Museum of Southwestern Biology

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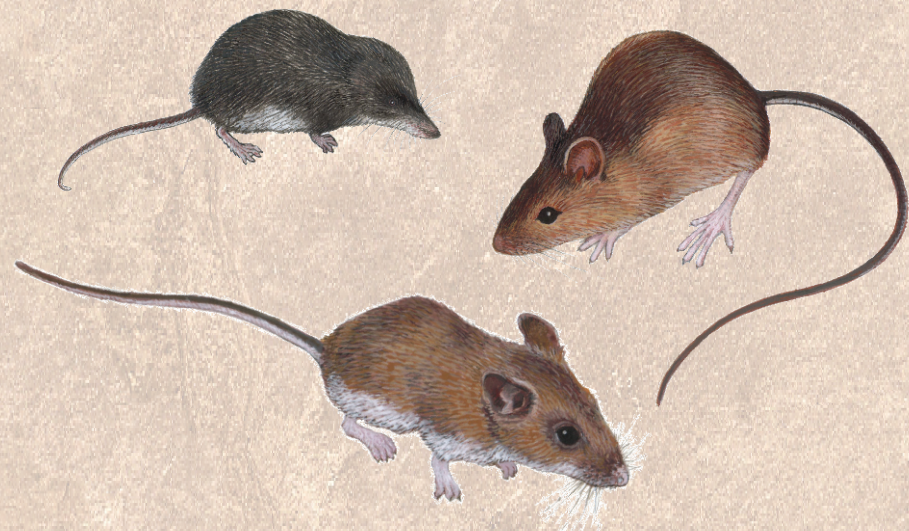
# The SMALL MAMMALS of SOUTHEAST ALASKA



## An Identification Guide to the Shrews and Small Rodents

S. O. MacDonald

*Field sketch by William D. Berry*



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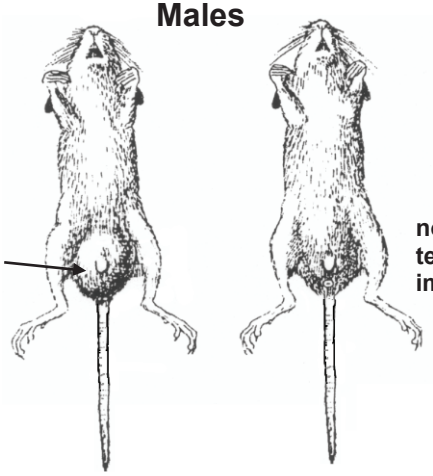
# Reproductive Status

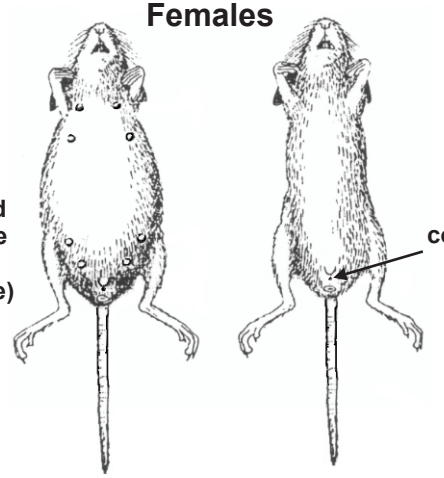
## Males



scrotal testes of adult male

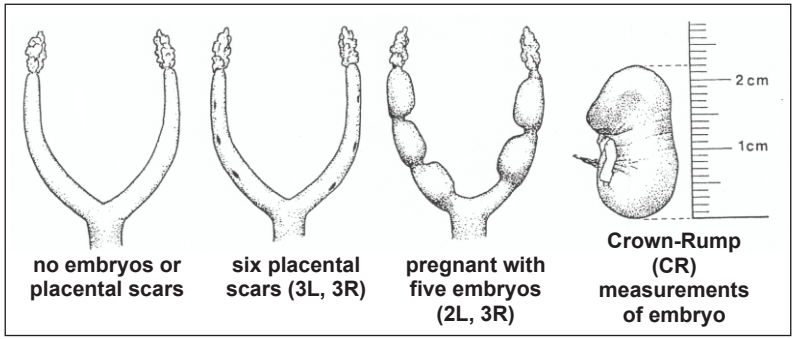
non-scrotal testes of immature male

## Females



pregnant with enlarged teats and without membrane covering vaginal opening (perforate)

membrane covering vaginal opening (imperforate)




no embryos or placental scars

six placental scars (3L, 3R)

pregnant with five embryos (2L, 3R)

Crown-Rump (CR) measurements of embryo



# Table of Contents

# Introduction

Southeast Alaska is a mosaic of hundreds of islands extending along a thin strip of mainland capped with extensive ice fields and glaciers. It and adjoining British Columbia comprise the most extensive temperate rainforest in the world. The exceptional fauna and flora of this region includes a number of organisms found only here (namely, are endemic to the region, often to an island or small group of islands). This high level of endemism stems from dynamic historical events and the complex landscape of the region which together have isolated this fauna from the remainder of North America.

Most elements of the biotic diversity of this outstanding coastal forest ecosystem have not been systematically inventoried. Since 1992, we have conducted field, museum, and laboratory studies designed to survey mammalian diversity of Southeast Alaska. These surveys have focused in particular on the little-known small mammal fauna, using standard traplines for shrews and small rodents set in the range of available habitats and ecotones in each study location. Traplines for shrews and small rodents typically consist of 20 or more trap stations per line, with stations spaced 8-10 m apart. At each station, two Museum Special snap traps or one snap trap and 1 pitfall trap or live trap are typically set within 2 m of each station point. The snap traps are baited with a mixture of rolled oats and peanut butter; pitfall traps (44 oz. plastic cups) are buried flush with the ground and left unbaited. Productive lines are usually kept in operation for two or more nights.

Reliable identification is essential in these inventories. Yet many small mammal species are difficult to identify particularly in the field. Thus, the objective of this publication is to provide an identification manual that is easily carried in the field and designed to identify all of the region's shrews and small rodents customarily captured on traditional small mammal traplines. In addition to the identification keys, there is a brief species account for each species with a synoptic summary of the species' description, identification from similar species, general habitat and habits, and a regional range map denoting specimen localities. Important references on the mammalian fauna of Southeast Alaska and other identification manuals that may be useful to the reader are summarized in the Bibliography.

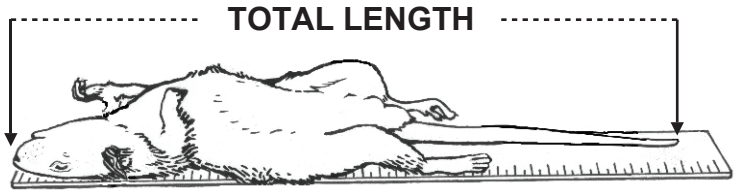
44 oz. plastic "pitfall" cup

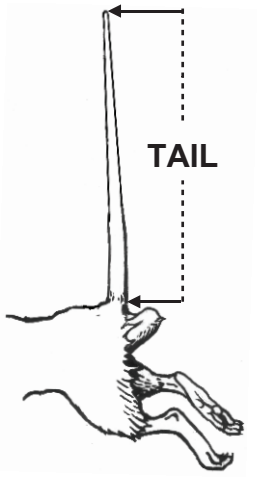

Museum Special

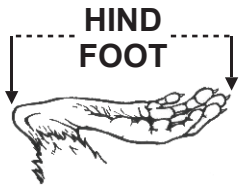
Sherman live trap



## Standard Body Measurements





**TOTAL LENGTH** (TL). Measured (in millimeters) from the tip of nose pad to top of fleshy part of tail, excluding hairs that project beyond.

**TAIL** (T). Bend tail at right-angle with body and measure from bend on back to tip of the fleshy part of tail, excluding hairs.

**HIND FOOT** (HF). With toes out straight, measure the distance from tip of longest claw to heal.

**EAR FROM NOTCH** (EFN). Insert end of rule in notch at bottom of ear and measure to distalmost border of fleshy part of ear.

**WEIGHT** (MASS). Measure (in grams) with either hand-held or electronic scale.

# Brown Rat
*Rattus norvegicus*

**OTHER NAMES.** Norway rat, barn rat.

**DESCRIPTION.** A large, stocky rat with a naked tail and prominent ears; grizzled brown above, grayish below. Tail thick, brown, and scaly; somewhat shorter than the body. Skull with prominent brow ridges that extend from the interorbital constriction to the back of the skull; cheek-teeth in 3 rows of cusps running down the crowns of the tooth row; length of first unnotched upper molar (M1) about equal to or less than the rest of the cheek-teeth row (page 6).

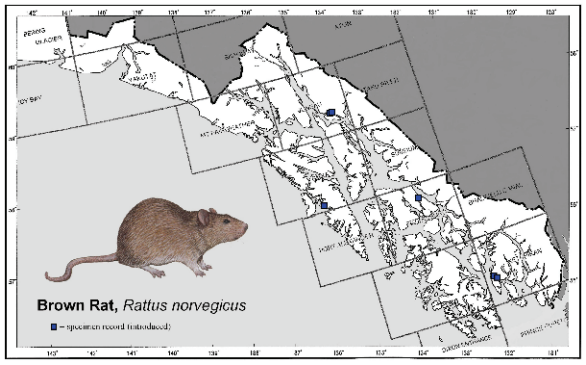
**Total length:** 316-460 mm
**Tail vertebrae:** 122-215 mm
**Hind foot:** 30-45 mm
**Ear:** 15-20 mm
**Weight:** 195-485 grams

**SIMILAR SPECIES.** The woodrat (*Neotoma*) has a white belly and feet, and a hairy tail. The **roof rat** (*Rattus rattus*), which was recently discovered extant on Shemya Island in the far-western Aleutians and of possible occurrence in Southeastern, is sooty black or brown, has a tail longer than its head and body, brow ridges that do not extend all the way down to the back of the skull, and an M1 with distinct notches on the first row of cusps.

**HABITAT.** This species is usually associated with human-created habitats.

**HABITS.** Brown rats are colonial and prolific.

**REMARKS.** Documented records of this destructive species (especially to burrow-nesting seabirds) include at least 22 islands and a number of towns across the state. In Southeastern, brown rats have been documented from Douglas, Juneau, Ketchikan, Petersburg, and Sitka.




Distribution of brown rat, *Rattus norvegicus*



# Checklist of Species

**SORICOMORPHA** - Shrews
**Soricidae**
*Sorex alaskanus*, Glacier Bay water shrew
*Sorex cinereus*, cinereus shrew
*Sorex monticolus*, dusky shrew
*Sorex palustris*, water shrew

**RODENTIA** - Rodents
**Dipodidae**
*Zapus hudsonius*, meadow jumping mouse
*Zapus princeps*, western jumping mouse

**Cricetidae**
*Lemmus trimucronatus*, brown lemming
*Microtus longicaudus*, long-tailed vole
*Microtus oeconomus*, root vole
*Microtus pennsylvanicus*, meadow vole
*Myodes gapperi*, southern red-backed vole
*Myodes rutilus*, northern red-backed vole
*Neotoma cinerea*, bushy-tailed woodrat
*Peromyscus keeni*, northwestern deermouse or Keen's mouse
*Phenacomys intermedius*, western heather vole
*Synaptomys borealis*, northern bog lemming

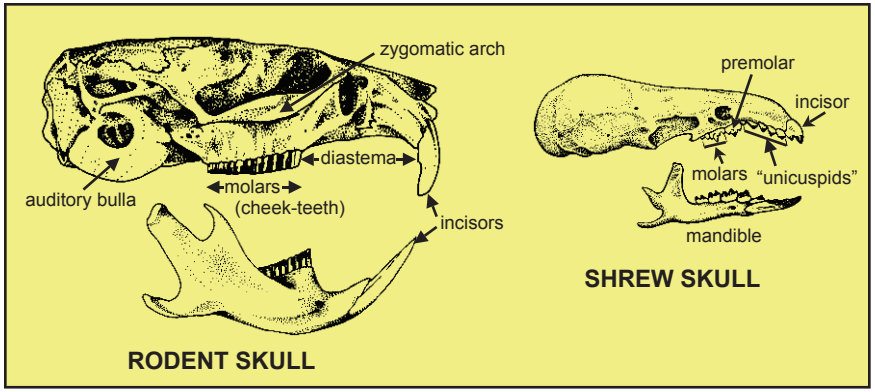
**Muridae**
*Mus musculus*, house mouse*
*Rattus norvegicus*, brown rat*
*Rattus rattus,* roof rat*

Bushy-tailed Woodrat (*Neotoma cinerea*)

# Key to the Orders

• Body very small, snout relatively long and slender pointed, eyes tiny, 5 clawed toes on forefeet; needle-sharp teeth in a continuous row; zygomatic arches and auditory bulla absent ..... **SHREWS** (SORICOMORPHA)

• Body larger, snout blunter, 4 clawed toes on forefeet; 2 pairs of large, curved, chisel- like incisor teeth visible in front of the mouth with a large space (diastema) between incisors and the row of cheek-teeth; zygomatic arches and auditory bulla present ..... ..... **RODENTS** (RODENTIA)






# House Mouse

*Mus musculus*

**OTHER NAMES.** M*us domesticus*.

**DESCRIPTION.** A small mouse with a pointed head, obvious ears, and a long scaly tail about the same color above and below and about same length as body. Fur fairly short, grayish-brown to yellowish-brown above, nearly as dark below. Skull small (less than 30 mm) with ungrooved upper incisors; cheek-teeth with 3 rows of cusps running down the crowns of the tooth row, and length of first upper molar (M1) greater than the combined length of M2 and M3.

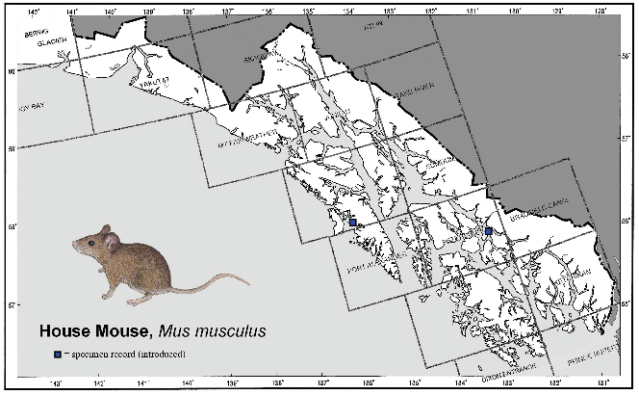
**Total length:** 173 (130-198) mm
**Tail vertebrae:** 84 (63-102) mm
**Hind foot:** 19 (14-21) mm
**Ear:** 13.8 (13-15) mm
**Weight:** 18-23 grams

**SIMILAR SPECIES.** Deermice (*Peromyscus keeni* and *P. maniculatus*) have white bellies. Jumping mice (*Zapus*) have white underparts, and exceptionally long tails and hind feet.

**HABITAT.** This introduced species is usually found closely associated with human habitations and adjacent farmland.

**HABITS.** House mice are colonial and social. They build nests of grasses and other materials in and under buildings.

**REMARKS.** Originally from Asia, this commensal species has been reported from several Alaskan settlements, including Juneau, Sitka, and Wrangell.




Distribution of house mouse, *Mus musculus*

# Northern Bog Lemming

*Synaptomys borealis*

**OTHER NAMES.** *Mictomys borealis, Synaptomys dalli, S. truei, S. wrangeli*; lemming mouse.

**DESCRIPTION.** A small, vole-like rodent, with a very short (about as long as hind foot), bicolored tail; upper parts and sides dark brown to grizzled gray; underparts pale gray; feet grayish to almost black. Sparse covering of buffy-orange hairs at bases of the inconspicuous ears. Males often have a patch of white hair on each flank. Skull with very short rostrum; lower cheek-teeth lacking outer re-entrant angles (page 9); upper incisors grooved and often with the outer corners projecting in a sharp point.

**Total length:** 117 (103-135) mm
**Tail vertebrae:** 20 (14-25) mm
**Hind foot:** 19 (14-21) mm
**Ear:** 12 (10-14) mm
**Weight:** 21.8 (12.2-33.5) grams

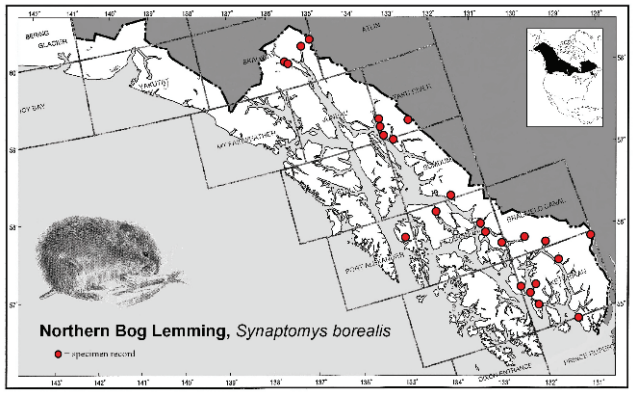
**SIMILAR SPECIES.** *Lemmus* is not uniformly brownish-gray above, and lacks grooved upper incisors. Other vole-like animals have longer tails and ungrooved upper incisors.

**HABITAT.** Northern bog lemmings are generally restricted to open habitats in the boreal and coastal forest zones of Alaska. They prefer damp meadows, marshes, bogs, and fens that have an abundance of grasses, sedges, mosses, and other low vegetation.

**HABITS.** This species is usually uncommon to rare across its range, but can become numerous and less localized some years. They dig short underground burrows and leave small piles of feces and plant cuttings along their runways through the vegetation. The use of pitfall traps has greatly increased our knowledge of this species.

**REMARKS.** There is a growing consensus that *Mictomys* is the appropriate generic name for this North American species.

Island records include Back, Betton, Gravina, Revillagigedo, Kuiu, Kupreanof, and Wrangell islands.




Distribution of northern bog lemming, *Synaptomys borealis*



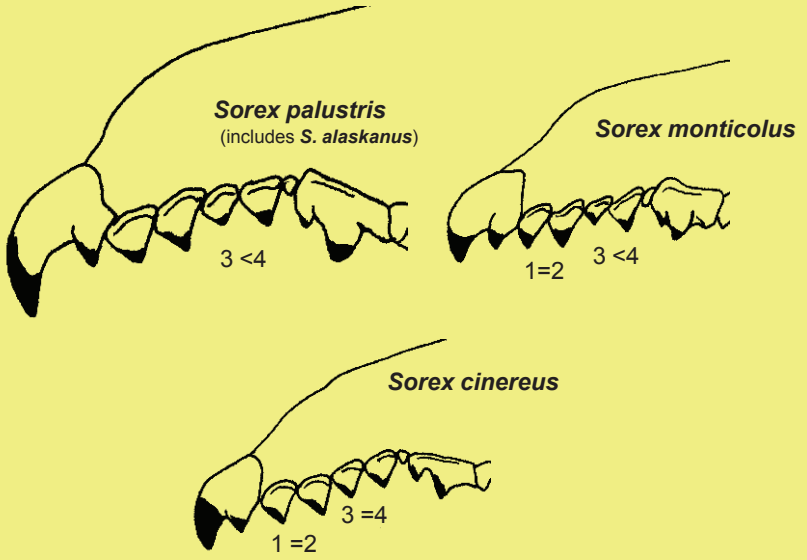
# Key to the Shrews

**1.** • 3rd unicuspid tooth noticeably smaller than the 4th ..... 2

• 3rd unicuspid tooth equal to or larger than the 4th ..... ***Sorex cinereus*** (*p. 10*)

**2.** • Total length usually greater than 130 mm; Skull length usually greater than 19 mm; pelage gray-black; fringe of stiff hairs on hind feet ..... ***Sorex palustris*** (*p. 15*)

• Total length less than 130 mm; Skull length less than 19 mm; pelage brownish; hind feet without fringe of stiff hairs ..... ***Sorex monticolus*** (*p. 14*)




*Lateral views of shrew maxilla showing relative size of unicuspid teeth for each species.*

# Key to the Small Rodents

**1.** • Hind legs considerably longer than frontlegs; tail very long in relation to body size, usually greater than 125 mm; infraorbital canal of skull large and oval; 4 upper cheek-teeth that includes a small premolar (DIPODIDAE) ..... 2

• Frontlegs and hindlegs equal in size; tail length variable relative to total size; infraorbital canal smaller, being much wider at the top than at the bottom; 3 upper cheek-teeth (CRICETIDAE, MURIDAE) ..... 3

**2.** • Length of upper cheek-tooth row greater than 3.7 mm; incisive foramina longer than 4.7 mm; posterior portion of septum dividing the incisive foramina very thin ..... ***Zapus princeps*** (*p. 20*)

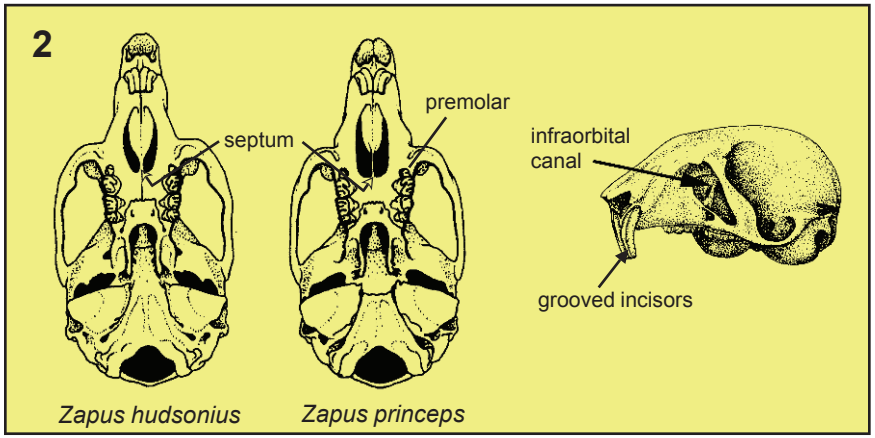
• Length of upper cheek-tooth row less than 3.7 mm; incisive foramina shorter than 4.7 mm; posterior portion of septum dividing the incisive foramina broad ..... ***Zapus hudsonius*** (*p. 19*)

**3.** • Mouse- and rat-like with a slender body, pointed snout, well-developed hind legs, large eyes, prominent ears, and a long tail; cheek-teeth cuspidate or, if cusp pattern not apparent, flat-crowned and prismatic not arranged as alternating triangles ..... 4

• Vole-like with a stout, furry body, blunt snout, short legs, small eyes, ears frequently hidden by long pelage, and tail relatively short; cheek-teeth without rows of cusps on crown; crowns flat with alternating triangles or "puddles" filled with dentine and surrounded by enamel ..... 7

**4.** • Cheek-teeth appearing prismatic and flat-crowned; tail well furred and bushy ..... ***Neotoma cinerea*** (*p. 31*)

• Cheek-teeth clearly cuspidate; tail without hair ..... 5






# Western Heather Vole

*Phenacomys intermedius*

**OTHER NAMES.** Mountain phenacomys.

**DESCRIPTION.** The heather vole has long and lax fur along its back that is grizzled grayish-brown in color; belly dull to silvery gray. Tail proportionally short, wire-thin, and bicolored; feet silvery gray. Cheek-teeth usually blackish in color. Deep re-entrant angles of the lower molars diagnostic.

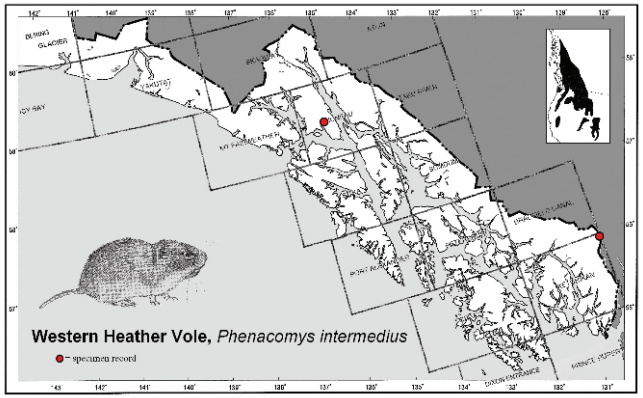
**Total length:** 130 (115-156) mm
**Tail vertebrae:** 31 (26-37) mm
**Hind foot:** 17 (16-19) mm
**Ear:** 12 (10-14) mm
**Weight:** 22.6 (14.6-33.9) grams

**SIMILAR SPECIES.** The heather vole has been called the "deceiver" mouse because of its close resemblance to some species of *Microtus*, including young meadow voles (*M. pennsylvanicus*). The slender, silvery tail and hind feet of *Phenacomys* are usually distinctive. The eastern heather vole, *P. ungava mackenzii*, of northern British Columbia and southern Yukon has a yellowish face region rather than gray.

**HABITAT.** This vole is an inhabitant of mountainous regions, typically at higher elevations near or above timberline. They are most often found in open coniferous forest, riparian areas, forest edge, and moist alpine and subalpine meadows, and are usually associated with habitats with low-lying scrub including blueberry, bearberry, and dwarf willows.

**HABITS.** Heather voles do not make runways of their own. They cache small piles of leaves and fruits near burrow entrances, amongst rocks and inside stumps. They can be extremely docile when handled. The species tends to avoid baited snap traps and are more readily captured in pitfall traps.

**REMARKS.** The taxonomic relationship among eastern (as *P. ungava*) and western (as *P. intermedius*) populations remains unresolved. Heather voles should be looked for in the southern mountains of extreme east-central Alaska, and throughout alpine areas of mainland and perhaps insular Southeast Alaska.




Distribution of western heather vole, *Phenacomys intermedius*

# Northwestern deermouse

*Peromyscus keeni*

**OTHER NAMES.** *Peromyscus sitkensis*; Keen's mouse, forest deer mouse, Sitka mouse, Sitka deer mouse.

**DESCRIPTION.** A slender mouse with prominent naked ears and long whiskers. Upperparts reddish-brown to dark brown (grayish in young), underparts white. Tail moderately long, short-haired, slender, sharply bicolored, white below. Skull relatively light, delicate, with long rostrum; cheek-teeth with two rows of little cusps running down the crowns of each tooth row.

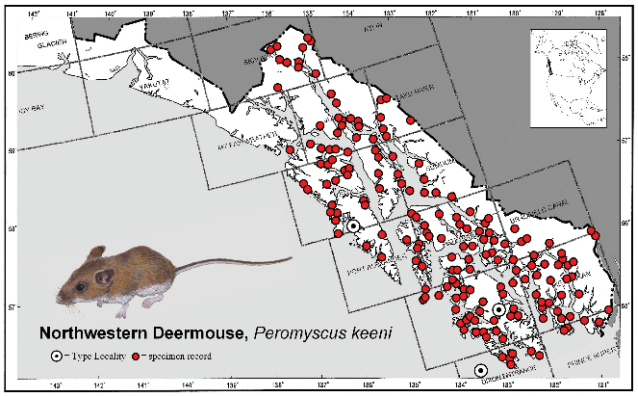
**Total length:** 192 (110-300) mm
**Tail vertebrae:** 98 (35-194) mm
**Hind foot:** 23 (9-33) mm
**Ear:** 17 (7-29) mm
**Weight:** 23.8 (6-70.2) grams

**SIMILAR SPECIES.** Adult *Peromyscus maniculatus* of adjacent British Columbia are smaller, lighter colored, and shorter tailed (less than 100 mm). Jumping mouse (*Zapus*) are smaller and have exceptionally large hind feet and a very long tail.

**HABITAT.** *Peromyscus keeni* inhabits a wide variety of habitats at various elevations.

**HABITS.** Northwestern deermice are common and ubiquitous throughout their range. They commonly invade human dwellings, and have been observed climbing about high up in the forest canopy.

**REMARKS.** This mouse is widely distributed in the region, occurring on Admiralty, Anguilla, Annette, Baker, Baranof, Betton, the Brothers (E. and W.), Bushy, Cat, Chichagof, Coronation, Dall, Deer, Dog, Douglas, Duke, Esquibel, Etolin, Forrester, Goat, Gravina, Heceta, Inian, Kadin, Kosciusko, Kruzof, Kuiu, Kupreanof, Lincoln, Long, Lowrie, Lulu, Marble, Mary, Mitkof, Moser, Noyes, Onslow, Orr, Partofshikof, Pow, Prince of Wales, Revillagigedo, Saint Ignace, San Fernando, San Juan Bautista, Santa Rita, Sergief, Shelter, Shrubby, Spanish, Suemez, Sukkwan, Swan, Thorne, Tuxekan, Vank, Warren, Woewodski, Woronkofski, Wrangell, and Zarembo islands.




Distribution of northwestern deermouse, *Peromyscus keeni*



**5.** • 2 rows of cusps running down the crowns of the tooth row ..... ***Peromyscus keeni*** (*p. 32*)

• 3 rows of cusps running down the crowns of the tooth row ..... 6

**6.** • Total length greater than 300 mm; 1st upper cheek-tooth (M1) about equal to or less than combined length of M2 and M3 ..... ***Rattus norvegicus*** (*p. 35*)

• Total length less than 200 mm; M1 length greater than combined length of M2 and M3 ..... ***Mus musculus*** (*p. 35*)

**7.** • Tail very short, about as long as the hind foot; lower incisors set inward from the cheek-teeth, and ending in a horizontal projection opposite or in front of the socket of the last lower molar ..... 8

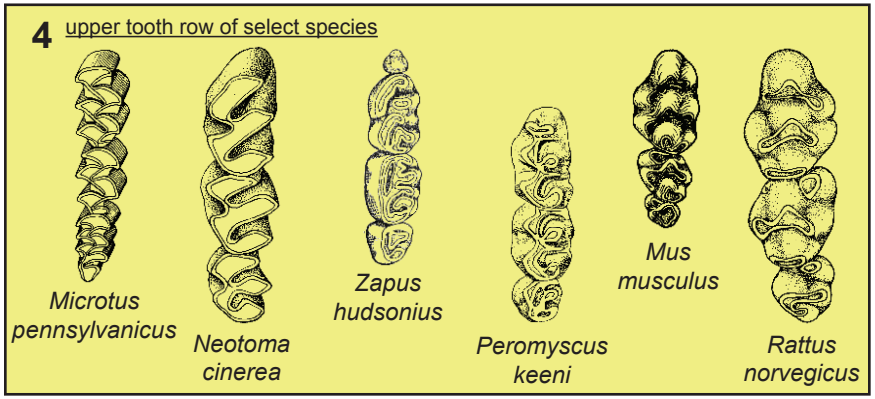
• Tail length variable but clearly extending past the hind feet when legs outstretched; lower incisors passing from the tongue to the lip sides of the cheek-teeth and ascending back to within or near the condylar process ..... 9

**8.** • Pelage uniformly grizzled brown above, grayish below; upper incisors deeply grooved with projecting outer edges ..... ***Synaptomys borealis*** (*p. 34*)

• Chestnut-brown above and without black stripe down back; cheek-teeth relatively simple with few loops; inner salient angles of upper molars and outer angles of lower molars smaller than those of the opposite side; robust skull lacking squamosal peg inside orbit ..... ***Lemmus trimucronatus*** (*p. 24*)

**9.** • Pelage rust-reddish above; skull relatively rounded and light, zygomatic arches relatively slender and the mandibles week; outer angles of cheek-teeth rounded, without a "heel" projecting posteriorly on the last upper molar (M3) ..... 10

• Pelage color not as above; skull relatively angular and more massive, zygomatic arches and mandibles more robust; outer angles of cheek-teeth pointed, with a "heel" projecting posteriorly on the M3 ..... 11



**10.** • Tail short, thick, with closely set bristly hairs; post-palatal bridge usually incomplete in adults, and always incomplete up through 1st year ..... ***Myodes rutilus*** (*p. 22*)

• Tail longer and more slender, with short hairs except at tip where hairs longer; post-palatal bridge always complete, even in half grown young ..... ***Myodes gapperi*** ( *p. 21*)

**11.** • Cheek-teeth (usually black in color) rooted in adults; re-entrant angles on the inner side of the lower molars deeper than those on the outer side (Fig. 3) ..... ***Phenacomys intermedius*** (*p. 33*)

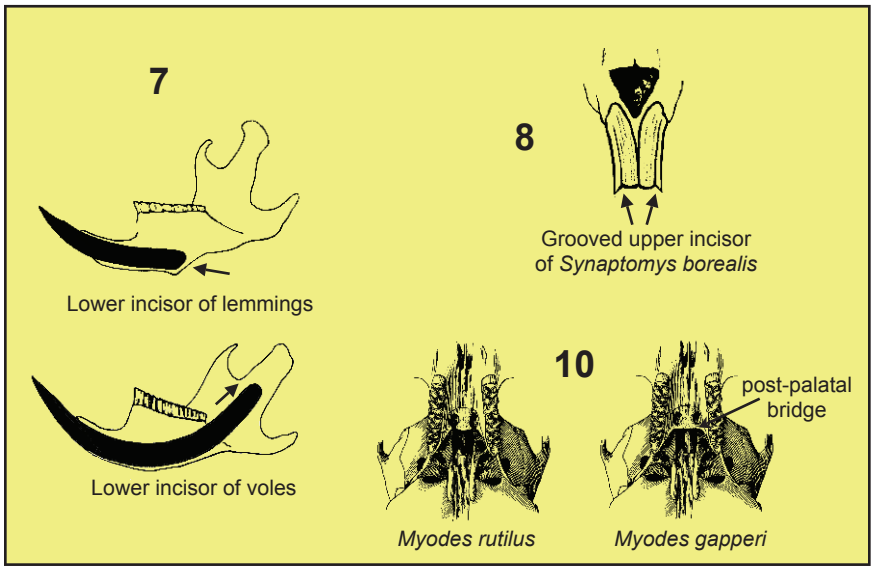
• Cheek-teeth not rooted in adults; re-entrant angles on the inner side of the lower molars approximately equal in depth ..... 12

**12.** • Tail averaging 1/3 or more of total length ..... ***Microtus longicaudus*** (*p. 26*)

• Tail averaging less than 1/3 of total length ..... 13

**13.** • 2nd upper molar (M2) with 4 closed triangles and a posterior loop ..... ***Microtus pennsylvanicus*** (*p. 29*)

• M2 with 4 closed triangles and no posterior loop ..... ***Microtus oeconomus*** (*p. 28*)






# Bushy-tailed Woodrat

*Neotoma cinerea*

**OTHER NAMES.** *Neotoma occidentalis, N. saxamans*; bushy-tailed packrat.

**DESCRIPTION.** A large, squirrel-like rodent with a long, bushy and flattened tail. Fur is long and soft; upperparts grizzled pale grayish to blackish; belly, feet, and underside of tail whitish. Males with prominent mid-ventral and smelly musk glands covered with stiff, matted hairs. Eyes, ears, and whiskers prominent. Skull long and narrow, with two prominent temporal ridges with an intervening depression; cheek-teeth rooted and moderately high crowned.

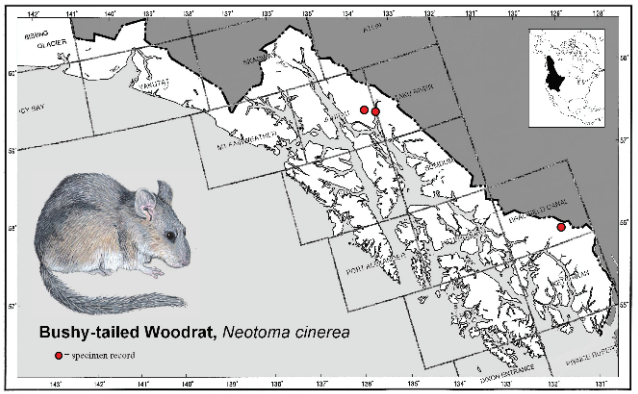
**Total length:** 390 (370-422) mm
**Tail vertebrae:** 166 (157-185) mm
**Hind foot:** 46 (43-50) mm
**Ear:** 28 (26-30) mm
**Weight:** 275.4 (291.8-442.7) grams

**SIMILAR SPECIES.** The Old World brown rat (*Rattus norvegicus*) has a fur-less, scaly tail and dark underparts.

**HABITAT.** Woodrats are found in rocky situations and occasionally in deserted buildings and mine shafts, from sea level to the very top of mountains.

**HABITS.** This "pack rat" builds large, bulky dens by accumulating sticks, bones, and other material in rock crevices, under logs, and in abandoned buildings. Toilet areas and white-stained rocks are often evident nearby. They will engage in a hindfoot-stomping behavior when alarmed.

**REMARKS.** Alaska's only native "rat" is restricted to the coastal mainland in the southeast region of the state, but should be looked for in the eastern-most Wrangell-St. Elias Mountains.




Distribution of bushy-tailed woodrat, *Neotoma cinerea*

# Meadow Vole

*Microtus pennsylvanicus*

**OTHER NAMES.** *Microtus admiraltiae*.

**DESCRIPTION.** A medium-sized vole with long, soft, dense fur that hides the rounded ears; pelage of adults varies from grizzled gray to grizzled rusty-brown above and dusky gray to silvery below (in winter belly more whitish); immature voles darker than adults. Tail about twice the length of the foot and only faintly bicolored; feet gray. Skull relatively rectangular and heavily constructed; incisive foramina long and not constricted posteriorly. Tooth pattern of upper middle molars (M2) with 4 closed triangles and a rounded 5th posterior enamel loop is diagnostic.

**Total length:** 145 (112-178) mm
**Tail vertebrae:** 38 (23-52) mm
**Hind foot:** 19 (11-23) mm
**Ear:** 12 (6-21) mm
**Weight:** 30.0 (12.4-56.4) grams

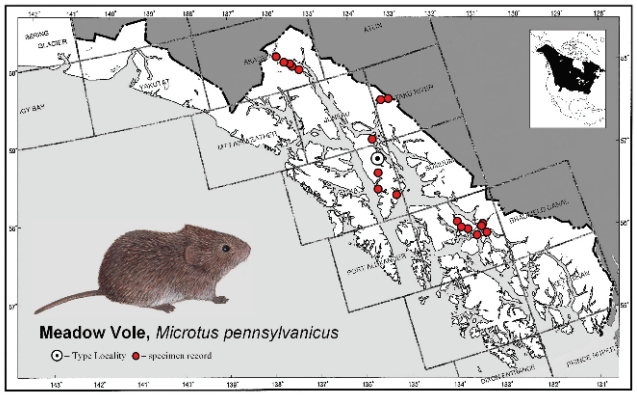
**SIMILAR SPECIES.** *Microtus pennsylvanicus* is distinguished from other Alaskan voles, including the very similar *M. oeconomus*, by the an extra posterior loop on M2.

**HABITAT.** A species of Alaska's taiga zone, meadow voles prefer wet meadows and grassy riparian areas.

**HABITS.** Meadow vole populations are periodically abundant in suitable habitat. They build extensive runaway networks marked occasional with communal toilet areas and the clippings of grass and sedge stems. They are socially aggressive and pugnacious. They readily enter water and swim with ease.

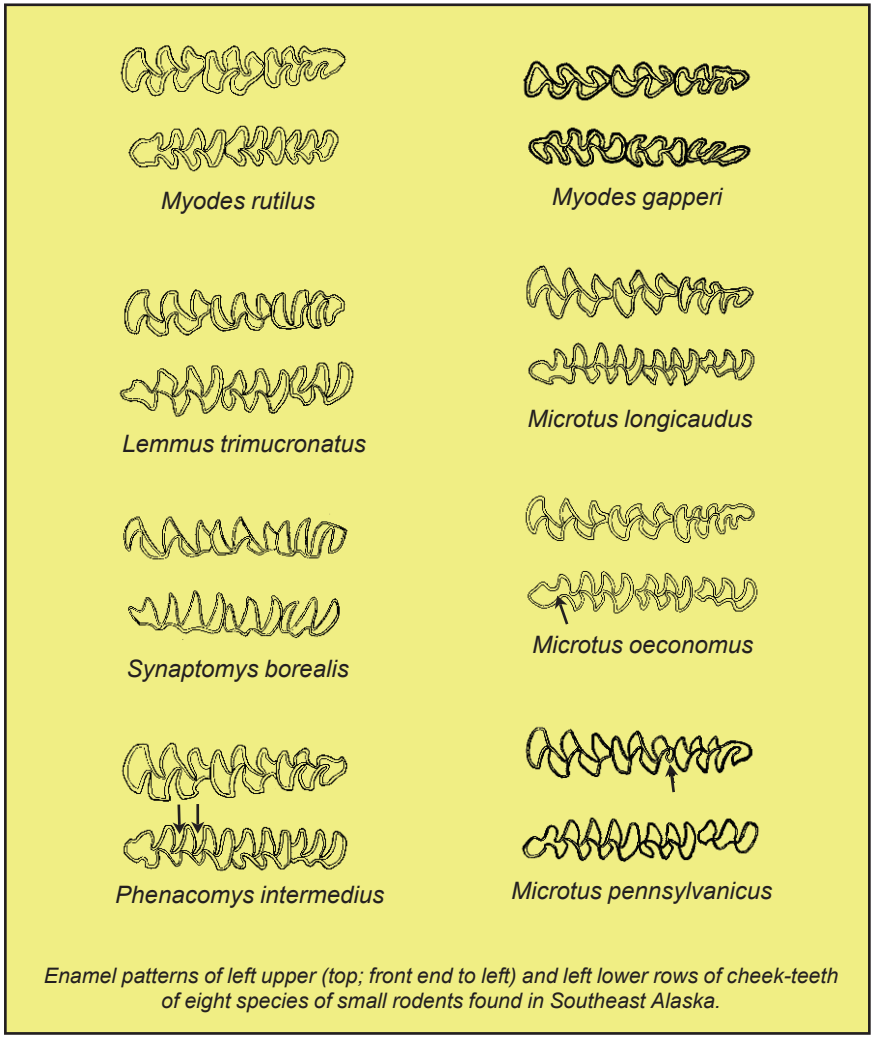
**REMARKS.** This vole has the broadest range across North America of any small mammal. The numerous subspecies currently recognized (four in Alaska alone) are in need of a modern revision.

Meadow voles have been found on Admiralty (as *M. p. admiraltiae*), Mitkof, Wrangell, and near the delta of the Stikine River on Kadin, Sergief, Sokolof, and Vank islands.



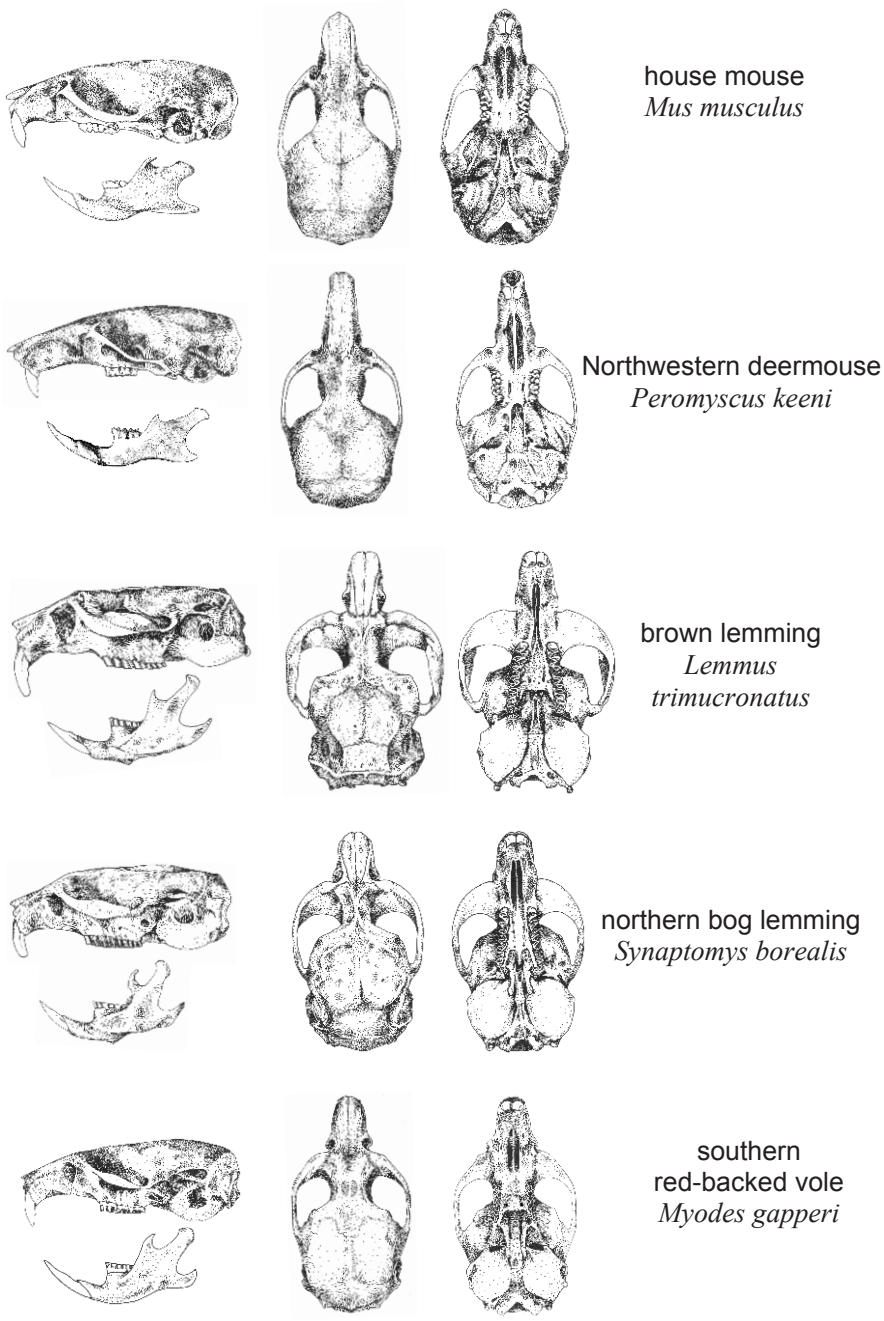

Distribution of meadow vole, *Microtus pennsylvanicus*






*Enamel patterns of left upper (top; front end to left) and left lower rows of cheek-teeth of eight species of small rodents found in Southeast Alaska.*

# Small Rodent Skulls



house mouse
*Mus musculus*

Northwestern deermouse
*Peromyscus keeni*

brown lemming
*Lemmus trimucronatus*

northern bog lemming
*Synaptomys borealis*

southern
red-backed vole
*Myodes gapperi*



# Root Vole
*Microtus oeconomus*

**OTHER NAMES.** *Microtus sitkensis, M. yakutatensis*; northern vole, tundra vole.

**DESCRIPTION.** A medium- to large-sized (on some Alaska islands) vole, dusky gray to rich buff, tawny, cinnamon brown, or rusty brown above, paler on sides, white to dark buff wash below. Tail relatively short and markedly bicolored. Ears hidden in pelage. Skull strong and angular; the incisive foramina only moderately long and constricted to a slit posteriorly. Upper middle molar (M2) has four closed enamel triangles. The first lower molar (m1) has 4 median closed triangles, the 5th prism usually open and confluent with terminal loop.

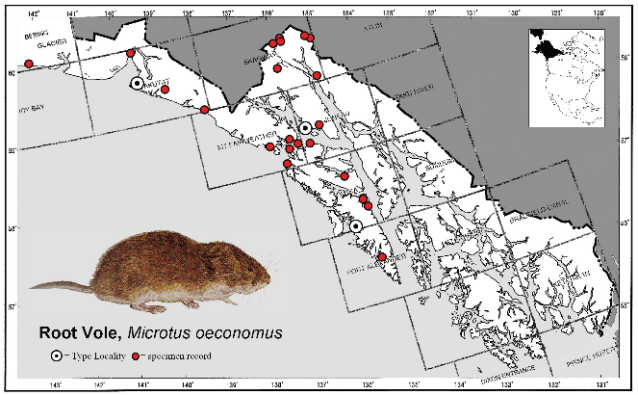
**Total length:** 153 (114-199) mm
**Tail vertebrae:** 38 (14-63) mm
**Hind foot:** 20 (15-25) mm
**Ear:** 13 (9-19) mm
**Weight:** 38.7 (14-75) grams

**SIMILAR SPECIES.** Although the pelage of *M. pennsylvanicus* tend to lack the yellowish cast found in root voles (especially when comparing young animals), the two species are usually so similar in external appearance that positive identification requires looking under magnification to see if there is the extra rounded posterior loop on the lingual side of the upper middle molar (M2) that is present in *M. pennsylvanicus* and absent in *M. oeconomus*. *Microtus longicaudus* has a much longer tail and a more luxuriant, grayish-brown pelage.

**HABITAT.** Root voles are found in a variety of tundra and meadow habitats at various elevations across their range.

**HABITS.** Root voles are periodically abundant, and travel in well-developed runways.

**REMARKS.** This vole is widely distributed across Eurasia, but is restricted to Alaska and NW Canada in North America. In the Alexander Archipelago, they occur on Baranof, Chichagof, Inian, Lemesurier, and Yakobi islands. Those islands are the southern limit of this Holarctic species' range in North America.




Distribution of root vole, *Microtus oeconomus*

# Long-tailed Vole

*Microtus longicaudus*

**OTHER NAMES.** *Microtus coronarius, M. mordax*.

**DESCRIPTION.** A medium-sized vole characterized by a long, bicolored tail that is over half the combined length of the head and body. Fur grizzled grayish-brown to reddish brown above; grayish below; feet dusky white. Ears relatively small and mostly hidden by long fur. Skull relatively smooth; incisive foramina long and gradually tapering posteriorly.

**Total length:** 167 (115-230) mm
**Tail vertebrae:** 61 (21-107) mm
**Hind foot:** 21 (12-28) mm
**Ear:** 13 (6-20) mm
**Weight:** 31.8 (9.6-79) grams

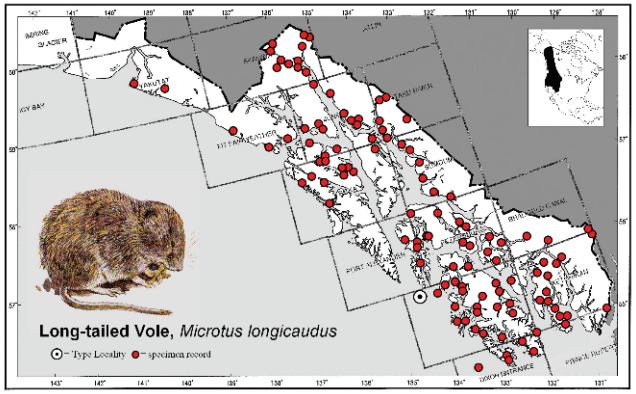
**SIMILAR SPECIES.** Other sympatric voles have shorter tails. Second upper molar (M2) of *Microtus pennsylvanicus* has an extra posterior loop. Incisive foramina of *M. oeconomus* skull is short and constricted posteriorly, rather than long and gradually tapering.

**HABITAT.** This vole is an inhabitant of grassy forest openings and a variety of meadow and riparian habitats, from estuarine meadows at sea level to dry rocky slopes high up in the mountains.

**HABITS.** *M. longicaudus* is uncommon to periodically abundant. They tend to make few runways. They are readily captured in snap, live, and pitfall traps.

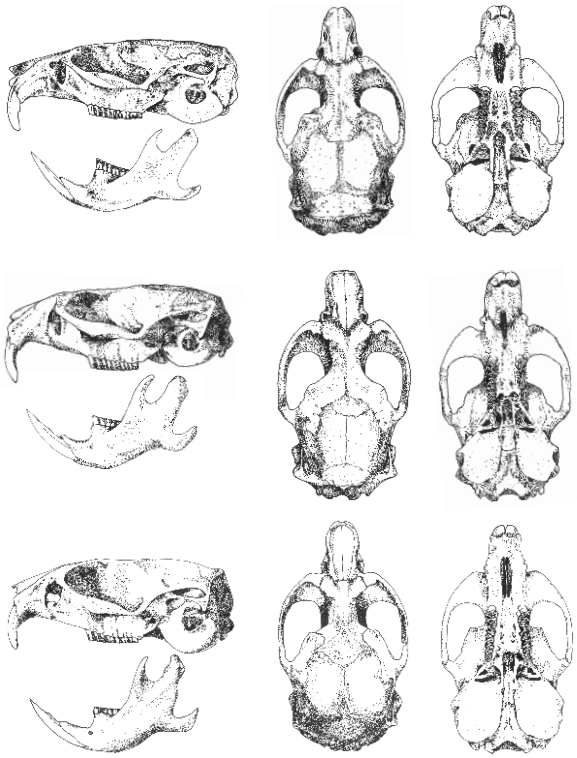
**REMARKS.** The large-bodied voles on Coronation, Warren and Forrester islands in Southeast Alaska were once considered a separate species, *M. coronarius*, the Coronation Island vole.

Other islands of occurrence include Admiralty, Anguilla, Annette, Chichagof, Coronation, Dall, Dog, Douglas, Etolin, Forrester, Hoot, Kosciusko, Kuiu, Kupreanof, Lester, Marble, Mary, Mitkof, Moser, Noyes, Orr, Owl, Prince of Wales, Revillagigedo, Santa Rita, Shelikof, Stevenson, Suemez, Sukkwan, Sullivan, Thorne, Tuxekan, Warren, Woewodski, Wrangell, and Zarembo islands. Sign of *Microtus* have been noted on Baker Island. Long-tailed Voles have not been found on Baranof Island.




Distribution of long-tailed vole, *Microtus longicaudus*





long-tailed vole
*Microtus longicaudus*

root vole
*Microtus oeconomus*

meadow vole
*Microtus pennsylvanicus*

# The Shrews

Primarily small primitive mammals of uncertain affinities were historically relegated to the order Insectivora, but molecular DNA analyses of these organisms have begun to produce phylogenies and classifications that likely more accurately reflect their evolutionary relationships. Because of accumulating evidence for the paraphyletic nature of the former Insectivora, some authorities provisionally treat Soricomorpha as a separate order inclusive of the moles, shrews, and solenodons. Thus reconstituted, it comprises 428 species and 45 genera in 4 families, with Soricidae containing 88 percent of all living species.

The monophyletic family Soricidae consists of 26 genera and 376 species in 3 subfamilies (Wilson and Reeder 2005). All Recent North American shrews are soricines. The genus *Sorex* is generally divided into two subgenera, *Otisorex* and *Sorex*, and includes seventy-seven species. Ten of these occur in Alaska (three in Southeastern), making *Sorex* the most speciose genus in the state.

Shrews are among the world's smallest and most active mammals. The Alaska tiny shrew, *Sorex yukonicus*, a newly discovered species that is endemic to Alaska outside of the southeastern region, is the smallest, with an average total length in twenty-nine individuals of 70 mm and weight of just 1.8 grams. Shrews have tiny eyes, pointy snouts, and a metabolic rate that requires them to feed frequently throughout the day and year. Invertebrates are their primary food. Some species use echolocation to navigate and find prey. Other species (outside Alaska) have poisonous salivary glands. Most shrews prefer moist microhabitats and a few species are so well adapted to an aquatic lifestyle (e.g., water shrew, *Sorex palustris*).

Cinereus Shrew (*Sorex cinereus*)



# Brown Lemming

*Lemmus trimucronatus*

**OTHER NAMES.** *Lemmus sibiricus*; Siberian lemming, Nearctic brown lemming.

**DESCRIPTION.** The fur of the brown lemming is long and soft; tawny orange shading to chestnut-brown above, with grayish head and shoulders, buff-gray below. Feet silvery. Tail stubby and colored like body. Ears small and hidden by thick fur. Soles of feet hairy. Cheek-teeth relatively simple with few loops; inner salient angles of upper molars and outer angles of lower molars smaller than those of the opposite side. Upper incisors prominent and not grooved.

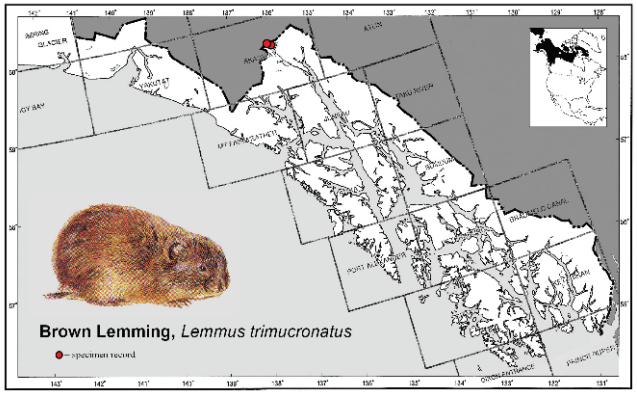
**Total length:** 114, 106 mm (n=2)
**Tail vertebrae:** 12, 13 mm
**Hind foot:** 18, 18 mm
**Ear:** 12, 10 mm
**Weight:** 31, 27 grams

**SIMILAR SPECIES.** *Synaptomys* is brownish gray with grooved incisors. Voles have unfurred soles of feet, not brightly colored, and have longer tails (usually greater than 25 mm).

**HABITAT.** This species occurs in a variety of arctic and alpine tundra habitats. Above treeline they are usually associated with wet sedge-grass tundra above treeline, and restricted to spruce bogs and wet meadows at lower elevations.

**HABITS.** Population levels of brown lemmings fluctuate widely between years, but unlike Norwegian lemmings (*L. lemmus*), brown lemmings do not migrate en masse during periods of super-abundance. Lemmings are most often captured in pitfall traps and in snap traps set at burrow entrances and across runways.

**REMARKS.** The taxonomy of Old World and New World *Lemmus* has been problematic. At least four circumpolar species are currently proposed, with populations in North America and far eastern Siberia together constituting the one species, *L. trimucronatus*.




Distribution of brown lemming, *Lemmus trimucronatus*

# Northern Red-backed Vole

*Myodes rutilus*

**OTHER NAMES.** *Clethrionomys rutilus, Evotomys dawsoni*; Dawson red-backed vole, tundra redback vole. *Myodes* is the correct generic name for red-backed voles according to Wilson and Reeder (2005).

**DESCRIPTION.** The summer pelage of *M. rutilus* has a bright rufous dorsal stripe running from head to tail (rarely dark brown or blackish); sides ochraceous, belly buffy or creamy white. Winter pelage is longer and silkier, and dorsal strip more contrastingly cinnamon-colored. Tail is short, thick, and covered with dense, bristly fur. Ears are rounded and well-furred, and extending well beyond the pelage. Skull is small, light, rounded, the zygomatic arches slender, mandible weak. Post-palatal bridge is incomplete. Cheek-teeth bear twin roots in adults.

**Total length:** 123 (84-155) mm
**Tail vertebrae:** 29 (12-49) mm
**Hind foot:** 18 (13-22) mm
**Ear:** 13 (7-20) mm
**Weight:** 21 (7.2-44) grams

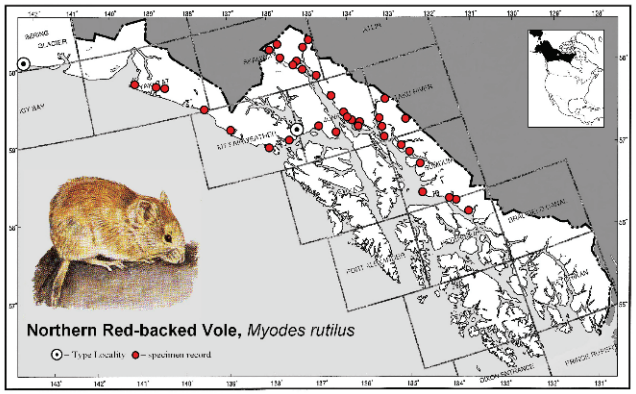
**SIMILAR SPECIES.** *M. gapperi*, a species restricted to southern Southeast Alaska, usually has a thinner, longer, less bristly tail; less bright, more brownish pelage on its back and sides; and a post-palatal bridge that is always complete.

**HABITAT.** This very common and periodically abundant vole has broad and flexibly habitat preferences within the northern boreal forest and shrub tundra.

**HABITS.** Red-backed voles eat a wide variety of foods, including leaves, seeds, fruits, mushrooms, lichens, and even some insects. They utilize surface runways of other species, and it is not unusual for them to enter human habitations. Red-backed voles are readily captured in a variety of trap types.

**REMARKS.** This species also occurs in the taiga but not the tundra of Eurasia.

The only insular populations in the region are nearshore Douglas and Young islands (one of the Beardslee Islands in Yakutat Bay).




Distribution of northern red-backed vole, *Myodes rutilus*



# Cinereus Shrew

*Sorex cinereus*

**OTHER NAMES.** Masked shrew, common shrew.

**DESCRIPTION**. A small, bicolored shrew with pale brownish back shading gradually into grayish underparts. Winter pelage darker. Snout long and slender. Tail relatively thick, lacking a distinctive terminal tuft of dark hairs. 1st unicuspid tooth same size as 2nd; 3rd smaller and slightly larger than or equal to the 4th; 5th very tiny.

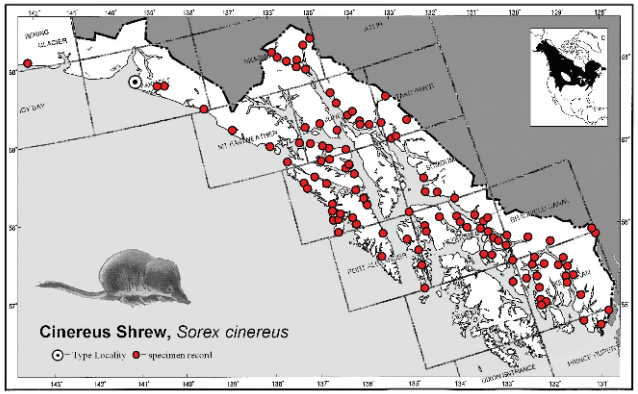
**Total length:** 104 (73-135) mm
**Tail vertebrae:** 45 (25-73) mm
**Hind foot:** 12 (6-21) mm
**Weight:** 4.3 (2.4-11.5) grams

**SIMILAR SPECIES.** *Sorex monticolus* is larger and longer tailed (usually greater than 50 mm), and 3rd unicuspid is noticeably smaller than 4th.

**HABITAT.** The cinereus shrew occurs in a wide variety of habitats at various elevations. It prefers damp areas with dense ground cover and an abundance of insects and other small prey.

**HABITS.** Often abundant, the cinereus shrew is the dominant shrew in most communities across its broad range. Shrews have voracious appetites, which accounts for their continual activity and quick death when deprived of food. Most do not live beyond a year.

**REMARKS.** The taxonomic relationship of *cinereus, pribilofensis, jacksoni*, and *ugyunak* is problematic, with most authorities considering each a separate species. Islands in Southeast Alaska where *Sorex cinereus* has been recorded are Baranof, Bell, Black, Chichagof, Deer, Etolin, Gedney, Grant, Gravina, Halleck, Hassler, Herbert Graves, Kadin Krestof, Kruzof, Kuiu, Kupreanof, Lemesurier, Lester, Mitkof, Moser, Onslow, Partofshikof, Read, Revillagigedo, Wrangell, and Yakobi Islands.




Distribution of cinereus shrew, *Sorex cinereus*

# Dusky Shrew

*Sorex monticolus*

**OTHER NAMES.** *Sorex obscurus, S. vagrans*; montane shrew.

**DESCRIPTION.** A medium-sized, bicolored shrew with gray-brown back and sides and brown to gray belly. Tail weakly bicolored and relatively long (usually greater than 50 mm). Unicuspids well pigmented; U3 distinctly smaller than U4.

*Northern Mainland:*
**Total length:** 114 (96-143) mm
**Tail vertebrae:** 48 (27-62) mm
**Hind foot**: 13 (11-16) mm
**Weight:** 6.6 (3.4-11.1) grams

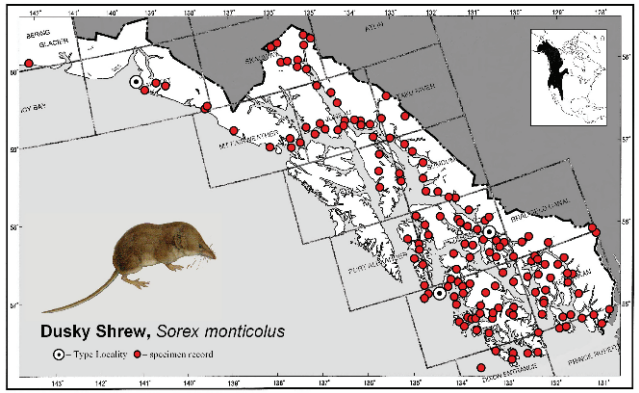
*Juneau and Admiralty Island southward:*
**Total length:** 121 (106-149) mm
**Tail vertebrae:** 53 (35-65) mm
**Hind foot**: 14 (7-28) mm
**Weight:** 7.0 (3.0-14.5) grams

**SIMILAR SPECIES.** Most similar to *S. cinereus*, which is smaller, shorter tailed (usually less than 46 mm), and with U4 smaller than or equal to U3. *Sorex palustris* also has U3 smaller than U4, but its large size, blackish-gray pelage (never distinctly brown), easily separates it from this and other shrews.

**HABITAT.** This shrew is found from coastal and boreal forests to alpine tundra. They tend to favor moist sites with adequate ground cover and an abundance of invertebrate prey.

**HABITS.** Little is known about the habits of this shrew in Alaska.

**REMARKS.** Recent molecular studies of this shrew in Southeast Alaska indicate a deep genetic divergence between coastal and continental populations that may be indicative of species-level differentiation. Islands of occurrence include Admiralty, Anguilla, Annette, Baker, Barrier, Beardslee (including Lester and Young), Bell, Betton, Black, Cap, Coronation, Dall, Deer, Dog, Douglas, Duke, Eagle, Etolin, Forrester, Gedney, Gravina, Hassler, Heceta, Hoot, Hotspur, Inian, Kadin, Kosciusko, Kuiu, Kupreanof, Lemesurier, Long, Lowrie, Lulu, Marble, Mary, Mitkof, Noyes, Onslow, Owl, Percy, Pleasant, Prince of Wales, Revillagigedo, San, San Fernando, San Juan Bautista, Sangao, Santa Rita, Shelikof, Shelter, Shrubby, Spanish, Stone, Suemez, Sullivan, Tuxekan, Warren, Woewodski, Woronkofski, Wrangell, and Zarembo.




Distribution of dusky shrew, *Sorex monticolus*



# Southern Red-backed Vole

*Myodes gapperi*

**OTHER NAMES.** *Clethrionomys gapperi, Evotomys gapperi*; boreal red-backed vole, Gapper's red-backed vole. Wilson and Reeder (2005) resurrected *Myodes* as the correct generic name for red-backed voles.

**DESCRIPTION.** The reddish-brown stripe down the back of this small vole usually contrasts with buffy-gray sides and white or gray underparts. Tail is short, about twice the length of the hind foot, slim, and scantily covered with short hairs. This genus has well-furred ears that perceptibly extend above the fur. Cheek-teeth are rooted in older individuals. Skull is relatively rounded and light, with post-palatal bridge of *M. gapperi* always complete, even in half grown young.

**Total length:** 130 (84-170) mm
**Tail vertebrae:** 34 (17-50) mm
**Hind foot:** 18 (10-38) mm
**Ear:** 12 (5-21) mm
**Weight:** 21.1 (6.2-49) grams

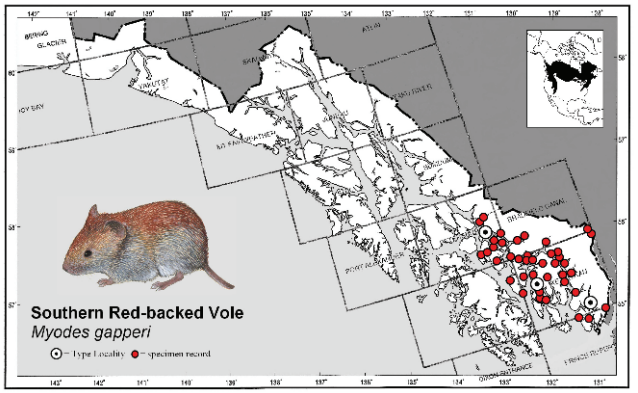
**SIMILAR SPECIES.** *Myodes rutilus* generally has a thicker, shorter tail that is covered with dense, bristly fur and brighter reddish color on its back. Post-palatal bridge of *M. rutilus* is usually incomplete. Voles in the genera *Microtus* and *Phenacomys* lack reddish stripe down the back and have round ears hidden or barely extending above their fur.

**HABITAT.** This vole is an inhabitant of the southern coastal forests of Southeast Alaska. They are found under shrubbery and amongst the litter covering the forest floor.

**HABITS.** This species is common, occasionally abundant. They do not construct elaborate runways. Their omnivorous feeding habits consists of a wide variety of seeds, fruits, leaves and fungi.

**REMARKS.** *Myodes gapperi* and *M. rutilus* are difficult to distinguish morphologically where the two come in contact along the mainland of Southeast Alaska, and there is a preliminary indication (based on the mitochondrial cytochrome *b* gene) that some gene flow may have occurred between species.

Islands of occurrence include Bell, Black, Deer, Etolin, Hassler, Misery, Onslow, Eagle, Revillagigedo, and Wrangell islands.




Distribution of southern red-backed vole, *Myodes gapperi*

# Western Jumping Mouse

*Zapus princeps*

**OTHER NAMES.** *Zapus saltator*.

**DESCRIPTION.** The external appearance of the western jumping mouse differs little from *Z. hudsonius*, with its exceptionally long and slender tail, large hind legs and feet, and yellowish-buff color, darker dorsal stripe and white underparts.

**Total length:** 233 (187-258) mm
**Tail vertebrae:** 145 (116-159) mm
**Hind foot:** 32 (29-35) mm
**Ear:** 14 (11-18) mm
**Weight:** 20.7 (10.3-43.7) grams

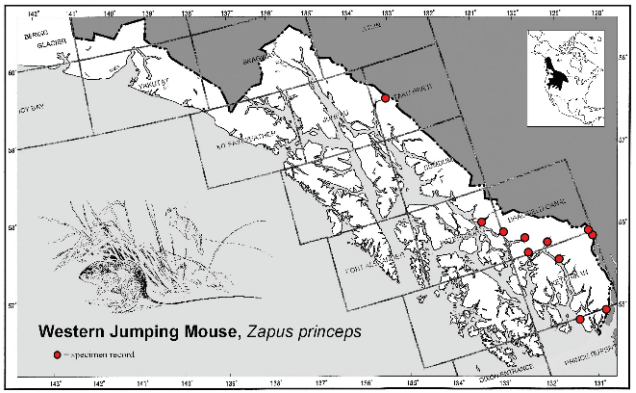
**SIMILAR SPECIES.** *Zapus hudsonius* is smaller (total length usually less than 230 mm), has a less grizzled dorsal pelage, and the underparts tend to have a faint buffy wash over them. The most reliable characters separating the two are found in the skull.

**HABITAT.** This species, like its close relative *Z. hudsonius*, occurs from high mountain meadows to riparian streamsides, ponds, and marshes in the lowlands where moist soils support a dense canopy of grasses, forbs, and shrubs. They hibernate underground in a dry nest chamber during the winter months. During active months, they build globular nests in tall grass and at the base of tall shrub clumps.

**HABITS.** The life history and habits of *Z. princeps* are apparently similar to *Z. hudsonius*. Differences of preferred ecologic niche where the two species overlap have not been adequately studied.

**REMARKS.** Minimal levels of sequence divergence between individuals of *Z. princeps* from Southeast Alaska and individuals from southern Canada were found in a study of geographic variation in the mitochondrial cytochrome *b* gene.

There are no island records of this species.




Distribution of western jumping mouse, *Zapus princeps*



# Water Shrew

*Sorex palustris*

**OTHER NAMES.** Navigator shrew, American water shrew, northern water shrew.

**DESCRIPTION.** A large shrew with velvety fur; blackish-gray above, white or silvery gray below. Scattered silvery white hairs are visible on some individuals. Tail distinctly bicolored. Hind feet large and have a fringe of stiff silvery hairs along outer and inner margins of feet and toes; middle toes partially webbed. Skull large (greater than 19 mm) with 3rd unicuspid smaller than 4th.

**Total length:** 145 (134-153) mm
**Tail vertebrae:** 71 (66-76) mm
**Hind foot:** 19 (18-20) mm
**Weight:** 9.6 (6.8-15.6) grams

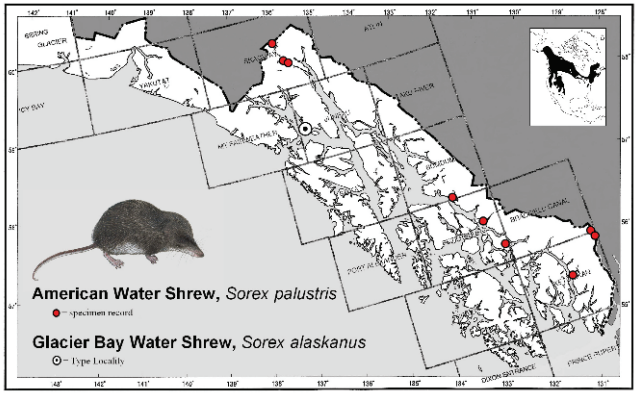
**SIMILAR SPECIES.** Its large size, blackish-gray pelage (never distinctly brown), and aquatic habits easily separates the water shrew from other species.

**HABITAT.** This shrew is seldom found far from water-adjacent cover. They occur along lakes, ponds, streams, rivers and marshes where sheltering banks, low vegetation, tree roots or other debris offer protection.

**HABITS.** The water shrew uses its aquatic habitat to find food and to escape from predators. It readily dives to stream bottoms, its fur silvery from trapped air bubbles. It paddles vigorously to submerge itself; when it stops swimming, it shoots up to the surface and floats well out of the water.

**REMARKS.** *Sorex alaskanus*, a taxon restricted to Glacier Bay, is probably only a subspecies of *S. palustris*, but the lack of comparative materials has prevented resolution of this issue.

Pitfall and snap traps set close to water, as well as submerged minnow traps have been used to capture water shrews. The only island of know occurrence is Wrangell Island. Sightings of this shrew on Revillagigo and Kupreanof islands have not been substantiated.




Distribution of water shrews, *Sorex palustris and S. alaskanus*

# The Small Rodents

Rodents comprise the largest order of living mammals worldwide, with over 2200 species and 481 genera in 33 families (Wilson and Reeder 2005). In Southeast Alaska, rodents comprise the most speciose group of land mammal, representing 19 native and 2 non-native species in 17 genera and 6 families.

The rodents have traditionally been divided into three suborders: the Sciuromorpha (squirrel-like rodents), the Myomorpha (rat-like rodents), and Hystricomorpha (porcupine-like rodents). More recently, the number of rodent suborders has been expanded to five. All share the distinguishing characteristic of having only two pairs of incisors (2 upper, 2 lower) and no canine teeth, which leaves a wide gap between incisors and molars called the diastema.

Three families of small rodents occur in Southeast Alaska (the squirrels, beaver, muskrat, and porcupine are not included in this guide):

Family **Dipodidae** — jumping mice

This family of birch mice (genus *Sicista*), jumping mice (*Zapus, Napaeozapus, Eozapus*), and jerboas comprises 51 species in 15 genera in Eurasia and North America. Two species in the genus *Zapus* occur in Southeast Alaska.

Jumping mice are small, slender nocturnal rodents that hibernate. They have very long tails, large hind feet, and deeply grooved orange incisors.

Family **Cricetidae** — voles, lemmings, deermice, woodrats

A long-standing dilemma has been whether to place the cricetid and murid rodents into one all encompassing family or be into two separate families. Musser and Carleton (in Wilson and Reeder 2005) provided sound reasons for taking the two family approach.

Cricetidae is the second largest family of rodents, comprising nearly a third of the world's species. This diverse group of voles, lemmings, hamsters, and New World rats and mice includes about 681 species and 130 genera in 6 subfamilies. Cricetid rodents constitute the single largest family of mammals in Alaska. Nine species of arvicolines (subfamily Arvicolinae: voles and lemmings) in five genera occur in Southeast Alaska. Two species of the New World neotomines (subfamily Neotominae, genus *Peromyscus, Neotoma*) also occur in the region.

Cricetids are relatively small, short-lived animals that range upward to the muskrat in size (about 1.8 kg). Members of this group are found in almost every available terrestrial habitat, as well as some that are arboreal and aquatic. Voles and lemmings tend to undergo frequent and extreme fluctuations in population density.

Family **Muridae** — Old World mice and rats

Muridae is the largest family of rodents, comprising 730 species and 150 genera in 5 subfamilies. Two murids, the house mouse (*Mus*) and brown rat (*Rattus*), have been accidentally introduced into Southeast Alaska. Both have proportionally long, sparsely haired and scaley tails. Their molars are provided with small, rounded cusps or tubercles arranged in three longitudinal rows.



# Meadow Jumping Mouse

*Zapus hudsonius*

**OTHER NAMES.** *Dipus hudsonius*.

**DESCRIPTION.** Jumping mice are relatively small mice with extremely long (about 1-1/2 times longer than their body), wire-like, scaly tails, and large hind legs and feet (much larger than front feet). Pelage is coarse and wiry with brownish band on back, white belly and feet, and often yellowish to orange along sides. The ears are small and narrowly edged with buff or white. The skull is narrow in proportion to length; infraorbital canal large and oval (page 5); upper premolar present; upper incisors orange and grooved down the front surfaces.

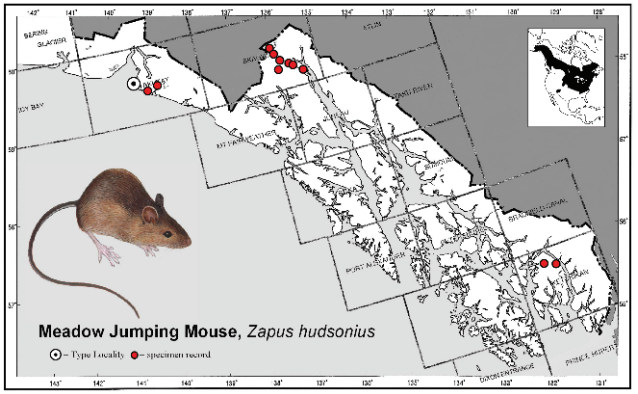
**Total length:** 221 (193-236) mm
**Tail vertebrae:** 133 (119-152) mm
**Hind foot:** 31 (28-33) mm
**Ear:** 13 (10-17) mm
**Weight:** 19.6 (15.5-26) grams

**SIMILAR SPECIES.** The very similar western jumping mouse (*Zapus princeps*) of mainland Southeast Alaska, is slightly larger in overall size and best separated from *Z. hudsonius* by cranial characters.

**HABITAT.** In summer, jumping mice are generally found in shrubby thickets and meadows bordering streams, ponds, and other openings.

**HABITS.** Jumping mice are chiefly nocturnal but may become active on damp, cloudy afternoons. They breed soon after emergence from hibernacula around May or early June. In spring, half of their diet may be caterpillars and other arthropods. Later, seed heads, fruits and fungi make up most of their diet. They are adept swimmers and agile jumpers, capable of hopping up to 3 m at a single bound when alarmed. They accumulate fat prior to entering hibernation below ground in late September or early October. Jumping mice are readily captured in pitfall traps deep enough (or partial filled with water) to prevent their bounding escape.

**REMARKS.** A geographically isolated population of *Z. hudsonius* occurs on Revillagigedo Island in southern Southeast Alaska. It has yet to be found on any other island in the region.




Distribution of meadow jumping mouse, *Zapus hudsonius*