

Mountain Beaver, *rainieri* subspecies

Aplodontia rufa rainieri

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Disclaimer: The following document was compiled based on a review of information currently available for this species as of November 25, 2005. This document can be used to assist with the identification of this species and to support the development of management recommendations as they relate to forestry activities. For more information on this species, please refer to the reference section or consult with a Species at Risk specialist.

Description

The Mountain Beaver is the most primitive living rodent. It resembles a medium-sized muskrat, except the tail is well furred and exceedingly short. The body is thick, heavy, and covered with coarse, dull, uniformly dark brown fur. The average adult weighs 806 g and is 30-47cm long¹.

The head is relatively large and wide and blends into a large neck with no depression where it joins the shoulders. The eyes and ears are relatively small and the cheeks have long silver “whiskers.” The hind feet are about 5 cm long and slightly longer than the front feet. Mountain Beavers often balance on their hind feet while feeding¹.

The front feet are developed for grasping and climbing. Adults are grayish brown or reddish brown. The underfur on the back and sides is charcoal with brown tips; guard hair is dark brown or black with silver tips. Ventrally, the underfur is gray with few guard hairs. A whitish spot of bare skin is present at the base of the ears. The feet are lightly furred on top and bare on the soles. Young animals are generally darker than adults^{1,2}.

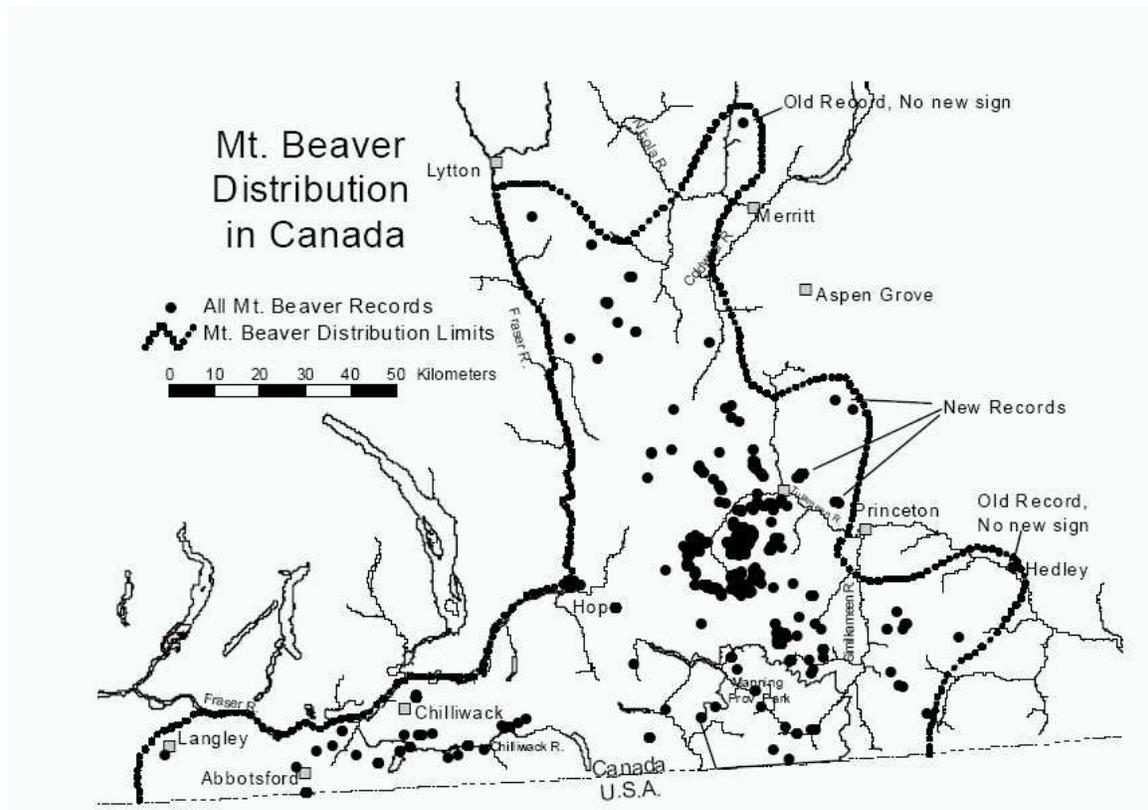


Photos courtesy of Dale Steele³

Identification is usually made by finding the burrow openings which are about 15 cm in diameter and in groups of several in a small area. Clipped vegetation near the burrow system is another sign. There may also be "haystacks" of drying vegetation near the burrows⁴.

Distribution

The Mountain Beaver occurs within and to the west of the Cascade and Sierra Nevada mountain ranges of western North America. In Canada, it is found only in extreme southwestern British Columbia. The subspecies *A. rufa rainieri* is found east of Hope, north along the Cascade Mountains, to the Lytton-Merritt area, and west to about Princeton. A very crude estimate of the number of Mountain Beavers in Canada is about 1,600 adults¹.



Distribution of Mountain Beaver in British Columbia⁵.

Forest Districts⁶

- Chilliwack Forest District (DCK)
- **Cascades Forest District (DCS)**

Biogeoclimatic Units⁶

- CWH – Coastal Western Hemlock
- ESSF – Engelmann Spruce – Subalpine Fir
- MH – Mountain Hemlock
- MS – Montane Spruce
- IDF – Interior Douglas Fir

Elevation⁶

1,200 to 1,600M

Map of Known Locations



Known locations for Mountain Beaver rainieri subspecies (*Aplodontia rufa rainieri*) in the Cascades Forest District as of September 2005 (data source: Conservation Data Centre).

Biology

Mountain Beavers breed from February to March and gestate for 28 to 30 days, after which 2 to 4 young are born. The blind and helpless young are suckled for 2 months until they leave the underground nest. Dispersal is limited; movements of about 200 m have been recorded for a male and about 570 m for a female^{1,5,7,8,9}.

The maximum lifespan of Mountain Beavers is at least six years. Their diet consists of a wide variety of herbaceous and woody plants. Predators include bobcats, coyotes, cougars and golden eagles. Mountain Beavers also must have access to large amounts of water because their primitive kidneys are unable to concentrate urine effectively^{2,4,6}.

The Mountain Beaver is active year round. After the spring thaw, soil cores from winter burrows and runs can be found that are similar to pocket gophers but on a larger scale. Some of these runs may lead to clumps of trees or shrubs with extensive bark and limb damage⁴.

Habitat

Mountain Beavers occupy mature forests usually in openings or in thinned stands where there is substantial vegetation in the understory. They usually leave stands where the canopy has closed and ground vegetation has become sparse.

Preferred habitats in forested sites are often dominated by red alder (*Alnus rubra*), which the animals promote by preferentially feeding on conifers and other vegetation. These sites are often dominated by an understory of sword fern (*Polystichum munitum*), a preferred food of mountain beavers. Stands of bracken fern (*Pteridium aquilinum*) are also favored by mountain beavers. Preferred shrub habitats include salmonberry (*Rubus spectabilis*), huckleberry (*Vaccinium parvifolium*), salal (*Gaultheria shallon*), and Oregon grape (*Berberis nervosa*). Small trees often found cut by mountain beavers include vine maple (*Acer circinatum*) and cascara (*Rhamnus purshiana*). These species are often intermingled with 30 or more other plant species including forbs, grasses, and sedges^{2,4}.

Some burrows, especially those on slopes, will show signs of excavated dirt and rocks. Look for them in wet meadows, the fringe of wooded areas, Douglas Fir and Western Hemlock forests, and clear cuts. Also look for the clustering of several entrances. A burrow system may have as many as 10 to 30 entrances and be in use for more than three years of their estimated five to six year life span. Mountain Beavers pile vegetation in front of the burrow entrance to wilt before transport to a feeding chamber⁴.



Photos courtesy of Dennis Deck



Mountain Beaver hay pile and nest entrances under tree in unlogged block⁵. *Photo courtesy of Les Gyug*

Important Habitats and Habitat Features

Mountain Beavers occur in forested areas from near sea level to timberline. Specific requirements include soils that allow tunnel, burrow and runway construction; a cool and moist microclimate within tunnels and burrows; and suitable forage within 50 m. Deep soils with subsurface drainage that keeps the majority of the tunnels and burrows wet, even to the point of having water trickling through them, appear ideal for these rodents. The underground nest sites must remain dry and above the water table, however. Slopes around nests tend to have a grade of less than 20%. It is usually solitary, but may live in loose colonies, occupying a home range of 0.03 to 0.20 ha in a network of tunnels just below the surface^{1,2,6,9}.

In British Columbia, most occurrences are in areas with water (either above or below ground), well developed, firm soils, and abundant vegetation. In the Southern Interior,

habitat is described as wet soils with water within 1m of the surface between 1,200 to 1,600 m in elevation^{4,6,9}. They are typically found in draws and moist areas on north to east slopes, although south-facing slopes may also be inhabited provided that the habitat is sufficiently moist¹⁰.

The entrance to a mountain beaver burrow can easily be distinguished from that of a mole (*Neurotrichus* and *Scapanus* spp.) 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 vegetation¹⁰.

Foraging

The Mountain Beaver forages above ground for a wide variety of vegetation. In the summer, its diet includes ferns, forbs, and deciduous plants. In the winter, it will feed on the needles, leaves, and tender twigs of evergreen plants, or it may survive using cached food, which often consists of sun-cured grass and fern fronds^{1,2,4,6}.

The food habits of mountain beavers are closely tied to the dominant vegetation in their habitat. Sword fern and bracken fern are preferred when available. Douglas-fir, hemlock, western red cedar (*Thuja plicata*), and red alder are all commercial tree species that are cut and eaten by mountain beavers. Other species found in their habitat are either eaten or used for construction of nests¹.

Most feeding occurs above ground within 15-25 m of burrows, although occasionally mountain beavers may travel distances of up to 110m during the breeding season. They routinely climb shrubs and trees 2.4 m or higher to cut off branches up to 1.9 cm in diameter, where they leave cut stubs of branches on trees. Mountain Beavers also girdle the base of tree stems and will feed on stems up to 15 cm in diameter, as well as the root systems of large trees. The bark is found in the stomach contents of animals collected in midwinter. Woody stems are often girdled and cut into about 15 cm lengths^{2,4,10}.

Conservation and Management

Status¹

Prov. Rank: S3 (Rare-uncommon)

BC List: Blue (Special concern)

COSEWIC Status: Special Concern (May 1999)

Threats

Within their present range in the Cascade Mountains in British Columbia, clear-cutting and associated silvicultural practices that severely disturb the soil layer are probably the major limiting factors preventing Mountain Beavers from using otherwise suitable habitat. These soil disturbances appear to be extremely damaging to Mountain Beaver populations through direct mortality and by limiting the recolonization opportunities after clearcutting^{1,6}.

Management Recommendations

Consult with a Registered Professional Biologist prior to implementing the following management recommendations because certain situations may require custom solutions based on specific site characteristics.

- Budget permitting, develop a habitat model to help identify high value habitat found within your areas of interest. The complexity of the model, and therefore its accuracy, will be dependent on budgetary constraints.
- Identify locations where this species is known to occur: obtain occurrence data from the Conservation Data Centre (<http://srmwww.gov.bc.ca/cdc/>) and if necessary conduct ground surveys for active burrows.

In areas where this species is identified⁵:

- Mountain Beaver tunnel/runway system perimeters are to be delineated both by flagging and by painting at the bases of perimeter trees.
- The areas within these perimeters are to be designated for special management.
- The only exception would be where these areas will fall entirely within existing no machine areas along streams or riparian areas.

Within these Mountain Beaver perimeters⁵:

- There is to be no machine use within these areas except on top of a deep (1m+) snowpack that would protect tunnels and nests from compaction or disruption.
- Even on a deep snowpack, skidding through the area should be minimized by using direct routes outwards from the area.
- Any skid trails through these areas need to be carefully placed to avoid impacts on concentrations of Mountain Beaver nest sites.
- If harvesting proceeds when the snowpack is not deep, then trees will be felled by hand, and the trees top-skidded out of the areas. The only exception would be for trees at the edge of the area that a feller-buncher could reach without driving within the perimeter of the area.
- There is to be no mechanical site preparation, since any machine use will collapse nests and tunnels.
- Stocking standards should accept natural regeneration.
- Stocking standards should reflect pre-harvest stocking levels and site conditions if the areas have lower than normal stocking to begin with, e.g. because of high water tables.
- Hand-skreefing of individual planting spots would be acceptable.
- Broadcast burning may be acceptable in some cases depending on existence of surrounding populations for immigration, and depending on extent and impact of planned burn.
- Maintain habitats in mature forested sites that are dominated by red alder (*Alnus rubra*) with an understory of sword fern (*Polystichum munitum*) and/or bracken fern (*Pteridium aquilinum*), preferred food sources of Mountain Beavers. Mountain Beaver are typically found in draws and moist areas on north to east slopes, although south-facing slopes may also be inhabited provided that the habitat is sufficiently moist.

References

- ¹ Environment Canada Species at Risk Website:
http://www.speciesatrisk.gc.ca/search/speciesDetails_e.cfm?SpeciesID=333
- ² Denver Wildlife Research Center. Prevention and Control of Wildlife Damage. 1994.
Website: http://wildlifedamage.unl.edu/handbook/handbook/allPDF/ro_b53.pdf
- ³ Mountain Beaver Website: <http://infowright.com/mtbeaver/>
- ⁴ Mountain Beaver website: <http://dirttime.ws/Notebook/Aplodontia.htm>
- ⁵ Gyug, L. Assessment of Alternative Timber Harvesting Methods on Mountain Beaver (*Aplodontia rufa*) in the Merritt Forest District: Progress Report 2001. 30pp
- ⁶ BC Conservation Data Centre: Website: <http://srmapps.gov.bc.ca/apps/eswp>
- ⁷ Banfield, A.W.F. 1974. The mammals of Canada. Univ. Toronto Press, Toronto, ON. 438pp.
- ⁸ Carraway, L.N., and B.J. Verts. 1993. *Aplodontia rufa*. Am. Soc. Mamm., Mammal. Species No. 431:1-10.
- ⁹ Gyug, L.W. 1997. Forest development plan Red- and Blue-listed species inventory for small mammals: Mountain Beaver (*Aplodontia rufa*), Cascade Mantled Ground Squirrel (*Spermophilus saturatus*), Sagebrush Northern Bog Lemming (*Synaptomys borealis artemisiae*), and Tailed Frog (*Ascaphus truei*). Rep. prep. for B.C. Minist. Environ., Lands and Parks, Penticton, BC. 28pp.
- ¹⁰ Ministry of Environment. Inventory Methods for Mountain Beaver, Bushy-tailed Woodrat & Porcupine Standards for Components of British Columbia Biodiversity (<http://srmwww.gov.bc.ca/risc/pubs/tebiodiv/beaver/mbwpml20.htm#2.1>)