

## BC's Coast Region: Species & Ecosystems of Conservation Concern

### Southern Red-backed Vole (*Myodes gapperi* & *M. g. occidentalis*)

Global: G5 Provincial: S5 COSEWIC: N/A BC List: Yellow / Global: G5T5 Provincial: S1 COSEWIC: N/A BC List: Red



Notes on *Myodes gapperi* & *M. g. occidentalis*: A member of the family Cricetidae (true hamsters, voles, lemmings, new world rats and mice), this is the second largest mammalian family with almost 600 species. The genus was previously known as *Evotomys* or *Clethrionomys* and has gone through several changes. Presently the BCCDC recognizes two species of *Myodes* in BC, Southern and Northern Red-backed Vole and two subspecies (*M. g. occidentalis* and *galei*). Southern Red-backed Vole is restricted to higher latitudes in North America and is divided into three major genetic groups (“clades”); east, central and west. Detailed genetic analyses is needed to determine the subspecies status. Much about the subspecies biology is inferred from the species.

#### Description

*Length 7.0-11.2 cm, tail 2.5-.60 cm, Weight 6-42 g.* Similar to their lemming relatives, voles have small ears and short furred tails. In winter Red-backed Vole have dense, long, soft fur which becomes shorter and coarser in summer. Dorsal coloration is dark gray with a pronounced chestnut cap, nape and saddle running from head to tail. The ventral area is gray to almost white. Males and females are similar in size and color; juveniles tend to be darker than adults.

#### Diet

Southern Red-backed Vole feed chiefly on vegetation, seeds, nuts, fungi and some insects. Fungi compromise the majority of the summer diet for most western populations. This dietary preference provides a critical function, dispersing fungal spores and nitrogen-fixing bacteria that form complex mycorrhizal associations (mutualistic nutrient relationships between fungi and vascular plant root networks), that contribute to forest health.

#### Look's Like?

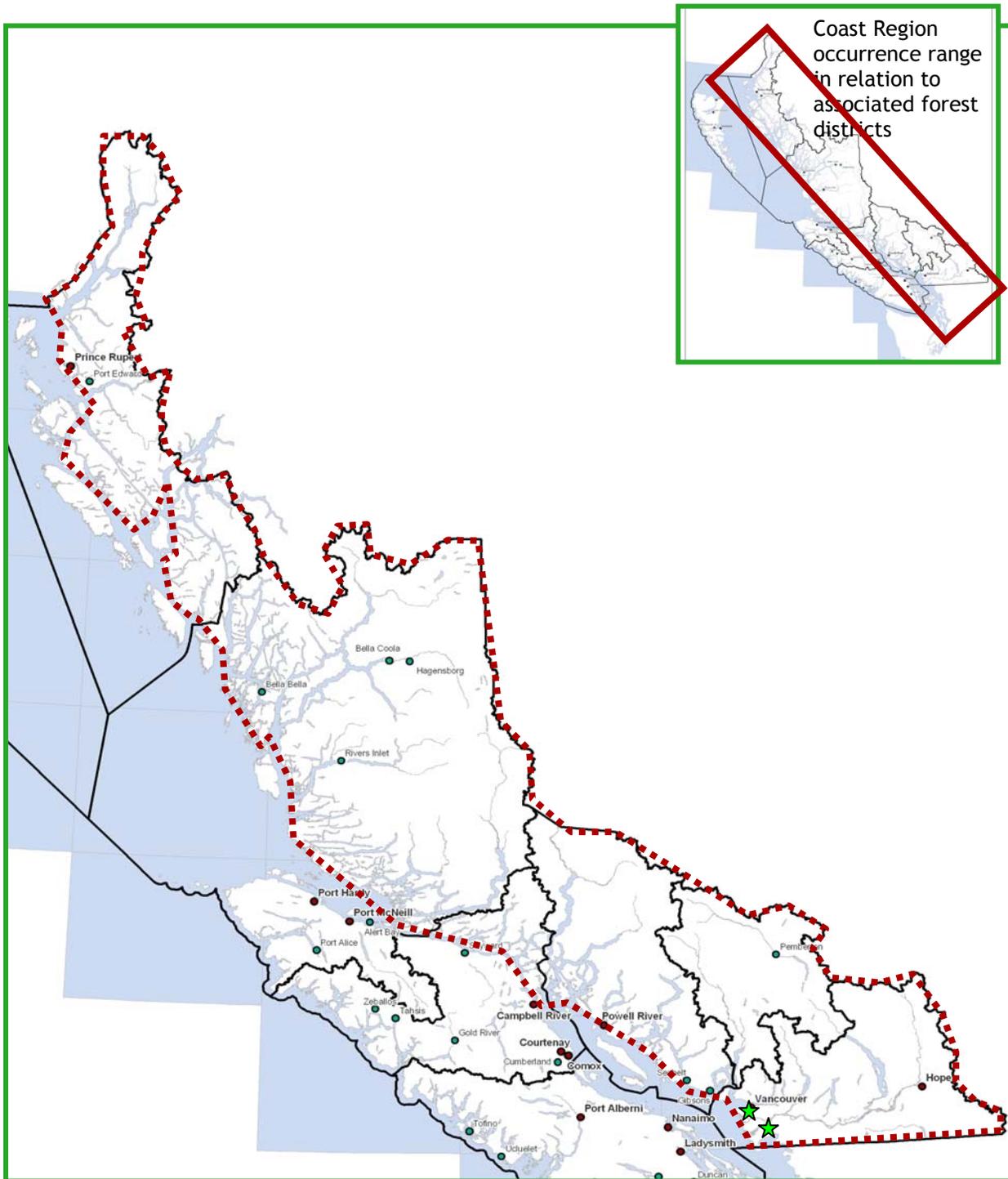
The species and subspecies are most likely to be confused with the more common Townsend's Vole, a grassland associated species of the genus *Microtus*. Both voles may overlap in distribution where transition zones between forest communities and wetland (e.g. bog) and old-field or grass dominated habitats occur. The most characteristic difference is the pelage (fur) which tends to be evenly brown to grey on the dorsal area of Townsend's Vole. However some populations and or individuals of *M. townsendii* may have more chestnut or red dorsal pelage. Specimens observed in areas associated with potential *M. gapperi* habitat should be sampled for potential genetic analysis (preferably fur or fecal samples) by qualified individuals.



Townsend's Vole

## Distribution

Southern Red-backed Vole are an old-growth forest specialist species found throughout the mainland of the Coast Region. Coastal populations extend from the southwest US up along the BC coast north to Yukon and Alaska as part of the western group of the species. Of the two subspecies found in BC only one, *M. g. occidentalis* is found west of the Cascades and is restricted to the extreme southwest portion of BC. Originally known from 2 historical records in the Vancouver area (Point Grey and Stanley Park), *M. g. occidentalis* was most recently detected in Burns Bog in Vancouver in 1999.



Southern Red-backed Vole (*Myodes gapperi* red dotted line) known occurrence range and Southern Red-backed Vole *occidentalis* ssp. (*M. g. occidentalis* - green stars) historic and known occurrences for the Coast Region

### Habitat Preferences

Southern Red-backed Vole inhabits cool, mossy and rocky forested areas. While coniferous forests are preferred, deciduous or mixed forests are also utilized. Regarded as an ecological indicator of old-growth forest conditions in the Rocky Mountains, Southern Red-backed Vole will also use second-growth communities, more typical in the southwest part of their range (e.g. Fraser Lowlands).



Key habitat components include mature forest cover, high levels of structural diversity and large woody debris accumulations.

### Critical Features

Mossy logs and tree roots in coniferous forests are an optimal feature. Nests are generally constructed under the roots of stumps, logs, or brush piles, but may be located in holes or branches of trees high above the ground. Burrows of other small mammals (moles, mice) are used. Unlike Townsend’s Vole, *M. gapperi* does not dig tunnels or create grass covered surface runways for cover. However during the winter, nests are sometimes placed directly on the ground under the snow, with radiating snow tunnels for foraging. Home range varies from 0.25 to 3.5 acres. Experimentation suggests that populations separated by inter-patch distances of 60-70 m is likely a barrier to population connectivity.

### Seasonal Life Cycle

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Courtship / Breeding peak period Feb-Oct, litter size 1-9 pups, sexually mature at 3 months, 2-3 litters per year											
Active											

### Threats

- ◆ While the status of the *occidentalis* subspecies has yet to be adequately determined, knowledge gaps in occurrence, population, and abundance contribute to ongoing conservation and management challenges for the species as a whole.
- ◆ Distribution of coastal populations, especially on the South Coast, coincides with areas undergoing rapid development and land use conversion.
- ◆ Damage or disruption to nests, litter abandonment and possibly extirpation of local populations may occur where logging or land clearing, removal of standing, dead and downed wood and loss of other critical features from extractive resource activities occur.
- ◆ Roadways that cut through core habitat areas and lack of wildlife passage structures increase vehicle mortality impacts and population fragmentation.
- ◆ While voles can swim, major waterbodies, generally greater than 50 meters across in ice-free areas can be a barrier to dispersal.
- ◆ Predation by feral or free ranging domestic pets (e.g. cats) may impact local populations.

### Conservation & Management Objectives

- ◆ Apply conservation and management recommendations as set out in the review of the *occidentalis* subspecies in “Rare amphibians, reptiles, and mammals of British and “Distribution and Abundance of Four Species of Small Mammals at Risk in a Fragmented Landscape”. Application of recovery objectives and IWMS measures such as those described for species like Pacific Water Shrew or similar species would likely provide improved conservation for the species as a whole

- ◆ Assess, inventory and monitor using methodology set out in the RISC standards # 31 Inventory Methods for Small Mammals: Shrews, Voles, Mice & Rats (Version 2.0).

### Specific activities should include:

- ◆ Updated inventory and distribution for all coastal Red-backed Vole populations needs to be undertaken. The issue of *M. g. occidentalis* taxonomy needs to be addressed through modern DNA analysis.
- ◆ Buffers similar to those proposed for Pacific Water Shrew (100 meters from top of bank on each side of a watercourse) may be necessary to protect the broadest range of habitat features and functions. Riparian buffers imposed to protect fish habitat are likely insufficient for protecting the complete range of foraging and refugia requirements of this species and its subspecies.
- ◆ Permanently maintain core patches of forested stands with understory vegetation and downed wood features to protect home ranges (a minimum of .5ha). This “core zone” should have limited access and no disturbance and should be linked to other adjacent patches to prevent source sinks.
- ◆ Wildlife underpasses should be installed at appropriate intervals where high road densities and potential for vehicle interactions occur. Voles will swim short distances, clear-span crossings are preferred. Culvert crossings should be a minimum 2 m diameter with open bottoms with natural substrate, no longer than 30 m and should not have large drops that would impede small mammal (or fish) movement. On long culverts that are dark in the middle, consider the use of grates that will allow light and rain to enter.
- ◆ Implement agricultural land set-asides and stewardship agreements, work towards covenant and acquisition opportunities to maintain forest patches and connectivity corridors in urban and rural areas.
- ◆ Education and outreach regarding free ranging and feral domestic pet impacts should form part of overall conservation approaches. Apply integrated pest management programs to reduce and avoid the need for rodent pest control methods that may impact native wildlife.

*M. gapperi* and its subspecies are subject to protections and prohibitions under the BC Wildlife Act. Their habitat may also be governed under provincial and federal regulations including the Fish Protection Act and Federal Fisheries Act as well as Regional and local municipal bylaws.

### Content for this Factsheet has been derived from the following sources

- B.C. Conservation Data Centre. 2010. [Internet] Species Summary: *Myodes gapperi* & *M. g. occidentalis* [updated June 2007]. BC MoE.
- Cannings, S.G., L.R. Ramsay, D.F. Fraser, and M.A. Fraker. 1999. Rare amphibians, reptiles, and mammals of British Columbia. Wildl. Branch and Resour. Inv. Branch, B.C. Minist. Environ., Lands and Parks, Victoria, BC. 198pp. Southern Red-backed Vole *occidentalis* subspecies *Clethrionomys gapperi occidentalis* (Merriam)
- Klinkenberg, Rose. 2009. [Pers. communication].
- Ministry of Environment, Lands and Parks, Resource Inventory Branch. 1998. Inventory Methods for Small Mammals: Shrews, Voles, Mice & Rats Standards for Components of British Columbia's Biodiversity, No. 31.
- Nagorsen, Dave et al. 2000. Conserving Mammals at Risk: The Role of Taxonomy. Proceedings of a Conference on the Biology and Management of Species and Habitats at Risk, Kamloops, B.C. Volume One. B.C. Ministry of Environment, Lands and Parks, Victoria, B.C. and University College of the Cariboo, Kamloops, B.C. 490pp.
- Polster, D. et al. 2006. Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia. Prepared for the BC Ministry of Environment. Victoria (BC).
- RUNCK AMY M., JOSEPH A. COOK. 2005. [Internet] Postglacial expansion of the southern red-backed vole (*Clethrionomys gapperi*) in North America. Molecular Ecology (2005) 14, 1445-1456.
- Zuleta, G.A. and C. Galindo-Leal. 1994. Distribution and Abundance of Four Species of Small Mammals at Risk in a Fragmented Landscape. Ministry of Environment, lands and Parks Wildlife Working Report No. WR-64

**Prepared by:** Pamela Zevit of Adamah Consultants for the South Coast Conservation Program (SCCP) in partnership with: International Forest Products (Interfor), Capacity Forestry (CapFor) and the BC Ministry of Environment (BC MoE), E-Flora and E-Fauna the Electronic Atlas of the Flora and Fauna of BC, Species at Risk & Local Government: A Primer for BC. Funding for this factsheet was made possible through the Sustainable Forestry Initiative (SFI): <http://www.sfiprogram.org/>

Every effort has been made to ensure content accuracy. Comments or corrections should be directed to the South Coast Conservation Program: [info@sccp.ca](mailto:info@sccp.ca). Content updated August 2010.

**Image Credits:** Southern Red-backed Vole: Phil Myers, Townsend's Vole: Hugh Griffiths, Habitat: Paul Griffiths. Only images sourced from “creative commons” sources (e.g. Wikipedia, Flickr, U.S. Government) can be used without permission and for non-commercial purposes only. All other images have been contributed for use by the SCCP and its partners/funders only.