

Northern red-backed vole

Myodes rutilus

Class: Mammalia

Order: Rodentia

Conservation Status

NatureServe:

Agency:

G Rank: G5

USFWS:

IUCN: Least Concern

S Rank: S5

ADF&G: Species of Greatest Conservation Need

Final Rank		
Conservation category: VI. Blue		
VI = unknown status and low biological vulnerability and action need		
<u>Category</u>	<u>Range</u>	<u>Score</u>
Status:	-20 to 20	0
Biological:	-50 to 50	-38
Action:	-40 to 40	-8
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 (-10 to 10)

0

Unknown.

Distribution Trend (-10 to 10)

0

Trends over the last 50 years are unknown. Modeling studies estimate that the distribution of *M. rutilus* in Alaska has increased since the Last Glacial Maximum (~21,500 years ago; Hope et al. 2015), but studies disagree as to whether its distribution will continue to expand (Hope et al. 2015) or retract (Baltensperger and Huettmann 2015a; Marcot et al. 2015) by the end of this century.

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 (-10 to 10)

-6

Unknown, but suspected large. *M. rutilus* is common and periodically abundant in suitable habitat (MacDonald and Cook 2009; Krebs et al. 2014b).

Range Size (-10 to 10)

-10

Occurs from the Canadian border west to western Alaska and the Alaska Peninsula, and from southeast Alaska north to the North Slope (ACCS 2017a; ARCTOS 2016). Estimated range size is >400,000 sq. km, calculated in GIS.

Population Concentration (-10 to 10)

-10

Does not concentrate at specific locations. Communal nesting has been observed in some populations (West 1977).

Reproductive Potential

Age of First Reproduction (-5 to 5)

-5

Less than 2 years. Some individuals reach sexual maturity within their first year (Gilbert and Krebs 1991;

Stevenson et al. 2009).	
Number of Young (-5 to 5)	-3
Litter size is between 5-7. Females can give birth to up to 4 or 5 litters per year (Krebs and Wingate 1985; Boonstra and Krebs 2006).	
<i>Ecological Specialization</i>	
Dietary (-5 to 5)	1
Herbivorous. Feeds on forbs, fungi, moss, horsetails, seeds and berries (Grodziński 1971; West 1982; Boonstra and Krebs 2006; Baltensperger et al. 2015). Diet varies seasonally depending on availability of resources (Grodziński 1971; West 1982; Bangs 1984; Boonstra and Krebs 2006). There is some evidence of specialization as population dynamics are thought to be heavily influenced by berry abundance in the fall, which affects overwinter survival (Boonstra and Krebs 2006; Krebs et al. 2010; Schmidt et al. 2018a).	
Habitat (-5 to 5)	-5
Inhabits a variety of habitat types and moisture regimes including tundra, grasslands, shrubland, deciduous, and coniferous forests (West et al. 1980; Whitney 1976; Whitney and Feist 1984; Andersen 2005; Cook and MacDonald 2006; MacDonald and Cook 2009). Known to recolonize recently burned areas (West 1982).	
Biological Total:	-38
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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
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Management Plans and Regulations (-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 (-10 to 10)	-10
Often captured as part of small mammal surveys. Surveys have been conducted in Fairbanks (Grodziński 1971; Whitney 1976; West 1982), Denali National Park (Furtsch and Rexstad 1994; Schmidt et al. 2018a), western Alaska (Douglass 1984), southcentral Alaska (Bangs 1984; Stevenson et al. 2009), and southwest Alaska (Nolan and Pierce 1996; Andersen 2005). Surveys by Cook and MacDonald (2006) and Baltensperger and Huettmann (2015b) have informed our knowledge of habitat associations and revealed a widespread distribution across Alaska. Distribution models have been developed for this species (e.g. Baltensperger and Huettmann 2015a; Hope et al. 2015; Marcot et al. 2015).	
Knowledge of Population Trends (-10 to 10)	2
Surveys have been conducted sporadically in numerous localities throughout the state (e.g. West 1982; Savage 2003; Andersen 2005; McDonough and Rexstad 2005; Schmidt et al. 2018), but are inadequate for detecting statewide trends.	
Knowledge of Factors Limiting Populations (-10 to 10)	-10
Factors affecting population dynamics are relatively well-understood. Food availability, mediated by weather, is the main factor limiting survival and densities (Boonstra and Krebs 2006; Boonstra and Krebs 2012). More specifically, the presence of a good berry crop, which provides food in the autumn and winter, contributes to high overwinter survival rates (West 1982; Furtsch and Rexstad 1994; Schweiger and Boutin 1995; Boonstra and Krebs 2006; Krebs et al. 2010). Through its influence on population dynamics, food availability also determines population cycling (or the absence or irregularity thereof; Boonstra and Krebs 2006; Boonstra and Krebs 2012; Schmidt et al. 2018a). This relationship is not without its complexity and we encourage interested readers to consult the primary literature for additional information. In some populations, snow depth and snowshoe hare densities are also important components because of their influence on primary productivity (Boonstra and Krebs 2006; Schmidt et al. 2018a) and, in the case of the former, overwinter survival and reproduction (West 1982; Whitney and Feist 1984; Boonstra and Krebs 2006; Stevenson et al. 2009). Density-dependent factors including the suppression of female sexual maturation also regulate reproduction, though Gilbert et al. (1986) did not find evidence that reproductive suppression was responsible for population cycling. Predation, interspecific competition, fire, and deforestation appear to have little effect on population dynamics (Whitney 1977; West et al. 1980; West 1982; Galindo and Krebs 1985b; McDonough and Rexstad 2005; Boonstra and Krebs 2006;	

Lance et al. 2006).

Additional research is needed to determine the role of parasites (Murrell et al. 2003; Matsumoto et al. 2010; Cook et al. 2017) and the effects of climate change. Populations may be adversely affected by spruce beetle infestations (McDonough and Rexstad 2005; Lance et al. 2006). There is some uncertainty as to whether our warming climate will increase (Hope et al. 2015) or decrease (Baltensperger and Huettmann 2015a; Marcot et al. 2015) the distribution of *M. rutilus* in Alaska. Several studies have addressed the taxonomy and evolution of *M. rutilus* (Cook et al. 2001; Hope et al. 2013b and references therein; Kohli et al. 2015). Additional work is needed to clarify the taxonomy and ecology of subspecies, of which six have been described in Alaska (Cook et al. 2001; MacDonald and Cook 2009).

Action Total: -8

Supplemental Information - variables do not receive numerical scores. Instead, they that 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:	Unknown
Peripheral:	No

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