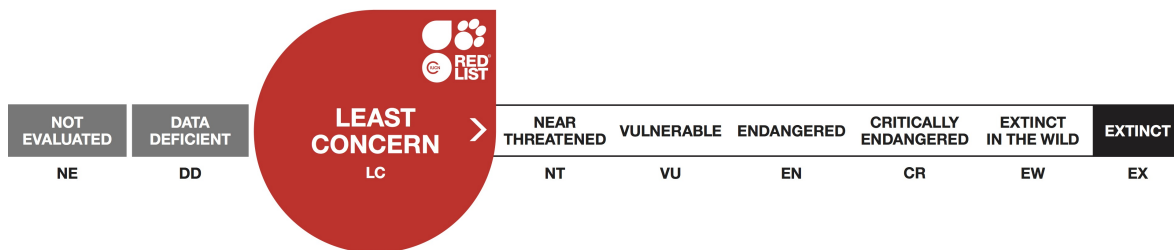


Gulo gulo, Wolverine

Assessment by: Abramov, A.V.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Carnivora	Mustelidae

Taxon Name: *Gulo gulo* (Linnaeus, 1758)

Synonym(s):

- *Gulo luscus* Linnaeus, 1758
- *Mustela gulo* Linnaeus, 1758

Regional Assessments:

- [Europe](#)

Common Name(s):

- English: Wolverine
- French: Glouton
- Spanish: Glotón

Taxonomic Notes:

Some authors (e.g. Hall 1981) have regarded the North American Wolverine as a species, *Gulo luscus*, distinct from the Eurasian Wolverine *G. gulo*. Most recent accounts (Jones *et al.* 1992, Pasitschniak-Arts and Larivière 1995, Wozencraft 2005) treat *luscus* as a subspecies of *G. gulo*, following Degerbol (1935) and Kurtén and Rausch (1959).

Assessment Information

Red List Category & Criteria: Least Concern [ver 3.1](#)

Year Published: 2016

Date Assessed: May 15, 2015

Justification:

The Wolverine is listed as Least Concern because of its wide distribution, remaining large populations, and the unlikelihood that it is in decline at a rate fast enough to trigger even Near Threatened. It occurs at low density and many populations appear to be relatively small and isolated (Ruggiero *et al.* 2007). There have been large past declines in some of its range but there is evidence of resurgence in some places of its historical distribution (Rowland *et al.* 2003). Thus although there is an overall continued decline due to human persecution and land-use change, the global decline of this species is not at a rate sufficient to qualify for categorisation even as Near Threatened as of 2015. However, in the mid-2000s the European Mammal Assessment determined that the European populations of Wolverine were in steep decline and would warrant a category of Vulnerable (A2c). Thus, the Least Concern global listing is driven by the large populations which remain in northern Asia and North America. Wolverine still faces some threats such as over-exploitation through hunting and trapping, predator-poisoning programmes and habitat resource extraction that caused the contraction of its historical range. More data on population trends, especially in northern Asia, might result in this species being re-assessed as Near

Threatened or even Vulnerable in the near future.

Previously Published Red List Assessments

2009 – Least Concern (LC) – <http://dx.doi.org/10.2305/IUCN.UK.2009-2.RLTS.T9561A13000870.en>

2008 – Near Threatened (NT)

1996 – Vulnerable (VU)

1994 – Vulnerable (V)

1990 – Vulnerable (V)

1988 – Vulnerable (V)

Geographic Range

Range Description:

Wolverine has a circumpolar distribution, corresponding with the Boreal zone of the northern hemisphere (Kvam *et al.* 1988). Its resident range reaches from Scandinavia across the Russian Federation (including Siberia), Mongolia, and northern China (provinces of Heilongjiang, Xinjiang, and Inner Mongolia) to Alaska (USA), Canada and the western lower states of the United States of America (Wyoming, Idaho, Montana, Washington, Oregon and California) (Whitman 1999). During the 19th century, Wolverine disappeared from its southernmost European range mainly through persecution, but also because of deforestation and other human developments. In Europe the species is now found, mainly north of 60°N, in Norway, Sweden, Finland, and the European part of Russia. It is a rare vagrant (from Russia) to Estonia (T. Maran *pers. comm.* 2015).

It has been recorded over the altitudinal range of at least 300-2,400 m a.s.l.

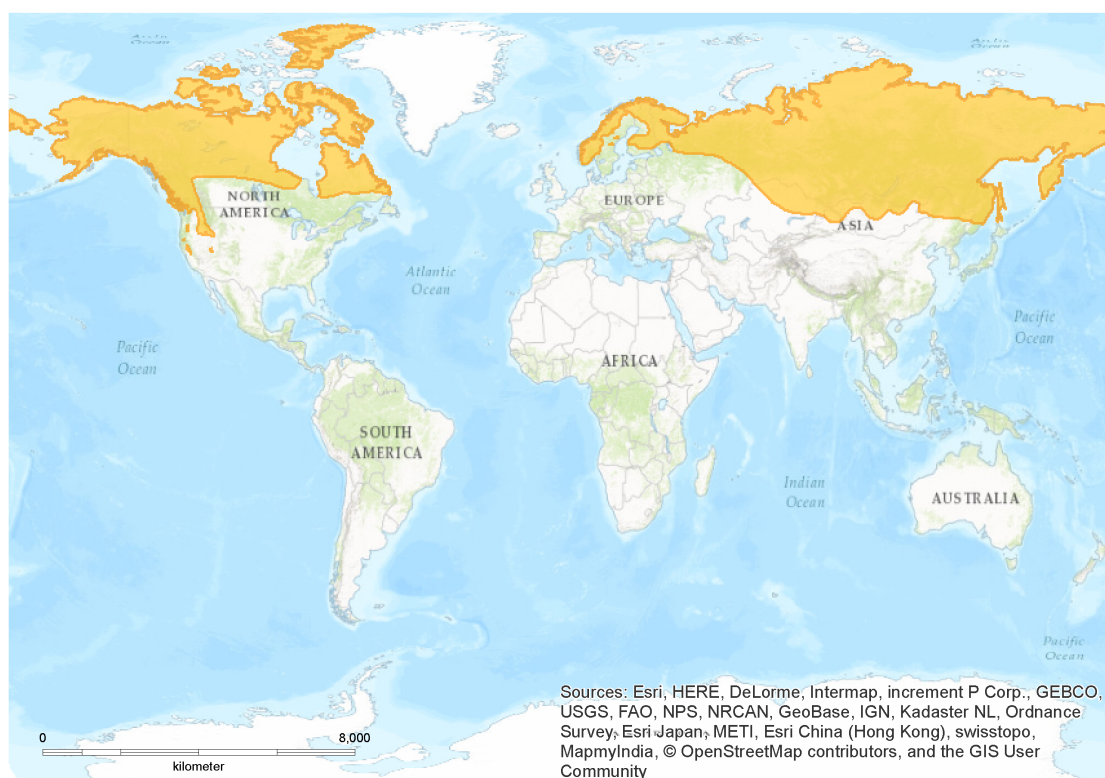
Country Occurrence:

Native: Canada; China; Finland; Mongolia; Norway; Russian Federation; Sweden; United States

Vagrant: Estonia

Distribution Map

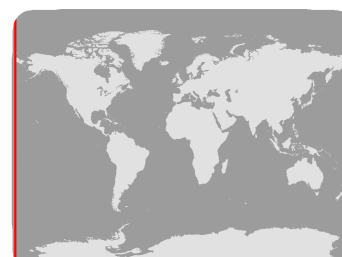
Gulo gulo



Range

■ Extant (resident)

Compiled by:
IUCN (International Union for
Conservation of Nature)



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.



Population

Wolverine distribution and abundance reduced notably in the 20th century in the United States of America (Pasitschniak-Arts and Larivière 1995), and during the 19th century, species disappeared from the south of its European distribution mainly through persecution, but also because of deforestation and other human developments. After this substantial range reduction, there is evidence of resurgence in some places of its historical distribution (Rowland *et al.* 2003). Throughout its range, Wolverine occurs at relatively low densities and requires large home ranges, typically of 100-600 km² (Whitman 1999). Densities are never high (Makridin 1964, Aubry *et al.* 2007), and it has been found to be less abundant than is Grey Wolf *Canis lupus*, even in optimal habitats (Pasitschniak-Arts and Larivière 1995). Densities range from one per 500 km² in Scandinavia to one per 65 km² in Montana, USA (Pasitschniak-Arts and Larivière 1995).

In North America, substantial populations occur in northern Canada and Alaska. In the USA outside Alaska, the population in Montana is considered to be the largest and most stable one, given its close proximity to healthy populations in Canada (Cegelski *et al.* 2003). Many wolverine populations appear to be relatively small and isolated (Ruggiero *et al.* 2007). In North America, population density estimates range from one animal per 65 km² in Montana (Hornocker and Hash 1981) to one per 200 km² in northern British Columbia (Quick 1953), Alaska (Becker and Gardner 1992), and the Northwest Territories (Lee and Niptanatiak 1993). Lofroth and Krebs (2007) estimated densities in British Columbia using existing Wolverine distribution, Wolverine food, ecosystem mapping and human development data. Estimates ranged from 6.2 Wolverines/1,000 km² in high-quality habitat to 0.3/1,000 km² in low-quality habitat. Their total population estimated for British Columbia was 3,530 Wolverines.

The European population was recently estimated at approximately 2,260 individuals: 1,400 in European Russia (Novikov 2005), 150 in Finland, 326 (±45) individuals in Sweden and 269 (±32) individuals in Norway (Sæther *et al.* 2005). The southern Norwegian population was naturally re-established during the late 1970s and was a result of protective legalisation (Landa and Skogland 1995). To the east, the eastern Russian Wolverine population is believed to comprise more than 18,000 individuals (Novikov 2005). The species is not abundant in Mongolia, but still relatively widespread: it is only found in northern taiga habitats in Hentii and Hövsgöl mountain ranges (Bannikov 1954, Dulamsteren 1970), northern parts of Hangai Mountain Range and Mongol Altai Mountain Range (Dulamtsere *et al.* 1989). The European distribution is connected to the eastern Russian population along the Urals. The overall European population forms a relatively continuous distribution with five geographically distinct subpopulations.

1. The Scandinavian population has shown a low genetic variability and subdivision among populations indicating that the Wolverine in Scandinavia has lost variation through a previous bottleneck and that the current populations are the result of a recent common genetic background (Walker *et al.* 2001, Flagstad *et al.* 2004). A recent population estimate is of 580 individuals (at or over one year of age) with approximately 200 in Norway and 380 in Sweden (Larsson 2005, van Dijk *et al.* 2005). The population has a continuous distribution and is narrowly connected to the Finnish – western Russian population along the border of the country of Finnmark in the northernmost parts of this population's distribution. An initial genetic analysis indicated a clear genetic distinction between these populations (Ø. Flagstad *pers. comm.* 2006). In its southern distribution, the Scandinavian population is a source for the southern Norwegian population (Walker *et al.* 2001; Flagstad *et al.* 2004, 2006) as well as a source for the Swedish

forest population(s) close to the Gulf of Bothnia in southern Sweden (Hedmark 2006).

2. The southern Norwegian population was naturally re-established during the late 1970s and was a result of protective legalisation (Landa and Skogland 1995). This population has recently increased in numbers and distribution, but is currently kept at around 100 individuals by various control measurements (Flagstad *et al.* 2006). Genetic surveys have shown that the southern Norwegian population is genetically distinct from the Scandinavian population, but the geographic gap between the southern and the main Scandinavian population to the north and east decreased from 100-200 km by the early 1990s to near-connectivity by 2006. Exchange of individuals is limited and the southern Norwegian population seems to form a sink (Landa *et al.* 2000a, 2000b, Flagstad *et al.* 2006).

3. Swedish forest Wolverine occurrences were naturally established during the mid 1990s (Hedmark 2006). These new occurrences, in two localities, were probably established by as few as 2 and 2-4 individuals respectively, and by the mid 2000s consisted of 2 and 10 individuals, respectively (Hedmark 2006). Non-invasive genetic surveys showed that these occurrences have little, if any, contact with the main Scandinavian wolverine population (Hedmark 2006).

4. The Finnish – western Russian population, in recent decades, increased in size and distribution in Finland, but decreased in Russia (Landa *et al.* 2000a, 2000b). The western Russian population is estimated to be approximately 1,400 individuals (Novikov 2005). To the west this population is narrowly connected to the Scandinavian population along common borders with Norway and Sweden. Initial genetic analysis indicated a clear genetic distinction between the Scandinavian population and the Wolverines in northern Finland (Ø. Flagstad *pers. comm.* 2006). It is unclear how the western part of this population (Finland, Kola, Karelia) connects along the narrow isthmus between the White Sea and Lake Onega in Western Russia. This area is judged as an extremely important connection for the northern element of the taiga fauna (Lindén *et al.* 2000) and these concerns should be further investigated. To the east, the European Russian population has a wide connection to the much larger eastern Russian population adjoining along the Urals in western Siberia. The eastern Russian population is believed to comprise more than 18,000 individuals (Novikov 2005).

5. The Finnish western population was established by translocating Wolverines from domestic Reindeer *Rangier tarandus* herding areas in the north during the 1980s-1990s. It is estimated to comprise about 10-15 individuals and seems to reproduce naturally (Kojola 2005). The gap between this and the Karelia distribution is about 200-300 km and little is known about exchange between these populations. This population should be judged as isolated from other populations pending further knowledge.

Current Population Trend: Decreasing

Habitat and Ecology (see Appendix for additional information)

The Wolverine inhabits a variety of habitats in the alpine, tundra, taiga, and boreal forest zones, including coniferous, mixed, and deciduous woodlands, bogs, and open mountain as well as tundra habitats (Mitchell-Jones *et al.* 1999). Snow is generally regarded as an important component of its seasonal habitat requirements (Banci 1987, Hatler 1989). Wolverine habitat selection is negatively affected by human activity, including roads, infrastructure, and back-country recreation (May *et al.* 2006; Krebs *et al.* 2007). It has vast home-ranges (Landa *et al.* 1998), varying from 100 to 500 km² for males and 100 to 200 km² for females, and good dispersal abilities. Faecal DNA sampling has detected

dispersal distances of more than 500 km (Flagstad 2005, Flagstad *et al.* 2006). Hornocker *et al.* (1983) considered this species to be solitary, with large home ranges and extensive seasonal movements. It is largely nocturnal with some daylight activity (Whitman 1999).

The Wolverine has an average life expectancy of 4 to 6 years in the wild, with a maximum of about 13 years (Pasitschniak-Arts and Lariviere 1995). It reaches sexual maturity at 2.5 years. It breeds in early spring to late autumn with litters of 1-5 young (mean litter size: 3) born between February and April (Whitman 1999).

The Wolverine is thought to have evolved to scavenge from the kills of wild ungulates abandoned by other carnivores such as lynx *Lynx* and Grey Wolf *Canis lupus*, as well prey animals felled by disease or injury. It also actively hunts smaller animals such as rodents, hares *Lepus*, musk-deer *Moschus*, roe *Capreolus* and wild sheep *Ovis*. Given the appropriate snow conditions it will also hunt larger animals such as moose *Alces*. Conflicts arise when Wolverines prey on livestock such as sheep or Reindeer. Given its dependence on other hunters for much of its scavenged food, the Wolverines is able to carry and cache large amounts of meat for later consumption.

Systems: Terrestrial

Use and Trade

For information on use and trade, see under Threats.

Threats (see Appendix for additional information)

Within its current range, extensive human activities continue to pressure Wolverine populations and habitat (Krebs *et al.* 2004). Overhunting (often by trapping), as well as predator-poisoning programs and resource extraction caused Wolverine populations to contract in the eastern and south-western portions of the species's historical range in North America since the early 1900s (Banci 1994).

The Wolverine is potentially locally threatened by its fragmented distribution and presumed low genetic diversity, as well as by 'population control' hunting and other consequences of perceived conflicts with people resulting from depredation of livestock. While this species inhabits a zone that is particularly affected by climate change (Rosenzweig *et al.* 2007), habitat change is not fast enough to be considered a major threat to it in the next three generations. Ample forest and tundra with suitable prey stocks are available throughout much of its range. A low rate of human land-use expansion into this range increases the frequency of interaction people, notably in conflict over livestock depredation. Given the remoteness of these locations, tolerance of Wolverines taking livestock is low and in some areas 'population control' hunting is used as a proactive means to avoid loss of animals. In Norway, where almost 10,000 sheep are believed to be killed by Wolverines each summer, government committees have instituted annual harvest quotas in an effort to control livestock losses; however, these quotas may not be sustainable as they are set very high even in relation to the most liberal estimate of Wolverine population size, and it is unclear whether this hunt actually reduces the numbers of sheep and semi-domestic deer lost to predators.

Wolverines are scarce in Europe today. Their continued survival is threatened because of their small and fragmented distribution, and the potential for their future survival may be weakened by the likelihood

of low genetic diversity. Habitat loss *per se* is not a substantial threat. Large areas of Norway, Sweden and Finland are still covered by forests and mountains that offer a suitable prey base and habitat for Wolverine. These are not wilderness areas, and the species comes into conflict with a low, but crucial, number of human land uses. There are no large areas within Wolverine distribution with no livestock conflict potential. This results in a difficult situation for wildlife managers who are forced to try and balance Wolverine conservation against the conflicts with livestock. In Norway, farmers no longer use traditional sheep-herding methods that once deterred depredation, so Wolverines are often controlled in an effort to protect livestock. Poaching also occurs. In Russia, over-harvesting and declines in key prey species are threats.

1 and 2. The Scandinavian and southern Norwegian populations are subject to illegal killings because of depredation conflicts (sheep, domestic reindeer). The scope of this is difficult to quantify. Furthermore Wolverines are sensitive to human disturbance (settlements, public and private roads, etc.) especially near their dens (May *et al.* 2006). Most people in Norway are settled in southern Norway.

3. In the Swedish forest population/occurrence, high genetic similarity among individuals in the two areas indicates inbreeding, possibly including brother-sister matings (Hedmark 2006). Inbreeding depression and demographic stochasticity are therefore likely to be threats (Pimm *et al.* 1988). These forest dwelling Wolverines live outside the distribution of 'domestic' Reindeer, which form the most common prey for Wolverines further north (Landa *et al.* 1997). Establishment in the forest landscape is judged to be a way of reducing Wolverine conflict with the domestic Reindeer industry (Hedmark 2006).

4. In the Finnish – Western Russian population, about half the Finnish population lives within the Reindeer management area in the north (Kojola 2005), in conflict with this industry (Landa *et al.* 2000a, 2000b) with associated illegal killings. The scope of this is unknown. The Russian economic depression during the 1990s is believed to have led to widespread poaching of ungulates, and to a reduction of the domestic reindeer herding industry through large calf/breeding losses. This is believed to have indirectly reduced the Wolverine's numbers and distribution in the European and most human-populated part of Russia (Landa *et al.* 1997, 2000a, 2000b; Novikov 2005). In Russia the Wolverine is harvested for fur, apparently without harvest restrictions. Russia has not yet ratified the Bern Convention.

5. The Finnish western population is small and presumably isolated: it is likely that it will face inbreeding problems (Hedmark 2006) as well as being exposed to demographic stochasticity (Pimm *et al.* 1988). Inbreeding depression and demographic accidents are therefore main threats, especially because these forest-dwelling Wolverines live outside the distribution of semi domesticated reindeer.

Conservation Actions (see Appendix for additional information)

The Wolverine is recorded from a number of protected areas. However, because of its high spatial requirement, very few reserves will contain the full home ranges of more than a small number of individuals (Schreiber *et al.* 1989).

European range states have different monitoring and management regimes varying from strict protection in Finland and Sweden, licensed harvest and control measurements in Norway to legal harvest year-round in Russia. In North America, Wolverine management issues include regulating trapper harvest, preventing human disturbance at denning sites, and mitigating for habitat loss and fragmentation (Krebs *et al.* 2004).

Key conservation measures that need to be implemented revolve around minimising conflicts resulting from depredation of livestock, reducing legal and illegal hunting of Wolverines, establishing well-planned conservation areas and carrying out surveys to gain a better understanding of the species's population and ecology.

Farmers and local communities should be educated in and encouraged to adopt husbandry practices that will minimise depredation of livestock thereby reducing conflicts. Economic incentives could encourage farmers to conserve Wolverines on their land instead of hunting them. A compensation and education programme has been implemented in Sweden with Reindeer herders, where the herders profit financially from identifying dens on their land and protecting them; similar programmes could be applied elsewhere in the species's range.

Governments and researchers require a more solid knowledge of Wolverine population dynamics, prey relationships, habitat-use and distribution, to ensure that legal, government-permitted hunting quotas are appropriate and small, localised, endangered populations are protected. Better enforcement of laws that prohibit Wolverine hunting is required in applicable parts of the species's range, with higher penalties to discourage poachers. Governments need also improve coordination between wildlife conservation and agriculture programmes to ensure that conservation areas are established in regions with little risk of conflict with farmers and herders.

The Wolverine has been petitioned twice for listing under the federal Endangered Species Act in the conterminous United States, but the most recent petition was denied citing lack of information on distribution, habitat requirements, and threats (United States Fish and Wildlife Service 2003). In North America, the eastern Wolverine population continues to be Endangered, and the western population remains Special Concern. The species is listed on Appendix II of the Bern Convention and Annex II* and Annex IV of the EU Habitats and Species Directive. European range states have different monitoring and management regimes varying from strict protection in Finland and Sweden, licensed harvest and control measurements in Norway to legal harvest year round in Russia.

1. The Scandinavian population is covered by both Swedish and Norwegian management regimes, which are quite different. However, both Norwegian and Swedish populations are monitored through annual counting of active natal dens (Landa *et al.* 1998) and non-invasive faecal DNA surveys (in southern areas). There is cooperation and data exchange between the two national programmes. The Swedish national interim goal is to reach a minimum of 90 annual Wolverine reproductions (requiring approximately 575 individuals over one year of age) (Riksdagen 2000). Sweden has international obligations through the Bern Convention for the conservation of the European wildlife and habitats, the regulation of trade through the European Council Regulation on the protection of species of wild fauna and flora, and the EU Habitats Directive. The Wolverine in Sweden is officially listed as 'endangered' and is not subject to hunting. However, recently a few family groups have been killed in the purpose of reducing conflict with the domestic Reindeer herding industry in northern areas. Norway was recently (2003) divided into six different management regions with politically appointed management boards (Miljøverndepartementet 2003). The Norwegian national goal is to control the total population within the limits of 39 yearly active reproductions (21 within the Norwegian part of the Scandinavian Wolverine population) (Miljøverndepartementet 2003). The total of 39 breedings equals approximately 250 individuals >1 yr of age. Control measurements, killing of family groups in early spring and licensed

harvest is used as a management tool to restrict Wolverine distribution and predation on unattended sheep during summer and domestic Reindeer all year around. Wolverines in Norway are covered by the Bern Convention (Bern 1979) and as of 2005 were officially listed as 'vulnerable'.

2. The southern Norwegian population is subject to the same measures and legislation as the Norwegian part of the main Scandinavian population.

3. The Swedish forest population/occurrence is totally protected; also see description for the Scandinavian population for further details.

4. The Finnish – western Russian population is subject to different management between Finland and Russia. In Finland the species is monitored through a national fauna monitoring programme based on tracks crossing fixed 4x4+4 km triangles. Wolverine has been fully protected in Finland since 1982. In Russia, Wolverine, a game/pelt species, is monitored via tracking surveys and numbers are estimated based on daily pats and a calculation coefficient (Novikov 1994, 2005).

5. The Finnish western population, which is small and introduced, seems to function without the presence of semi-domesticated Reindeer, Grey Wolf *Canis lupus*, or lynx *Lynx*. Across the country the species has been fully protected since 1982. A research project comparing nutritional ecology of Wolverines within the three national areas of the species's distribution has been initiated. A future aim is to develop non-invasive molecular genetic monitoring of Finland Wolverines, similar to that conducted in Scandinavia (Kojola 2005).

Credits

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External Resources

For [Images and External Links to Additional Information](#), please see the [Red List website](#).

Appendix

Habitats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Habitat	Season	Suitability	Major Importance?
1. Forest -> 1.1. Forest - Boreal	-	Suitable	Yes
1. Forest -> 1.2. Forest - Subarctic	-	Suitable	Yes
3. Shrubland -> 3.1. Shrubland - Subarctic	-	Suitable	Yes
3. Shrubland -> 3.3. Shrubland - Boreal	-	Suitable	Yes
4. Grassland -> 4.1. Grassland - Tundra	-	Suitable	Yes
4. Grassland -> 4.2. Grassland - Subarctic	-	Suitable	Yes
0. Root -> 6. Rocky areas (eg. inland cliffs, mountain peaks)	-	Suitable	Yes

Threats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	Unknown	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
1. Residential & commercial development -> 1.3. Tourism & recreation areas	Ongoing	Unknown	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.3. Livestock farming & ranching -> 2.3.2. Small-holder grazing, ranching or farming	Ongoing	Majority (50-90%)	Negligible declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
4. Transportation & service corridors -> 4.1. Roads & railroads	Ongoing	Unknown	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.2. Species disturbance		
5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.1. Intentional use (species is the target)	Ongoing	Unknown	Unknown	Unknown
	Stresses:	2. Species Stresses -> 2.1. Species mortality		

5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.2. Unintentional effects (species is not the target)	Ongoing	Unknown	Unknown	Unknown
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.3. Persecution/control	Ongoing	Majority (50-90%)	Negligible declines	Low impact: 5
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.3. Logging & wood harvesting -> 5.3.5. Motivation Unknown/Unrecorded	Ongoing	Minority (50%)	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		
6. Human intrusions & disturbance -> 6.1. Recreational activities	Ongoing	Unknown	Unknown	Unknown
	Stresses:	2. Species Stresses -> 2.2. Species disturbance		

Conservation Actions in Place

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Conservation Actions in Place
In-Place Land/Water Protection and Management
Occur in at least one PA: Yes

Additional Data Fields

Distribution
Lower elevation limit (m): 300
Upper elevation limit (m): 2400
Population
Continuing decline of mature individuals: Yes
Population severely fragmented: No
Habitats and Ecology
Generation Length (years): 7

The IUCN Red List Partnership



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