

BURROW IDENTIFICATION GUIDE

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Introduction

This guide was developed to assist field personnel with the identification of dens and burrows that may be encountered in the interior of British Columbia. It does not cover all animals that will dig dens or burrows, but instead focuses on those species field crews are most likely to encounter.

The information included in this guide was obtained from several sources including conversations with species experts, published scientific papers, technical reports, and various websites. It is important to note that this guide was designed to be simple and easy to use. It does not provide an exhaustive literature review for each species or its habitat preferences. There are a variety of published and non-published documents available that should be consulted if you require additional information on a particular species or its habitat.

The guide is organized into three major colour-coded categories based on the habitat the den or burrow is most likely to be found within:

1. **Large dens in forested habitats**
2. **Medium sized burrows or dens in open forest or grassland habitats**
3. **Small burrows in forested habitats**

Introduction

Key den and burrow identification characteristics are described for eight species. Also included are photos of the animal and example den or burrow structures. Species with similar den or burrow characteristics are provided for cross-referencing purposes to help users of this guide distinguish one structure from another. Contact a Registered Professional Biologist for assistance if you are unsure about the identification of a burrow or den.

We are very grateful to those photographers who generously contributed their images for this guide. In particular, we would like to acknowledge Jared Hobbs, Les Gyug, Richard Klafki, Dennis Deck, James Anderson, Harry van Oort, Roger Packham, Francis Iredale, and Marilyn Schiele.

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Grizzly Bear



DEN DESCRIPTION

- Most dig their own dens although they sometimes use a natural cavity such as a hollow tree or log, rock crevices, or natural caves.
- Excavated dens may have large piles of soil, rocks and wood downslope from the entrance.
- The den is often located on moderately steep-to-steep well-drained slopes (41-90% based on current literature).
- Most dens are composed of a single entrance, which widens after a short distance (<50 cm) into a large, circular den cavity or chamber.
- Den entrance size: ~75 cm in diameter.
- Chamber size: 150-225 cm in diameter, height: 125 cm.
- Dens may be lined with shrub branches, tree boughs, and grass.
- Dens are usually located in mid to upper elevations. In coastal British Columbia they are located mostly between 350 and 850 m. In the Rockies dens are usually found between 2,000 and 2,350 m.
- Old growth forests are an important component of den selection sites.
- BEC zones: BWBS, CWH, ESSF, ICH, IDF, MH, MS, SBPS, SBS, SWB.

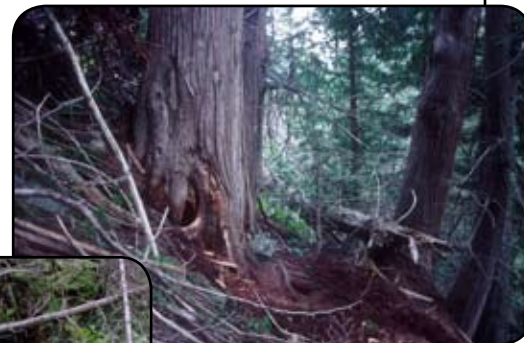
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LARGE DENS IN FORESTED HABITATS

Grizzly Bear

Den located at the base of a hollow yellow cedar tree.

Photo: Stefan Himmer



Den located in a rotten log in the ESSF BEC zone.

Photo: Stefan Himmer

FOREST DISTRICTS

Grizzly Bears can be found in almost all forest districts except the South Island, and Queen Charlotte Islands, and only in the mainland portions of the Campbell River and North Island forest districts. Numbers are generally low in the southern interior.

SPECIES WITH SIMILAR DEN CHARACTERISTICS

- Gray Wolf - dens will often have prey remains around the entrance. Bears do not bring food to the den.
- Black Bear – dens are usually located on or close to valley bottom. Excavations are not as extensive as those of Grizzly Bears.

TRACKS OR SIGNS

- Grizzly Bear claws are approximately 2 inches long. Black bear claws are much shorter.
- If a line is drawn across the front pad, all the toes will be in front of that line. Black bears will have one toe on or behind the line. Remember, "one toe back means black".



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LARGE DENS IN FORESTED HABITATS

Black Bear



Photo: James Anderson

DEN DESCRIPTION

- Commonly den in or under large-diameter trees (>85 cm in diameter), snags, logs, or stumps.
- If large trees are not available, Black Bears will den in rock cavities, under brush piles, or in holes dug into the ground.
- Most dens are lined with leaves, grass, or rotted wood.
- Dens are often located on or near valley bottom.
- Can be found in almost all BEC zones.

FOREST DISTRICTS

All

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LARGE DENS IN FORESTED HABITATS



Black Bear

Black Bear ►
den under
Douglas-fir tree.

Photo:
Francis Iredale



◀ Black Bear den in
100-Mile House.

Photo: Roger Packham

SPECIES WITH SIMILAR DEN CHARACTERISTICS

- Grizzly Bear - excavations are more extensive than those of Black Bears. Also Black Bear dens tend to be on or near valley bottom while Grizzly Bear dens tend to be in the upper to mid-elevations.
- Gray Wolf - dens are occupied from April to October and often have prey remains around the entrance. Black Bear and Grizzly Bear dens are only active during the winter and prey remains will not be present.

TRACKS OR SIGNS

- If a line is drawn across the front pad, the outside toe will often fall behind the line. Remember, "one toe back means black".
- Black Bear claws are significantly shorter than Grizzly Bear claws.
- The front of the footpad is more rounded than a Grizzly Bear track.



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LARGE DENS IN FORESTED HABITATS

Gray Wolf



Photo: James Anderson

DEN DESCRIPTION

- Den entrance is usually less than 60 cm in diameter.
- Often located in the sandy, gravelly soil of a slope or ridge.
- Can also be found under tree roots or sometimes in hollow logs.
- Den may have more than one entrance.
- Den sites are often at lower elevations (e.g., valley bottoms and lower slopes) in areas with low slope angles.
- Can be found in all BEC zones.

FOREST DISTRICTS

Wolves occur in all forested regions of the province (found in all ecoprovinces and Biogeoclimatic zones), including Vancouver Island and some adjacent islands. However, numbers are generally low in most areas. Moderate to high wolf populations occur in the north and central interior and in coastal areas, while low populations occur at higher elevations and within the southern parts of its range.

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LARGE DENS IN FORESTED HABITATS



Gray Wolf

Wolf den under tree.

Photo:
Harry van Oort



Wolf den in hollow log.

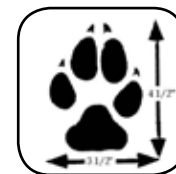
Photo: Harry van Oort

SPECIES WITH SIMILAR DEN CHARACTERISTICS

- Grizzly Bear and Black Bear - Although bears sometimes dig their den in the summer, they only occupy it in the winter. Wolf dens are active from April to October during birth and rearing of pups. Prey remains are often present around a Wolf den entrance. Bear dens will not have any evidence of prey remains.

TRACKS OR SIGNS

- Prey remains are often present around the den entrance.
- Wolf prints are approximately 4 ½" long by 3 ½" wide. The front track is generally larger than the rear track.



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LARGE DENS IN FORESTED HABITATS



Photo: Marilyn Schiele

DEN DESCRIPTION

- Approximately 30 cm in diameter but may be as large as 37 cm.
- Dens are usually hidden and often located in hollow trees, stumps, rock piles, or in brush.
- Entrances are often triangular in shape.
- Coyotes will sometimes enlarge the burrow of another animal including Badgers, Marmots and Red Foxes.
- Mounds of excavated soil are frequently found at the den entrances.
- The den chamber may have two or more entrances and will usually be about 90 to 120 cm under the surface.
- No prey remains will be present around den entrances.
- Elevations: valley bottom to alpine.
- Can be found in all BEC zones.
- Den sites can also be in more closed forested habitats.



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Coyote den in open
grassland.

Photo: Brian Michel



◀ Coyote den.

FOREST DISTRICTS

Found in all forest districts although population levels are lower in the wetter, thicker habitats of the Coast and Mountains and Georgia Depression ecoprovinces (Coastal Western Hemlock and Mountain Hemlock BEC zones).

SPECIES WITH SIMILAR DEN CHARACTERISTICS

- Badger – burrows are wider than they are tall (20-30cm wide by 15-20cm tall). Horizontal claw marks may be present on the burrow walls.
- Red Fox – prey remains will be present around the den entrance

TRACKS OR SIGNS

- Vertical claw marks may be present on the den walls starting from the peak of the entrance.
- Tracks are approximately 2 1/2" long by 2" wide.

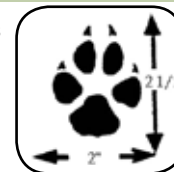


Photo: Richard Klafki

BURROW DESCRIPTION

- A mound of dirt will be present at the entrance to a large elliptical hole about 20–30 cm wide and 15–25 cm high.
- Located in flat to steep terrain from valley bottom to alpine.
- Minimum elevation: 300–800 m (depending on the region). Maximum elevation: 2,800 m.
- Prefer fine textured soils that are silty, loamy, clayey, and sandy.
- Found in a variety of habitats although they are most common in grasslands and dry open forests.
- Also found in the alpine and logged or burned forests often at disturbed areas such as landings.
- BEC zones: BGxh1, BGxh2, BGxh3, BGxw, BGxw1, BGxw2, ESSFdc1, ESSFdc2, ESSFdc3, ESSFdk, ESSFdkp, ESSFmw, ESSFmw1, ESSFmw2, ESSFmw3, ESSFwcp, ESSFwm, ESSFwmp, ESSFxc, ESSFxc1, ESSFxc2, ESSFxc3, ESSFxc4, ESSFxc5, ESSFxc6, ESSFxc7, ESSFxc8, ESSFxc9, ESSFxc10, ESSFxc11, ESSFxc12, ESSFxc13, ESSFxc14, ESSFxc15, ESSFxc16, ESSFxc17, ESSFxc18, ESSFxc19, ESSFxc20, ESSFxc21, ESSFxc22, ESSFxc23, ESSFxc24, ESSFxc25, ESSFxc26, ESSFxc27, ESSFxc28, ESSFxc29, ESSFxc30, ESSFxc31, ESSFxc32, ESSFxc33, ESSFxc34, ESSFxc35, ESSFxc36, ESSFxc37, ESSFxc38, ESSFxc39, ESSFxc40, ESSFxc41, ESSFxc42, ESSFxc43, ESSFxc44, ESSFxc45, ESSFxc46, ESSFxc47, ESSFxc48, ESSFxc49, ESSFxc50, ESSFxc51, ESSFxc52, ESSFxc53, ESSFxc54, ESSFxc55, ESSFxc56, ESSFxc57, ESSFxc58, ESSFxc59, ESSFxc60, ESSFxc61, ESSFxc62, ESSFxc63, ESSFxc64, ESSFxc65, ESSFxc66, ESSFxc67, ESSFxc68, ESSFxc69, ESSFxc70, ESSFxc71, ESSFxc72, ESSFxc73, ESSFxc74, ESSFxc75, ESSFxc76, ESSFxc77, ESSFxc78, ESSFxc79, ESSFxc80, ESSFxc81, ESSFxc82, ESSFxc83, ESSFxc84, 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Badger burrow in grassland habitat. *Photo: Chris Gill*

Badger burrow. *Photo: Richard Klafki*

Photo: Chris Gill

Badger burrow.

Photo: Richard Klafki

FOREST DISTRICTS

Arrow Boundary, Central Cariboo, Chilcotin, Cascades, Kamloops, Kootenay, 100-Mile House, Okanagan Shuswap, Rocky Mountain.

SPECIES WITH SIMILAR BURROW CHARACTERISTICS

- Yellow-bellied Marmot – found in rocky or bouldery areas (Badgers prefer fine soils). If you find a burrow in a rocky area, it is likely a marmot burrow.
- Coyote - dens are bigger than Badger burrows and their entrances are often triangular in shape with the claw marks running vertically from the peak of the entrance.
- Burrowing Owl – found in open prairie-like terrain. Active owl burrows will have horse or cow manure on the dirt mound in front of the entrance.
- Columbian Ground Squirrel – burrows are fairly round with entrances about 10 cm in diameter. Note: the amount of dirt at the entrance of badger or ground squirrel burrows is highly variable and not a good indicator of which species excavated the burrow.

TRACKS OR SIGNS

- Horizontal claw marks, often 3 to 5 cm apart, may be seen along sides and roof of the burrow.
- Tracks are approximately 2" long (not including claw prints) and 2" wide. The long claws on the front paws are prominent in most prints.



Burrowing Owl



Photo: Mike Mackintosh

BURROW DESCRIPTION

- Burrow dimensions vary because they often modify burrows dug by Badger, Coyote, Yellow-bellied Marmot, and other species.
- Nest burrows are usually 1-3 m long with a downward slope of approximately 15 degrees.
- Found in open prairie-like terrain with low herbaceous vegetation dominated by big sagebrush (*Artemisia tridentata*), antelope-brush (*Purshia tridentata*), and bunchgrass (*Agropyron* and *Festuca spp.*).
- Terrain is often flat but rugged landscapes are also used.
- Elevation: 335–1,250 m.
- BEC Zones: BGxh1, BGxh2, BGxw1, BGxw2, BGxw3, CDFmm, CWH, IDFdk1a, IDFxh1a, IDFxh2a, IDFxm, PPdh1, PPxh1, PPxh1a, PPdh2.

FOREST DISTRICTS

Cascades, Kamloops, Okanagan Shuswap (Penticton). Primarily found in the Kamloops area, west to Cache Creek, and south through the Okanagan.

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MEDIUM SIZED DENS OR BURROWS IN OPEN FOREST OR GRASSLAND HABITATS



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Burrowing Owl

Burrowing owl habitat.

Photo: Jared Hobbs



◀ Burrowing owl burrow.

SPECIES WITH SIMILAR BURROW CHARACTERISTICS

- Badger – look for horizontal claw marks on sides and roof of burrow. Badger hairs and tracks may also be present near the burrow entrance.
- Columbian Ground Squirrel – burrows are fairly round, with entrances about 10 cm in diameter. Ground Squirrels are communal animals so look for other burrows or individuals in the immediate area. Note: Burrowing Owls sometimes nest in Ground Squirrel colonies.
- Yellow-bellied Marmot – found in bouldery and rocky areas. Marmots are communal animals so look for other burrows or Marmots in the immediate area.

TRACKS OR SIGNS

- Look for owls perched near the burrow entrance on the dirt mound, on nearby rocks, fence posts, or other structures.
- Owl tracks, regurgitated pellets (fur and bones from prey), and whitewash (feces) may also be present near the burrow entrance.
- Active burrows will also have horse or cow manure on the dirt mound in front of the entrance.

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MEDIUM SIZED DENS OR BURROWS IN OPEN FOREST OR GRASSLAND HABITATS

Yellow-bellied Marmot



Photo: Dennis Deck

BURROW DESCRIPTION

- Burrows are usually greater than 15 cm in diameter and located in rocky or bouldery areas beneath large boulders and at bases of trees or logs.
- Numerous entrances may be present.
- Elevation: typically found above 2,000m.
- Can also be found in grasslands and open forests in or near rocky or bouldery areas from Hope to Trail, including the Okanagan, Nicola Valley, and southern Cariboo.
- BEC zones: BG, PP, IDF, ICH, MH, MS, SBPS, AT.

FOREST DISTRICTS

All interior forest districts that include the abovementioned BEC zones at elevations greater than 2,000 m.

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MEDIUM SIZED DENS OR BURROWS IN OPEN FOREST OR GRASSLAND HABITATS



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Yellow-bellied Marmot

Marmot burrow in meadow next to talus slope.

Photo: Dennis Deck



Marmot burrow under boulder.

Photo: Dennis Deck

SPECIES WITH SIMILAR BURROW CHARACTERISTICS

- Badger - prefer fine soils. If you find a burrow in a rocky area, it is likely a Marmot burrow.
- Coyote - dens are larger and their entrances are often triangular in shape with the claw marks running vertically from the peak of the entrance. Dens are usually hidden and often located in hollow trees, stumps, rock piles, or in brush.

TRACKS OR SIGNS

- Marmots are communal animals so look for other burrows or Marmots in the immediate area. They will often give an alarm call when a predator approaches.
- Tracks are unlikely to be found due to their preference for rocky or bouldery habitat.

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MEDIUM SIZED DENS OR BURROWS IN OPEN FOREST OR GRASSLAND HABITATS

Mountain Beaver



Photo: Jared Hobbs

BURROW DESCRIPTION

- Burrow entrance is approximately 15-20 cm in diameter.
- The tunnels or runways are also 15-20 cm in diameter or width, and connect the nest site to foraging areas of herbaceous plant material that are often associated with small canopy breaks at streams, seepage sites or other wet areas.
- A burrow system may have as many as 10 to 30 clustered entrances under the roots of trees or large pieces of Coarse Woody Debris.
- Mounds of dirt at the entrance of burrows may be conspicuous and seen from a considerable distance.
- Elevation: most are found between 1,200 and 1,800 m.
- In forested areas Mountain Beaver are usually associated with clearings (e.g., openings associated with overstorey mortality, stream courses and springs within stands) or with the more open forest types typical of hygric or subhygric sites.
- Slopes around nests tend to have a grade of less than 20%. If topography is flat, burrows can be located on the sides of high spots or small knolls.
- BEC Zones: CWHxm1, CWHdm, CWHvm2, ESSFdc2, ESSFmw, IDFxh1, IDFdk1, IDFWw, MHmm2, MSdm2.

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SMALL BURROWS IN FORESTED HABITATS



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Mountain Beaver



▲ Mountain Beaver burrows and runways. Photo: Les Gyug



▲ Mountain Beaver burrow under Engelmann spruce tree showing "haypile" at entrance. Photo: Les Gyug



◀ Mountain Beaver burrows and runways along the gully wall of a small stream. Photo: Les Gyug

FOREST DISTRICTS

Cascades, Chilliwack.

SPECIES WITH SIMILAR BURROW CHARACTERISTICS

- Mole (*Neurotrichus* and *Scapanus spp.*) - The entrance to a Mountain Beaver burrow can easily be distinguished from that of a mole by 1) the size; a Mountain Beaver's entrance is much larger than a mole's and 2) a mole's entrance is always plugged with dirt, whereas a Mountain Beaver's entrance is not. Entrances to mountain beaver burrows are also often littered with clipped vegetation.
- Red Squirrel – burrows are smaller and usually located in or near their cone middens.

TRACKS OR SIGNS

- During summer, look for piles of fresh or wilting green vegetation outside burrow entrances.
- Droppings and claw marks may be present at the entrance of burrows.

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SMALL BURROWS IN FORESTED HABITATS

BURROW IDENTIFICATION GUIDE

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