Root vole

Class: Mammalia
Order: Rodentia

Microtus oeconomus

Review Status: Peer-reviewed **Version Date:** 30 January 2018

Conservation Status

NatureServe:	*Agency:*		
G Rank: G5	ADF&G: Species of Greatest Conservation Need	IUCN: Least Concern	Audubon AK:
S Rank: S5	USFWS:	BLM:	

Final Rank

Conservation category: **V. Orange**

unknown status and either high biological vulnerability or high action need

Category	Range	Score
Status	-20 to 20	0
Biological	-50 to 50	-38
Action	-40 to 40	24

Higher numerical scores denote greater concern

Status - variables measure the trend in a taxon's population status or distribution. Higher status scores denote taxa with known declining trends. Status scores range from -20 (increasing) to 20 (decreasing). **Score**

Population Trend in Alaska (-10 to 10) 0

Unknown.

Distribution Trend in Alaska (-10 to 10) 0

Trends over the last 50 year are unknown.The distribution of root voles in Alaska is thought to have increased since the Last Glacial Maximum (~21,500 years ago; Hope et al. 2015), but models disagree as to whether suitable habitat will increase (Hope et al. 2015) or decrease (Baltensperger and Huettmann 2015a; Marcot et al. 2015) in the future.

Status Total: 0

Biological - variables measure aspects of a taxon's distribution, abundance and life history. Higher biological scores suggest greater vulnerability to extirpation. Biological scores range from -50 (least vulnerable) to 50 (most vulnerable). **Score**

Population Size in Alaska (-10 to 10) -6

Unknown, but suspected large. Widely distributed throughout Alaska and abundant in some areas (Douglass 1984; Batzli and Henttonen 1990; MacDonald and Cook 2009).

Range Size in Alaska (-10 to 10) -10

Widely distributed from Point Barrow to southeast Alaska and from Unalaska east to Canada (MacDonald and Cook 2009). Subspecies occur on several islands including St. Lawrence Island and the Aleutian Islands in the Bering Sea, islands in Prince William Sound (e.g. Montague Island,

Knight Island), and the Alexander Archipelago in Southeast Alaska (Lance and Cook 1998; MacDonald and Cook 2009). Estimated range size is likely >400,000 sq. km.

Population Concentration in Alaska (-10 to 10) -10

Does not concentrate.

Reproductive Potential in Alaska

Age of First Reproduction (-5 to 5) -5

Can reproduce within their first year (Whitney 1977; Gunderrsen and Andreassen 1998).

Number of Young (-5 to 5) -3

Litter sizes between 4 and 9 have been reported (Bee and Hall 1956; Whitney 1977; Ims 1997; Gunderrsen and Andreassen 1998). Average litter size was 6.5 (SD=1.29) near Prince William Sound (Lance and Cook 1995), 6.9 (SD=1.32) in interior Alaska (Whitney 1977), and 7.1 in northern Alaska (Batzli and Henttonen 1990). Females can have several litters per year (Ims 1997; Lance 2002).

Ecological Specialization in Alaska

Dietary (-5 to 5) -5

Herbivore with a broad and flexible diet (Batzli and Jung 1980; Soininen et al. 2013). In Alaska, diet consists of graminoids, forbs, willows, and mosses (Batzli 1975; Batzli and Jung 1980; Batzli and Henttonen 1990; Batzli and Lesieutre 1995; Lance 2002a; Baltensperger et al. 2015), with a preference for herbaceous plants and mosses (Baltensperger et al. 2015). A study in northeastern Norway identified at least 26 plant species in the diet of root voles (Soininen et al. 2013) and several studies suggest that this species' diet responds to changes in plant availability (Batzli and Jung 1980; Bergman and Krebs 1993; Soininen et al. 2014). Interestingly, Sealy (1982) documented root voles on St. Lawrence Island preying on bird eggs and nestlings.

Habitat (-5 to 5) 1

Exhibits some degree of specialization, though preferences seem to change across its range (Batzli and Henttonen 1990). In northern Alaska, prefers low-lying, wet or moist tundra habitats with dense vegetative cover (Batzli and Jung 1980; Douglass 1984; Batzli and Henttonen 1990; Pitelka and Batzli 1993). Habitat preferences in the more southern part of its range may be more diverse (Batzli and Henttonen 1990) but perhaps more specialized (Whitney 1976), and additional studies are needed to clarify habitat requirements. In interior Alaska, found in willow sandbars (A. Baltensperger, pers. comm.) and in mid-succession, open birch forests (Whitney 1976; 1977), but rarely seen in spruce or mixedwood forests (Whitney 1976; 1977; A. Baltensperger, pers. comm.). On Montague Island, found in vegetated areas near beaches (Lance 2002a).

Biological Total: -38

Action - variables measure current state of knowledge or extent of conservation efforts directed toward a given taxon. Higher action scores denote greater information needs due of lack of knowledge or conservation action. Action scores range from -40 (lower needs) to 40 (greater needs). **Score**

Management Plans and Regulations in Alaska (-10 to 10) 10

Voles are listed as unclassified game in Alaska with no closed season or bag limits (ADFG 2018c).

Knowledge of Distribution and Habitat in Alaska (-10 to 10) 2

Well-documented across most of their range (ARCTOS 2016). Lance and Cook (1998) examined the spatial and genetic structure of populations and subspecies in Alaska. Habitat associations have been extensively studied in northern Alaska where preferences are consistent (Batzli and Jung 1980; Batzli and Henttonen 1990; Batzli and Lesieutre 1991; Batzli and Lesieutre 1995), but have been

poorly studied elsewhere in Alaska. Habitat use has been briefly documented on the Seward Peninsula (Douglass 1984) and in interior Alaska (Whitney 1976; 1977). Preferences in the more southern part of its range may be more diverse (Batzli and Henttonen 1990) or more specialized (Whitney 1976), but additional studies are needed.

Knowledge of Population Trends in Alaska (-10 to 10) 10

Not currently monitored.

Knowledge of Factors Limiting Populations in Alaska (-10 to 10) 2

Factors affecting the population dynamics of root voles have been studied in interior (Whitney 1976; Whitney 1977) and northern Alaska (Batzli and Lesieutre 1991; Batzli and Lesieutre 1995). Food availability and food quality influences the abundance of root voles in northern Alaska (Batzli and Lesieutre 1991; Batzli and Lesieutre 1995). The role of predation has not been explicitly quantified in Alaska, but may also be important (Whitney 1977; Batzli and Lesieutre 1995). In southern Norway, predation by birds was the main cause of mortality in the summer, and explained 61% of total variation in population growth rate (Ims and Andreassen 2000). In the winter, the presence of snow cover may affect survival by providing thermoregulatory benefits (Whitney 1977; Aars and Ims 2002). An experiment in southern Norway reported low survival in mild winters with little snow cover and heavy ice (Aars and Ims 2002). In interior Alaska, survival was higher in a year with deep snow; however, this relationship was not consistent across all years, suggesting that other factors may be more important (Whitney 1977). Interspecific competition does not seem to be an important factor influencing population dynamics (Galindo and Krebs 1984; Batzli and Henttonen 1990; Bergman and Krebs 1993; Batzli and Lesieutre 1995). Populations near Fairbanks may cycle on a 3-4 year period (Whitney 1976), but such dynamics have not been observed across Alaska (Batzli and Jung 1980; Lance 2002). Parasites, diseases, and heavy metal contamination have been studied, but their effects on individual health, mortality, and reproductive output are unknown (Lance 2002; Brumbaugh et al. 2010). The effects of climate change on distribution and suitable habitat are uncertain (Baltensperger and Huettmann 2015a; Hope et al. 2015; Marcot et al. 2015).

Action Total: 24

Supplemental Information - variables do not receive numerical scores. Instead, they are used to sort taxa to answer specific biological or management questions.

Harvest:	Not substantial
Seasonal Occurrence:	Year-round
Taxonomic Significance:	Monotypic species
% Global Range in Alaska:	<10%
% Global Population in Alaska:	<25%
Peripheral:	No

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