

Hoary marmot*Marmota caligata*

Class: Mammalia

Order: Rodentia

Review Status: Peer-reviewed**Version Date:** 17 December 2018**Conservation Status***NatureServe:**Agency:*

G Rank: G5

ADF&G:

IUCN: Least Concern

Audubon AK:

S Rank: S4

USFWS:

BLM:

Final Rank		
Conservation category: V. Orange		
unknown status and either high biological vulnerability or high action need		
<u>Category</u>	<u>Range</u>	<u>Score</u>
Status	-20 to 20	0
Biological	-50 to 50	-32
Action	-40 to 40	4
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
<i>Population Trend in Alaska (-10 to 10)</i>	0
Unknown.	
<i>Distribution Trend in Alaska (-10 to 10)</i>	0
Unknown.	
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
<i>Population Size in Alaska (-10 to 10)</i>	-6
Unknown, but suspected large. This species is common in suitable habitat (MacDonald and Cook 2009) and has a relatively large range in Alaska.	
<i>Range Size in Alaska (-10 to 10)</i>	-10
Occurs from southeast Alaska north to the Yukon River and from Canada west to Bethel and the eastern Alaska Peninsula (Gunderson et al. 2009; MacDonald and Cook 2009). Absent from nearly all islands in southeast Alaska (MacDonald and Cook 2009), but distribution on islands in southcentral Alaska is unclear (Lance 2002b; L. E. Olson, pers. comm.). Estimated range size is >400,000 sq. km.	

<i>Population Concentration in Alaska (-10 to 10)</i>	-10
Colonial, but population does not concentrate (Barash 1974; Braun et al. 2011).	
<i>Reproductive Potential in Alaska</i>	
<u>Age of First Reproduction (-5 to 5)</u>	-3
Reaches sexual maturity at 3 years old (Blumstein and Armitage 1999; Kyle et al. 2007; Braun et al. 2011).	
<u>Number of Young (-5 to 5)</u>	1
Litter size ranges from 2 to 5 (Braun et al. 2011). Recent evidence suggests that females are annual breeders (Kyle et al. 2007; Patil et al. 2015).	
<i>Ecological Specialization in Alaska</i>	
<u>Dietary (-5 to 5)</u>	-5
Herbivorous. On the Kenai Peninsula, Hansen (1975) identified more than 15 species of plants eaten by hoary marmots. Sedges and fescue grass are preferentially consumed (Hansen 1975; Holmes 1984). The importance of other plants such as alpine arnica, fleabane, fireweed, and legumes seems to vary depending on location and season (Hansen 1975; Holmes 1984).	
<u>Habitat (-5 to 5)</u>	1
Typically found at high elevations in alpine meadows on steep, rocky slopes, outcrops, and talus (Holmes 1984; Lance 2002b; MacDonald and Cook 2009; Braun et al. 2011). In southcentral Alaska, also found along rocky beaches (Lance 1991, qtd. in Lance 2002b; Cook and MacDonald 2005). The northern extent of its distribution is likely limited by the ecologically similar Alaska marmot (Gunderson et al. 2009).	
Biological Total:	-32

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

<i>Management Plans and Regulations in Alaska (-10 to 10)</i>	-10
Marmots are classified as furbearers and can be trapped with no closed season or bag limit (ADFG 2018d). However, the meat or hide must be salvaged for human use (ADFG 2018d).	
<i>Knowledge of Distribution and Habitat in Alaska (-10 to 10)</i>	2
The northern distribution of the hoary marmot was recently investigated and clarified by Gunderson et al. (2009), and extended the known northern limit of this species' range. The distribution of hoary marmots on islands is unclear. Surveys support the idea that hoary marmots are absent from several islands in southeast Alaska (Blejwas et al. 2014), but recent fieldwork suggests that they occur on many more islands in southcentral Alaska than was previously thought (L. E. Olson, pers. comm.). Additional specimens are needed from Glacier Bay and Montague Island to review subspecies designations. Habitat associations have been described (see Habitat section above). Citizen science data on marmot sightings are actively being collected to inform distribution (http://www.alaskamarmoteers.org/).	
<i>Knowledge of Population Trends in Alaska (-10 to 10)</i>	10
Not currently monitored.	
<i>Knowledge of Factors Limiting Populations in Alaska (-10 to 10)</i>	2
Little is known about the population dynamics of hoary marmots in Alaska. Overwinter mortality may be a particularly important component of annual survival, especially for juveniles (Patil et al.	

2013; Patil et al. 2015; Lee et al. 2016). Winter severity (Patil et al. 2013), group size (Lee et al. 2016), and body mass (Patil et al. 2013; Zervanos et al. 2014) may all play a role in determining overwinter survival. Winter severity may also affect fecundity, such that females maintain annual breeding at the expense of larger litter sizes (Patil et al. 2015). Many studies have investigated social competition and reproductive suppression in marmots (reviewed in Armitage 2014). In male hoary marmots, agonistic behaviors between males may promote dispersal and restrict access to mates (Barash 1974a; 1974b; Kyle et al. 2007). Reproductive suppression in females does not appear to be density-dependent (Patil et al. 2015), but it is unclear whether non-reproductive females are responding to limited resources or to social suppression (Wasser and Barash 1983; Allainé 2000; Kyle et al. 2007). Predation rates are unknown, but the hoary marmot may be an important prey species for wolves when ungulate populations are low (Braun et al. 2011). The availability of suitable burrows may affect seasonal movements (Barash 1974a) and mating systems (Wasser and Barash 1983).

As an alpine species, marmots are thought to be very sensitive to the effects of climate change (Johnston et al. 2012; Hope et al. 2015), and suitable habitat in Alaska is expected to decrease by the end of this century (Hope et al. 2015). Low dispersal ability, habitat specialization, and low rates of genetic and phenotypic variation in Alaskan populations may limit their ability to adapt to climate change (Lanier et al. 2015a). Current research in Alaska is investigating the effects of hibernation timing on population dynamics, and previous studies have considered the genetic diversity of hoary marmots in the context of their post-glacial history (Lanier et al. 2015; Knowles et al. 2016) and gene flow between closely related marmot species (Kerhoulas et al. 2015).

Action Total: 4

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:	25-74%
Peripheral:	No

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