystoma gracile*
Rocky Mountain tailed frog	*Ascaphus montanus*
Birds	
Cooper's hawk	*Accipiter cooperii*
European starling	*Sturnus vulgaris*
Red-tailed hawk	*Buteo jamaicensis*
Rock dove	*Columba livia*
Rock ptarmigan	*Lagopus mutus*
Sharp-shinned hawk	*Accipiter striatus*
Willow ptarmigan	*Lagopus lagopus*
Mammals	
Beaver	*Castor canadensis*
Northern flying squirrel	*Glaucomys sabrinus*
Snowshoe hare	*Lepus americanus*
Western longeared myotis	*Myotis evotis*
Woodrat	*Neotoma sp.*
Wolf	*Canis lupus*

English name	Scientific name
Mosses, Lichens and Vascular Plants	
Amabilis fir	*Abies amabilis*
Annual bluegrass	*Poa annua*
Arbutus	*Arbutus menziesii*
Arrowleaf balsamroot	*Balsamorhiza pusilla*
Baneberry	*Actaea rubra*
Bigleaf maple	*Acer macrophyllum*
Big-leaved sandwort	*Moehringia macrophylla*
Bird-foot trefoil	*Lotus denticulatus*
Black cottonwood	*Populus balsamifera*
Black huckleberry	*Vaccinium membranaceum*
Blue wildrye	*Elymus glaucus*
Bracken fern	*Pteridium aquilinum*
Broad-leaved starflower	*Trientalis borealis latifolia*
Broad-leaved shooting star	*Dodecatheon hendersonii*
Broad-leaved stonecrop	*Sedum spatulifolium*
Brome	*Bromus sp.*
Bulrush	*Scirpus sp.*
Camas	*Camassania*
Carey's balsamroot	*Balsamorhiza careyana*
Cattail	*Typha latifolia*
Chufa flat sedge	*Cyperus esculentus*
Coastal leafy moss	*Plagiomnium insigne*
Choke cherry	*Prunus virginiana*
Columbian hawthorn	*Crataegus columbiana*
Common apple moss	*Bartramia pomiformis*
Common California aster	*Aster chilensis*
Common camas	*Camassia quamash*
Clasping twistedstalk	*Streptopus amplexifolius*
Common snowberry	*Symphoricarpos albus*
Cottonwood	*Populus deltoides*
Dense-flowered lupine	*Lupinus densiflorus var. densiflorus*

English name	Scientific name
Mosses, Lichens and Vascular Plants	
Dwarf mistletoe fungal tree parasite	*Arceuthodbium sp.*
Early hairgrass	*Aira praecox*
Elegant centipede	*Heterodermia leucomelos*
Engelmann spruce	*Picea engelmanii*
Fairy-slipper	*Calypso bulbosa*
Falsebox	*Paxistima myrsinites*
False Solomon's-seal	*Maianthemum racemosum amplexicaule*
Fern-leaved desert-parsley	*Lomatium dissectum*
Field mustard	*Brassia campestris*
Garry oak	*Quercus garryana*
Grand fir	*Abies grandis*
Great camas	*Camassia leichtlinii*
Hairy honeysuckle	*Lonicera hirsuta*
Hairy rockcress	*Arabis hirsuta*
Hardhack	*Spiraea douglasii*
Harsh paintbrush	*Castilleja hispida*
Harvest brodiaea	*Brodiaea coronaria*
Hedgehog dogtail	*Cynosurus echinatus*
Himalayan blackberry	*Rubus discolour*
Idaho Fescue	*Festuca idahoensis*
Indian paintbrush	*Castilleja sp.*
Indian pipe	*Monotropa unifloral*
Labrador tea	*Ledum groenlandicum*
Lodgepole pine	*Pinus contorta*
Long-stoloned sedge	*Carex inops*
Lousewort	*Pedicularis sp.*
Meadow death camas	*Zigadenus venenosus*
Menzies' larkspur	*Delphinium menziesii*
Mountain hemlock	*Tsuga mertensiana*
Oceanspray	*Holodiscus discolour*
One-leaved foamflower	*Tiarella trifoliata var. unifoliata*
Orchardgrass	*Dactylis glomerata*
Oregon beakedmoss	*Eurhynchium oreganum*

English name	Scientific name
Mosses, Lichens and Vascular Plants	
Oregon grape	*Berberis aquifolium*
Pacific sanicle	*Sanicula crassicaulis var. crassicaulis*
Paper birch	*Betula papyrifera*
Pink corydalis	*Corydalis sempervirens*
Pink mountain heather	*Phyllodoce empetriformis*
Pipecleaner moss	*Rhytidiopsis robusta*
Plantain	*Plantago sp.*
Poverty clover	*Trifolium depauperatum*
Prairie lupine	*Lupinus lepidus var. lepidus*
Prairie rose	*Rosa woodsii*
Prince's pine	*Chimaphila umbellata*
Queen's cup	*Clintonia uniflora*
Red alder	*Alnus rubra*
Red fescue	*Festuca rubra*
Red huckleberry	*Vaccinium membranaceum*
Red-stemmed feathermoss	*Pleurozium schreberi*
Ribwort plantain	*Plantago lanceolata*
Salal	*Gaultheria shallon*
Salmonberry	*Rubus spectabilis*
Scotch broom	*Cytisus scoparius*
Scouler's popcorn flower	*Plagiobothrys scouleri*
Sea blush	*Plectritis congestus*
Sedges	*Carex sp.*
Sierra sanicle	*Sanicula graveolens*
Sitka spruce	*Picea sitchensis*
Slender woollyheads	*Psilocarphus tenellus var. tenellus*
Snowberry	*Symphoricarpos albus*
Spiny wood fern	*Dryopteris expansa*
Spring gold	*Lomatium utriculatum*
Step moss	*Hylocomium splendens*
Stinging nettle	*Urtica dioica*
Strawberry	*Fragaria sp.*
Stream violet	*Viola glabella*

English name	Scientific name
Mosses, Lichens and Vascular Plants	
Subalpine fir	*Abies lasiocarpa*
Sweet vernalgrass	*Anthoxantum odoratum*
Sword fern	*Polystichum munitum*
Tall trisetum	*Trisetum canescens*
Thin-leaved owl-clover	*Orthocarpus tenuifolius*
Trailing yellow violet	*Viola sempervirens*
Trembling aspen	*Populus tremuloides*
Tumble mustard	*Sisymbra altissimum*
Twinflower	*Linnaea borealis*
Vanilla-leaf	*Achlys triphylla*
Water birch	*Betula occidentalis*
White hyacinth	*Triteleia hyacinthina*
Western buttercup	*Ranunculus occidentalis*
Western fescue	*Festuca occidentalis*
Willow	*Salix sp.*
Woolly sunflower	*Eriophyllum lanatum*
Yellow-cedar	*Chamaecyparis nootkatensis*

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Canadian Wildlife Service: http://www.speciesatrisk.gc.ca/species/

Committee on the Status of Endangered Wildlife in Canada: http://www.cosewic.gc.ca

Canadian Amphibian and Reptile Conservation Network: http://www.emanrese.ca/partners/carcnet/tour/glossary/tailfrog/ tailfro2.htm

Canadian Information Biodiversity Facility: http://www.cbif.gc.ca/spp_pages/butterflies/species/DunSkipper_e.php

Canada's Aquatic Environments: http://www.aquatic.uoguelph.ca e Nature: http://www.enature.com

Environment Canada: http://www.speciesatrisk.gc.ca/species/search/SearchDetail_e.cfm

Garry Oak Ecosystems Recovery: www.goert.ca

National Resources Conservation Service (USDA) The PLANTS Database, Version 3.5 (http://plants.usda.gov)

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Glossary

Achene: a one-celled, one-seeded dry hard (nut-like) fruit that does not open when ripe.

Aestivation: period in the summer during which animals are in a torpid condition.

Alluvial: pertaining to alluvium.

Alluvium: a deposit of sand and mud formed by flowing water.

Altricial: helpless at hatching and requiring parental care for a period of time.

Amphipod: small (2-50 mm) crustacean common in aquatic ecosystems.

Annual: plant that lives for one year.

Anther: part of male reproductive organ, with filament.

Apically: located or occurring at the apex (highest point).

Arthropods: segmented invertebrates.

Awn: bristle-like appendage.

Basal area: area of the cross section of a tree stem near its base, generally at breast height (1.37 m), above the ground and inclusive of bark.

Benthic: pertaining to or living on the bottom or at the greatest depths of a large body of water.

Biennial: plant that lives for two years.

Blade: expanded, usually flattened, portion of a leaf.

Bract: reduced or specialized leaf often borne below a flower or flower cluster.

Brunisol: normally immature soil commonly found under forested ecosystems. Brunisols are classified (*e.g.*, orthic, dystric, etc.) according to their composition.

Calcar: structure unique to bats – a cartilaginous spur that is attached to the heel bone and extends into the tail membrane.

Calyx: outermost group of floral parts.

Candal peduncle: narrow part of body between posterior ends of dorsal and anal fins and base of caudal fin.

Canopy closure: degree to which the canopy blocks sunlight.

Capsule: multi-chambered dry fruit that opens at maturity.

Caterpillar: wormlike larva of a butterfly or a moth.

Chernozem: a very black topsoil, rich in humus, typical of cool to temperate semiarid regions.

Chironomid: minute dipterous insects of the family *Chironomidae* resembling a mosquito.

Cingulum: an enamel shelf that lies below the cusp or peak of a tooth; in shrews, the cingulum of the upper unicuspid teeth is on the tongue side of the unicusppid.

Coarse woody debris: sound and rotting logs and stumps that provide habitat for plants, animals and insects, and a source of nutrients for soil development; material generally greater than 7.5 cm in diameter.

Colluvium: Materials that have reached their present positions as a result of direct, gravity-induced movement involving no agent of transportation such as water or ice, although the moving material may have contained water and/or ice.

Cusp: a point.

Dewclaw: a functionless digit; false hoof.

Diameter breast high (dbh): standard diameter measurement for standing tree, including bark, taken at 1.37 m above the ground.

Disk flowers: as part of composite inflorescence, the tubular shaped petals.

Diurnal: active by day.

Dorsal: back of an animal.

Dorsal fin: fin on the back of a fish.

Dystric Brunisol: partially developed, acidic (pH <5.5) soil lacking a thick, dark upper horizon.

Ecosystem: an interacting natural system including all the component organisms together with the abiotic environment.

Echolocation: an orientation system based on generating sounds and listening to their returning echoes to locate objects and prey.

Endemic: native to a particular region.

Entire: in botany, toothless margins.

Euphasids: shrimp-like crustacean found in the zooplankton.

Fjord: long narrow arm of the sea bordered by steep cliffs.

Floodplain: nearly flat plain along the course of a stream that is naturally subject to flooding.

Follicle: a dry fruit derived from a single carpel, splitting open along the ventral suture at maturity.

Fossorial: digging or burrowing.

Fluvial: pertaining to a river.

Fungus: any member of a diverse group of organisms subsisting upon dead or living organic matter, and including mushrooms, molds, mildews, rusts, etc.

Gill rakers: Finger-like portion of gills that extend into the throat; used to trap food.

Glaciofluvial materials: Materials that exhibit clear evidence of having been deposited by glacial meltwater streams either directly in front of, or in contact with, glacier ice.

Glaciolacustrine materials: Lacustrine materials deposited in or along the margins of glacial (ice-dammed) lakes; includes sediments that were released by the melting of floating ice.

Glumes: lowest pair of bracts in a grass spikelet.

Habitat: the sum total of environmental conditions of a specific place occupied by a wildlife species or a population of such species.

Hemiparasite: plant that produces chlorophyll and is capable of photosynthesis but maintains parasitic root connections, with those roots of nearby plants, allowing water and nutrients to be drawn from the host plant.

Hermaphroditic: having both the male and female reproductive organs.

Hibernacula: winter dwelling of an animal (e.g., bats may hibernate in caves).

Hibernation: period in winter during which animals are in a prolonged and controlled state of dormancy.

Inflorescence: a cluster of flowers.

Inlet: an identation of a shoreline, usally long and narrow.

Karst: an area of limestone formations characterized by sinks, ravines and underground streams.

Keel: longitudinal ridge, as on a leaf or bone.

Kelp: large, brown seaweed.

Krummholz: the stunted and gnarled woodlands characteristic of forest margins at high altitudes and high latitudes. The dwarfing, distortion and, in extreme conditions, prostrate habit of trees are a result of the combined effects of wind and cold.

Lacustrine: pertaining to a lake.

Lateral: side of an animal.

Leaf axis: the main stalk of a compound leaf, where leaflets attach.

Lemma: outer scale of a grass floret.

Ligule: membranous or hairy collar-like appendage at the junction of the blade and the sheath in the grass leaf; also a strap-shaped corolla of a ray flower of *Compositae* (aster family).

Limnetic: of, pertaining to or inhabiting the pelagic region of a body of fresh water.

Medial: in the middle

Morainal: pertaining to moraine.

Moraine: ridge, mound or irregular mass of boulders, gravel, sand and clay left by a glacier.

Mosaic: the intermingling of plant communities and their successional stages in such a manner as to give the impression of an interwoven design.

Mull: a soft, thin woven fabric.

Mustelid: any member of the family *Mustelidae* (i.e., weasel, skunk, badger, marten, fisher, wolverine, etc.)

Mycoparasitic: fungi attacking other fungi.

Mysids: aquatic micro crustacean.

Neotene: amphibian larvae that mature to adult size without losing their external gills. They are sexually mature, obligate waterdwelling individuals.

Niche: the *habitat niche* is the peculiar arrangement of food, cover, and water that meets the requirements of a particular species; the concept of niche is closely associated with the concept of competitive exclusion and competitive relationships among species; niche is also considered the role of an organism within a community.

Nocturnal: active by night.

Occurrence: a location representing a habitat, which sustains or otherwise contributes to the survival of a population.

Oligotrophic: deficient in plant nutrients.

Orthic brunisol: typical, original soil.

Ostracod: minute marine and freshwater crustacean of the subclass *Ostracoda*, with a hinged bivalve shell.

Panicle: branched cluster of flowers, each stalked, blooming from the bottom up.

Papillae: projections on lips of some fish for sensing food.

Parturition: giving birth.

Pelagic: pertaining to water or the open portion of a lake; or pertaining to water of the open portion of an ocean, above the abyssal zone and beyond the upper limits of the littoral zone.

Perennial: plant that lives for longer than two years.

Perigynium: special sac which encloses the achene in sedges; plural, peryginia.

Perlite: volcanic glass.

Petal: one of the segments of the corolla of a flower.

Phytoplankton: the plant organisms in plankton.

Pinna: a leaflet or primary division of a pinnate leaf or frond: plural, pinnae.

Pinnate: compound leaf, with leaflets arranged on two sides of a common axis.

Plankton: aggregate of passively floating or drifting organisms in a body of water.

Post-partum: following birth.

Precocial: active, down-covered, and able to move about freely when hatched.

Pupa: inactive development stage during which an insect larva becomes an adult.

Pupil: expanding and contracting opening in the iris of the eye.

Raceme: an unbranched type of inflorescence presenting a symmetrical display of stalked flowers, with older flowers toward the base.

Ray flowers: as part of composite inflorescence, the strap-shaped petals.

Receptacular bracts: specialized leaf attached to enlarged end of stem.

Rhizome: a rootlike subterranean stem, commonly horizontal in position, which usually produces roots below and sends up shoots from the upper surface.

Roost: perch upon which animals rest.

Rostrum: nasal area or snout of skull.

Saprophytic: living on dead organic matter.

School: large number of fish.

Scute: a large scale.

Sepal: one of the individual leaves or parts of the calyx of a flower.

Sere: the stages that follow one another in an ecologic succession.

Sheath: collar-like outgrowth at a node, or basal part of a leaf wrapped about the stem.

Silt: fine sand or similar material carried by water and deposited as sediment.

Sink habitat: marginal habitat where population mortality exceeds reproduction.

Snag: standing dead or partially dead tree.

Sombric brunisol: partially developed, acidic (pH <5.5) soil with a thick, dark upper horizon.

Sorus: cluster of spore cases, as in the ferns: *plural,* sori.

Species: group of cross-fertilizing individuals with common characteristics.

Species pair: two closely-related but distinct species.

Spike: elongated inflorescence with non-stalked flowers.

Spore: one- or multi-celled structure that gives rise to a new plant in lichens, mosses, hepatics, ferns and allies; plays the role of seeds in higher plants.

Sporangium: a spore case; plural, sporangia.

Spur: hollow appendage on a flower.

Stalk: stem or main axis of a plant.

Stigma: part of the pistil (female organ) that receives the pollen.

Stipule: leaf-like structure at the base of a leaf stalk.

Tadpole: aquatic larva or immature form of amphibians such as frogs, toads, etc.

Taproot: main root descending downward.

Taxum (taxa): group of genetically related organisms classified together as species, genus, etc.

Tephrite: basaltic rock.

Tine: sharp, projecting point or prong.

Tomentose: felt-like structures on plant; often anchors mosses to substrate.

Tragus: thin, cartilaginous structure attached to base of ear.

Tympanum: round eardrum behind the eyes.

Unicuspid: a tooth with one cusp.

Ventral: abdominal of an animal.

Wader: long-legged bird that moves slowly in shallow waters in search of food.

Weaning: time of year when young mammals become accustomed to food other than their mother's milk.

Zooplankton: the animal organisms in plankton.