

Summary Conservation Action Plans for Mongolian Mammals

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The Mongolian Biodiversity Databank holds further details on all the species listed in this book. It is available to the public and can be accessed through:

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Because only a limited number of hard copies will be produced, electronic versions of this report will be available through the ZSL library (<http://library.zsl.org>) and www.regionalredlist.com

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INTRODUCTION TO THE SUMMARY CONSERVATION ACTION PLANS

The mammals of Mongolia were recently assessed using the ‘IUCN Red List Categories and Criteria’ (IUCN, 2001) in conjunction with the ‘Guidelines for Application of IUCN Red List Criteria at Regional Levels’ (IUCN, 2003). The assessments were carried out during the Mongolian Biodiversity Workshop from October 31st to November 4th 2005. This was the first time that regional guidelines had been applied to Mongolian mammals and the results of the assessment provided an overview of their conservation status. A full list of species occurring in Mongolia along with possible species is included in Annex I. During the assessment process, groups of participants formulated summary conservation action plans for a number of threatened species, outlining recommended conservation measures that could be implemented to help arrest declines. Following the workshop, these documents were expanded to include all threatened species, with the help of workshop participants and external reviewers.

The assessments revealed a number of trends affecting the mammals of Mongolia. Twenty-one Mongolian mammal species were identified as regionally threatened. Of these, the majority are represented by carnivores and ungulates (Artiodactyla and Perissodactyla), which are predominantly threatened by overexploitation. Other groups, particularly rodents and other small mammals such as bats, lack detailed research and are more often categorised as Data Deficient. This does not imply that members of these groups are facing a lower risk of extinction than those identified as threatened, but highlights areas in need of more extensive research. Each species assessed as threatened is the subject of a summary conservation action plan in this document. However, it should be noted that the quantity and quality of available data varies amongst species.

These summary conservation action plans are intended to highlight species of particular concern and to alert policy-makers, conservationists, and government and planning authorities of actions that will help to ensure that all mammals of Mongolia maintain viable populations into the future. Detailed action plans are already in place for some of the species in this document; the Summary Conservation Action Plans for Mongolian Mammals are not intended to replace these documents, but to accompany them, and further details are provided for action plans already available. Each summary conservation action plan presents information about the status of the species, the current known distribution, threats faced, conservation measures presently established, and recommended conservation measures.

The future of Mongolia’s mammalian biodiversity depends on the response of the Mongolian and global community to the plight of the species discussed in these summary conservation action plans.

FORMAT OF THE SUMMARY CONSERVATION ACTION PLANS

The Summary Conservation Action Plans for Mongolian Mammals are arranged according to the IUCN threat categories, with the most threatened listed first. Within each threat category, higher-level taxonomy follows Wilson and Reeder (1993). Each summary conservation action plan follows the format outlined below:

Species name and taxonomic authority

Common names (English and Mongolian)

Subspecies in Mongolia (if applicable)

Synonyms (if applicable)

Description

Brief information on the physical characteristics of the species.

Conservation overview

Global status (global risk of extinction)

IUCN global population assessment for each species given in the ‘2004 IUCN Red List of Threatened Species’ (IUCN, 2004). Alteration of an existing global assessment during the Mongolian Biodiversity Databank Workshop is denoted by a single black circle symbol (●). If this was the first assessment for the species using the ‘IUCN Red List Categories and Criteria’ (IUCN, 2001) and it is pending evaluation by IUCN Red List Authorities, this is denoted with two black circle symbols (●●).

Regional status (risk of extinction within Mongolia)

Regional assessments conducted for the first time for Mongolian mammals using the ‘IUCN Red List Categories and Criteria: Version 3.1’ (IUCN, 2001) and the ‘Guidelines for Application of IUCN Red List Criteria at Regional Levels: Version 3.0’ (IUCN, 2003). For further details please refer to Clark *et al.* (2006), or the Mongolian Biodiversity Databank. Conservation assessments are identical to global status if endemic to Mongolia.

Legal status

Existing protective legislature for Mongolian mammals, including both Mongolian laws (e.g. Hunting Laws and the Law on Fauna) and international laws (e.g. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): see UNEP-WCMC (2006)). Legislated hunting seasons and details of permits and quotas for foreign hunters have been included where appropriate. For each species, the percentage of the Mongolian range occurring within protected areas has been estimated using the UNEP-WCMC World Database on Protected Areas (<http://sea.unep-wcmc.org/wdpa/>). For further details please refer to Clark *et al.* (2006). Within protected areas, species are conserved under Mongolian Laws of Protected Areas.

Distribution

Global distribution

Listed from west to east and based largely on IUCN (2004); additional references given in relevant species accounts. Current distributions that include introductions into countries outside the native global range, or reintroductions following regional extinction, are indicated by [int] or [re-int] respectively.

Regional distribution

Accompanied by a distribution map for Mongolia. These maps were updated during the Mongolian Biodiversity Databank Workshop, based on IUCN Global Mammal Assessment maps (IUCN-GMA, in prep.), new information from the scientific literature, museum records, government and conservation organisation documents, and expert observations (see Clark *et al.* (2006) for further details on production of maps). Although these are as accurate and up-to-date as possible, it should be noted that many species are lacking in distribution data. As further research is conducted, changes to these maps are likely to occur. Distributions outside Mongolia were not updated.

Abundance

Historic population trends and recent population estimates within Mongolia.

Habitat and ecology

Habitat preferences within Mongolia and general comments on ecology.

Dominant threats

Brief outline of dominant threats and their causes, identified as being of immediate and primary concern by participants during the Mongolian Biodiversity Databank Workshop. Threat processes can be complex and reflect multiple factors; for more detailed information please refer to the Mongolian Biodiversity Databank.

Conservations measures in place

Specific conservation actions currently established.

Conservation measures required

Actions suggested by experts at the Mongolian Biodiversity Workshop, and specialists in subsequent reviews, which are expected to reduce the negative impact of threats and ensure the future persistence of the species.

All summary conservation action plans have been compiled and reviewed by participants of the workshop and other specialists.

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THE SUMMARY CONSERVATION ACTION PLANS

CRITICALLY ENDANGERED

Ursus arctos gobiensis

Sokolov and Orlov, 1992

Order: Carnivora

Family: Ursidae

Common names: Gobi bear (English), mazaalai baavgai (Mongolian)

Subspecies in Mongolia: Officially recognised as a distinct taxon during an expedition by the Science Committee of the Mongolian People's Republic in 1943 (Bannikov, 1954). Described as a distinct species *Ursus gobiensis*, by Sokolov and Orlov (1992), however, this designation was based on morphological assessment of a limited sample of specimens and has since been questioned (Schaller *et al.*, 1993; McCarthy, 1999). Re-identified as a subspecies, *U. a. pruinosus* Blyth, 1854, this was later shown to be a misidentification, as Mongolia is not included in the geographic range of this subspecies and chronological investigation of a limited number of skull samples showed it to be distinct. In 1980, Sokolov and Orlov re-identified this taxon as *U. a. isabellinus*. Recent analysis of genetic samples taken from across the geographic range of *U. a. isabellinus* (Horsfield, 1826) suggests that this subspecies represents a monophyletic lineage which includes the Gobi bear, therefore *U. a. gobiensis* may represent a junior synonym of this subspecies (Galbraith *et al.*, submitted). It is hoped that further DNA analysis will reveal the true status of this taxon, but in the absence of sympatric or parapatric occurrence of populations of *U. a. isabellinus* and *U. a. gobiensis*, the Gobi bear is currently retained as a valid subspecies on the basis of its apparently distinctive morphology (H. Reynolds, pers. comm.).



Photograph courtesy of H. Reynolds

Description

This small bear has a brown coat, often with light markings on the neck or chest. During winter, patches of the coat may be grey in colour. Head-rump measurements are 147-167 cm, with a weight of 52-100 kg (Bold, 1967; Bugaev and Tumur, 1982; Tulgat *et al.*, 1993; Mijiddorj, 2006). Males have a larger head and a wider muzzle than females, and unlike brown bears (*Ursus arctos*) the claws are blunt (Sokolov and Orlov, 1992).

Conservation overview

Global status: Critically Endangered, D●●, pending review by IUCN authorities and resolution of taxonomic status.

Regional status: Critically Endangered, D

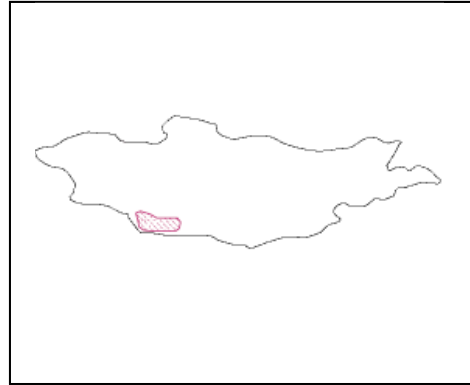
Legal status: Listed under CITES Appendix I (UNEP-WCMC, 2006) and protected as Very

Rare under part 7.1 of the Mongolian Law on Fauna (2000) (Badam and Ariunzul, 2005). Hunting has been prohibited since 1953, and it is currently protected as Very Rare under the 1995 Mongolian Hunting Law (MNE, 1996). Listed as Very Rare in the 'Mongolian Red Book' of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). Approximately 82% of the taxon's range occurs within Great Gobi Section A Strictly Protected Area. Much of this habitat is designated as Zone I, allowing limited research activities only (tourism, hunting, and other activities are prohibited) (McCarthy, 1999).

Distribution

Global distribution: If found to be a distinct subspecies, it is endemic to Mongolia.

Regional distribution: Formerly occurred as far east as Tost Ula Mountains in Trans Altai Gobi Desert (Bannikov, 1954), but currently restricted to southern parts of this region, including Atas Bogd, Shar Khuls and Tsagaan Bogd mountains, near to oases (McCarthy, 1999). Individuals may occasionally move into Gobi Gurvansaikhan National Park (Nemegt and surrounding areas) in Gobi Altai Mountain Range (not shown on the map) to raid livestock forage (R. Reading, pers. comm.).



Abundance

During the 1980s and 1990s the population size was estimated to consist of between 25 and 30 mature individuals (Zhirnov and Ilyinski, 1986; Schaller *et al.*, 1993). This figure remains relatively constant, with the most recent survey estimating the population size as 25-40 mature individuals (Batsaikhan *et al.*, 2004).

Habitat and ecology

Mountainous desert habitats (Shiirevdamba *et al.*, 1997). Wild rhubarb (*Rheum* spp.) and other cruciferous plants are a major food source. Plant species associated with oases such as *Phragmites communis*, *Triglochin maritimum*, *Juncus bufonius*, *Achnatherum splendens*, and *Carex enervis* are also utilised for food and bedding (Batsaikhan *et al.*, 2004).

Dominant threats

Negative stochastic effects associated with small populations (e.g. inbreeding and low reproductive rates) make the Gobi bear vulnerable to environmental change and biotic factors such as disease. Levels of population isolation and gene flow across its range are unknown, but may further reduce population viability (McCarthy, 1999). Roads passing close to oases within Great Gobi Section A Strictly Protected Area have been closed, although enforcement has proven difficult and human disturbance may still be a threat (McCarthy, 1999). Drying of water sources and droughts threaten this taxon, although it remains unclear if these represent natural environmental changes or are driven by anthropogenic activity. Monitoring by Great Gobi Section A Strictly Protected Area staff has shown that this area has been suffering a drought since 1992, with annual precipitation decreasing over this period from c. 100 mm per year to c. 50 mm per year (Mijiddorj, 2006; H. Reynolds, pers. comm., using information provided by B. Mijiddorj, Director of Great Gobi Strictly Protected Area and L. Amgalan, Mongolian Academy of Sciences).

Conservation measures in place

- Research was initiated by the Wildlife Conservation Society in 1989. This was followed by the establishment of the Conservation of the Great Gobi and its Umbrella Species Project by the United Nations Development Programme and the Global Environment Facility in 1993 (McCarthy, 1999). This project is a co-operative venture between several organisations including the Ministry of Nature and Environment, the Mongolian Academy of Sciences, and the Great Gobi Strictly Protected Area Administration.
- In 2004, the 'International Gobi Bear Conservation and Management Workshop' was presented by the Ministry of Nature and Environment, the Conservation of the Great Gobi and its Umbrella Species Project, the Wildlife Conservation Society, the International Association for Bear Research and Management, and IUCN Bear Specialist Group members, which resulted in the 'Gobi Bear Management Plan' (available from the Ministry of Nature and Environment). This addresses issues of population assessment and monitoring, genetics and demography, and human interactions and impacts on Gobi bears. This document should be referred to for further details. Participants also agreed to review and make recommendations for the revision of the 'Great Gobi Section A Strictly Protected Area Management Plan', to ensure appropriate management of Gobi bears and to maintain important areas of its range (Zahler, 2004).
- Following the recommendations of the action plan, radio-tracking began in 2005 as part of the Conservation of the Great Gobi and its Umbrella Species Project.

Conservation measures required

- Conduct further genetic research to determine taxonomic status.
- Implement the recommendations of the 'Gobi Bear Management Plan'.
- Revise the 'Great Gobi Section A Strictly Protected Area Management Plan'.
- Train staff in the use of Geographic Information Systems to monitor levels of population isolation across its range, movements, and habitat use.
- Evaluate population size, behaviour and ecology, and range size, using trip cameras and genetic analysis of hair samples. All research should be non-intrusive, with minimal human presence.
- Increase public awareness both internationally and within Mongolia.
- Petition the government for better protection of the Gobi bear.

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Equus ferus przewalskii

(Groves, 1986)

Order: Perissodactyla

Family: Equidae

Common names: Przewalski's horse, Asiatic wild horse or Mongolian wild horse (English), takhi or takhi aduu (Mongolian)

Synonyms: *Equus caballus przewalskii*, *Equus przewalskii*. Przewalski's horse

shares a common ancestor with the domestic horse (*Equus caballus* Boddaert, 1785), and can hybridise with domestic horses to produce fertile offspring (Ryder *et al.*, 1978; Trommerhausen-Smith *et al.*, 1979). However, genetic studies indicate that it is more distinct from its domestic relatives than are any two breeds of domestic horse (Ryder, 1994). Oakenfull *et al.* (2000) concluded that although Przewalski's horses have interbred with domestic horses in the past, and they are closely related, the fixed chromosomal number differences between them indicate that they should be interpreted as a distinct species.



Photograph courtesy of A. Enkhtur

Description

Przewalski's horse stands 115-146 cm at the shoulder and has a body weight of 275-325 kg (Danzig, 1992). It is compact and stocky, with a large head and a short thick neck. Its legs are thin and relatively short, and it has small hooves. Coloration varies from light sandy to dark brown with a white underside. The mane, tail, and lower parts of the legs are usually black; occasionally there are stripes on the legs (Groves, 1994). It has an erect mane with no forelock and many individuals have a dark dorsal stripe which runs down the centre of the back to the tail (Groves, 1994). The tail is similar to that of Asiatic wild ass (*Equus hemionus*), with short guard hairs growing from the dock (tail bone). Unlike domestic horses, both its tail and mane hair are shed every year.

Conservation overview

Global status: Critically Endangered, D●, pending evaluation by the IUCN Equid Specialist Group.

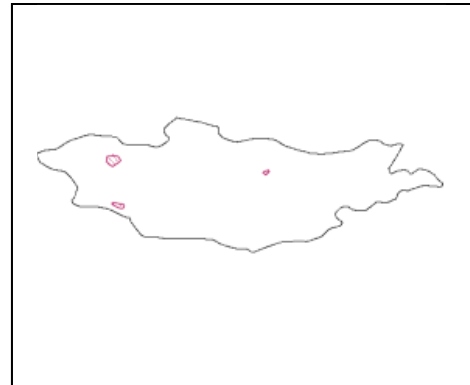
Regional status: Critically Endangered, D

Legal status: Listed under CITES Appendix I (UNEP-WCMC, 2006), and protected as Very Rare under part 7.1 of the Mongolian Law on Fauna (2000) (Badam and Ariunzul, 2005).

Hunting has been prohibited since 1930, and it is listed as Very Rare under the 1995 Mongolian Hunting Law (MNE, 1996). Listed as Very Rare in the 'Mongolian Red Book' of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). The taxon's entire range occurs within protected areas.

Distribution

Global distribution: This taxon formerly had a wide distribution across most of Eurasia, as indicated by cave paintings in France and Spain. Reintroduction programmes are currently taking place in several parts of its former range, and there are now reintroduced populations in Ukraine [re-int], Kazakhstan [re-int], China [re-int] and Mongolia [re-int]. Considered endemic to Mongolia, as this is the only country where truly wild populations exist within its historic range.



Regional distribution: The last sighting of native wild horses in Mongolia took place in 1969, north of Takhiin Shar Nuru in Dzungarian Gobi Desert (Paklina and Pozdnyakova, 1989). Reintroductions began in Takhiin Tal Nature Reserve (9,000 km²) in Dzungarian Gobi Desert and Hustai National Park (570 km²) in Mongol Daguur Steppe in 1994 (King and Gurnell, 2005). A third reintroduction site in Homiin Tal (2,500 km²) in Great Lakes Depression was established in 2004, as a buffer zone to Har Us Nuur National Park in Great Lakes Depression (C. Feh, pers. comm.).

Abundance

All Przewalski's horses alive today are descendents of just twelve individuals, which were the nucleus of a captive zoo breeding program. Between 1992 and 1999, 59 captive-born horses were transported to Takhiin Tal Nature Reserve reintroduction site in Great Gobi Section B Strictly Protected Area, where they were released after acclimatisation (Wakefield *et al.*, 2002). There are currently 85 free-ranging horses in seven groups within this population (P. Kaczensky, pers. comm.). Over the same time period, 84 horses were brought to Hustai National Park from reserves in Europe (King and Gurnell, 2005), and this population currently totals 168 individuals (information provided by Hustai National Park Administration). Twenty-two individuals consisting of four pre-established families and one male bachelor group were brought to the Homiin Tal buffer zone of Har Us Nuur National Park from a French semi-reserve between 2004 and 2005 (C. Feh, pers. comm.).

Habitat and ecology

Przewalski's horse formerly inhabited steppe and semi-desert habitats, however, most of this range has been degraded or is occupied by livestock, and therefore this species is currently restricted to semi-desert habitats with limited water resources (Van Dierendonck and de Vries, 1996). Lowland steppe vegetation was preferentially selected by individuals at Hustai National Park (King and Gurnell, 2005), and seasonal movements are influenced by the availability of the most nutritious vegetation.

Dominant threats

Hybridisation with domestic horses is the primary threat, accompanied by competition for resources with domestic horses and possibly other livestock. There is concern over

the potential loss of genetic diversity after being reduced to a very small population and maintained in captivity for several generations. Infectious diseases such as *Babesia equi*, *B. caballi* and strangles (infection by *Streptococcus equi*) are a major threat to these small reintroduced populations originating from zoos (Roberts *et al.*, 2005). Predation on foals by wolves accounts for a significant number of mortalities and constitutes a threat to the population growth and continued survival of this taxon (Shiirevdamba *et al.*, 1997; M. Stubbe, pers. comm.).

Conservation measures in place

- An International Studbook was produced in 1959, followed by establishment of the North American Breeders Group in the 1970s, which later developed into the Species Survival Plan for Przewalski's horses. The European Endangered Species Programme for this species was formed in 1986. Many countries now co-operate in these programmes to minimise inbreeding and to retain genetic diversity, and the worldwide captive population represents almost all of the surviving founder genes, although a degree of hybridisation with domestic horses has occurred (Ryder, 1993). Details of foals included in breeding programmes over the past century are provided in Garutt *et al.* (1966).
- Przewalski's horses were brought from Europe to Hustai National Park and Takhiin Tal Nature Reserve in 1992. The Hustai National Park Project was initiated by the Foundation Reserves Przewalski Horse organisation and the Mongolian Association for the Conservation of Nature and Environment. The first individuals were released from enclosures at Hustai National Park in 1994.
- The Takhiin Tal Nature Reserve Project was initiated through the Ministry of Nature and Environment and financed by an international sponsor group. At Takhiin Tal Nature Reserve, the government established a Research and Experiment Centre for Wild Horse Reintroductions in 1997, which is now run by the Great Gobi Section B Strictly Protected Area Administration in co-operation with the International Takhi Group. Activities in Takhiin Tal Nature Reserve include monthly wildlife transects, monitoring of Przewalski's horse and other species such as wolves (*Canis lupus*) and Asiatic wild ass (*Equus hemionus*) to understand interactions, vegetation mapping, and workshops to integrate Przewalski's horse reintroductions with park management and sustainable livelihoods (Kaczensky *et al.*, 2004).
- A third reintroduction project has taken place more recently in the Homiin Tal buffer zone of Har Us Nuur National Park.
- Horses are still being imported to the reintroduction facilities at Takhiin Tal Nature Reserve, but no future importations are planned for Hustai National Park or Homiin Tal (C. Feh, pers. comm.).
- The Mongolian Commission for Conservation of Endangered Species, the Mongolian Association for the Conservation of Nature and Environment, the Foundation Reserves Przewalski Horse, the International Takhi Group, the IUCN/SSC Equid Specialist Group, WWF, and the Association Pour le Cheval de Przewalski/TAKH, France were represented at a workshop held in 2000, where recommendations for conservation measures were formulated (Wakefield *et al.*, 2002).
- The 'Status and Action Plan for the Przewalski's horse (*Equus ferus przewalskii*)' was produced in 2002 (see Wakefield *et al.* (2002) for further details), and provides a detailed account of the history and ongoing conservation efforts surrounding this species.
- The New Zealand Nature Institute worked with the International Takhi Group in 2003 to evaluate problems of resource degradation and opportunities to improve local livelihoods through sustainable resource use (Ulambayar, 2004).

Conservation measures required

- Standardised techniques should be used to monitor health, fecundity, mortality, habitat utilisation, and social organisation of all populations (Wakefield *et al.*, 2002). Health monitoring of wild and domestic horses for disease is already in place in Takhiin Tal Nature Reserve (Roberts *et al.*, 2005).
- Contact between Przewalski's horses and domestic horses should be kept to a minimum to prevent hybridisation.
- Develop a single population management approach, starting with the compilation of a Mongolian studbook based on available data from existing captive breeding and reintroduction projects. This should be coupled with a reintroduction strategy formulated by the Ministry of Nature and Environment in association with conservation organisations and staff working in areas of reintroduction. A plan of action for when populations exceed the carrying capacity of current reserves and identification of other suitable areas for reintroduction should also be outlined (C. Feh, pers. comm.).
- Establish the genealogy of all Przewalski's horses in Mongolia using individual micro-satellite data to monitor inbreeding levels, identify hybrids, and plan for necessary movements of horses between reintroduction centres to maximise genetic diversity.
- Develop an authoritative government protocol of action for hybrids; this should be established before hybridisation occurs and be made available to reintroduction centres and local people (King and Gurnell, 2005).
- Encourage further communication between Chinese and Kazakh breeding and reintroduction centres. Discussions to date have been brought to print at the 'Second International Workshop on the Reintroduction of the Przewalski's Horse' held in June 2004 in Takhiin Tal Nature Reserve. Thirty-six people attended and eight countries were represented (see Kaczensky and Walzer (2004) for further details).
- Provide continued training and empowerment of involved staff and biologists; this is essential to the future of Przewalski's horse conservation projects in Mongolia.

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, C. Feh, B. Huffman, P. Kaczensky, S.R.B. King, D. Mallon, P. Moehlman, R. Reading, R. Samiya and M. Stubbe.

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Cervus elaphus Linnaeus, 1758

Order: Artiodactyla

Family: Cervidae

Common names: Red deer (English, Eurasian populations), wapiti (English, American populations), haliun buga (Mongolian)

Subspecies in Mongolia: Altai wapiti or Siberian red deer *C. e. sibiricus*. For the purposes of this report, all Mongolian red deer are assigned to this subspecies. Some authors assign these animals to several different subspecies including *C. e. alashanicus*, *C. e. songaricus*, *C. e. xanthopygus* and *C. e. wachei*, while others synonymise all Asian red deer with the North American red deer *C. e. canadensis* (see Geist, 1998).

Synonyms: Including *C. alashanicus*, *C. hagenbecki*, *C. maral* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of D. Osokhjargal

Description

This is the largest species of the genus *Cervus* (Groves and Grubb, 1987). Asian subspecies of male red deer stand between 140-165 cm at the shoulder, with a head-rump measurement of 213-247 cm, a tail length of 7-13 cm (Dulamtsuren *et al.*, 1989), and an average body weight of 250-300 kg (Whitehead, 1993). The coarse coat is brown in coloration, with a pale underside and a pale patch on the rump. Males have a long, dense mane and grow large antlers, which can reach a combined weight of 7 kg in males. Red deer from eastern Asia display reduced sexual dimorphism compared to European subspecies (Geist, 1998).

Conservation overview

Global status: Least Concern

Regional status: Critically Endangered, A2acd and A3d

Legal status: Protected as Rare under the 2001 revision (Mongolian Government Act No. 264) of the 2000 Mongolian Law on Fauna (Badam and Ariunzul, 2005). Listed as Rare under the 1995 Mongolian Hunting Law. As the population is declining, hunting licenses are not currently being issued (Wingard and Zahler, 2006). Approximately 11% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Holarctic: southern Canada, most of USA and northern Mexico, north-western Africa, western and eastern Europe, Asia Minor, southern Siberia, Caucasus, Central Asia, northern and western China, Himalayan region, Mongolia, Korea (Nowak, 1991).

Regional distribution: Hövsgöl, Hangai, Hentii, Ikh Hyangan, Mongol-Altai and Govi Altai mountain ranges (Dulamtsersen, 1989). Introduced into open hills in south-eastern parts of its range from forested areas during the 18th Century (Sokolov *et al.*, 1982; Dulamtsersen *et al.*, 1989).



Abundance

The Mongolian population size was assessed by the government in 1986, and was estimated to consist of around 130,000 individuals across 115,000 km² of its range (Dulamtsersen *et al.*, 1989). The most recent population assessment estimated the population to consist of between 8,000 and 10,000 individuals across 15 provinces in 2004 (Zahler *et al.*, 2004), reaching highest densities in Hustai National Park in Mongol Daguur Steppe (M. Stubbe, pers. comm.).

Habitat and ecology

Inhabits mountain forests and wooded habitats, occasionally moving into adjacent grassy plains (Dulamtsersen *et al.*, 1989). Shrubs and trees are critical for protection from predators such as wolves, and as an important source of food during the winter in the form of browse (Chen *et al.*, 1998). During the September-October rut, Mongolian populations of red deer congregate in large groups and are more often found in open lowland areas (Dulamtsersen *et al.*, 1989).

Dominant threats

This species is primarily targeted for its antler velvet, which is highly valued for traditional medicines, with a current market value of approximately \$60-100 USD per kg of antlers. Other antler products and body parts, including male genital organs (approx. \$70-80 USD each), foetuses (approx. \$20-50 USD each) and female tails (approx. \$50-80 USD each) are also valued for traditional medicines (Zahler *et al.*, 2004; Wingard and Zahler, 2006). The resulting illegal and unsustainable hunting has caused a 92% population decline over the past 18 years (Zahler *et al.*, 2004). Habitat loss and fragmentation, and human disturbance resulting from resource extraction (mining) and infrastructure development, constitute threats to some extent.

Conservation measures in place

- A project to reduce levels of illegal hunting is currently underway by the Society for Technical Co-operation (GTZ) in Hentii Mountain Range.
- In order to increase populations, successful translocations have taken place from Hustai National Park to Bogd Khan Strictly Protected Area in southern Hentii Mountain Range.
- Farms have been running since the 1960s to harvest antler velvet, in an attempt to reduce hunting pressure on wild populations (S. King, pers. comm.; M. Stubbe, pers. comm.).
- More than 120 people attended a workshop entitled ‘Mongolian Wildlife Trade’ held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Enhance enforcement of existing protective legislation.
- Establish additional protected areas and carry out additional reintroductions.
- Conduct further ecological research and monitor population trends.
- Implement recommendations from the ‘Mongolian Wildlife Trade’ workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, A. Bold, S. Dulamtseren, B. Huffman, S.R.B. King, R. Samiya, M. Stubbe and D. Tsendjav.

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ENDANGERED

Marmota sibirica

(Radde, 1862)

Order: Rodentia

Family: Sciuridae

Common names: Siberian marmot, Mongolian marmot, tarbagan marmot or Transbaikal marmot (English), Mongol tarvaga (Mongolian)

Subspecies in Mongolia: *M. s. sibiricus*, *M. s. caliginosus*

Synonyms: *M. caliginosus*, *M. dahurica* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of B. Lkhagvasuren

Description

Light brown in coloration with dark guard hairs on the head and the tip of the tail. Adults have an average head-rump measurement of 50-60 cm and typically weigh 6-8 kg, reaching a maximum of 9.8 kg (Adiya, 2000).

Conservation overview

Global status: Least Concern

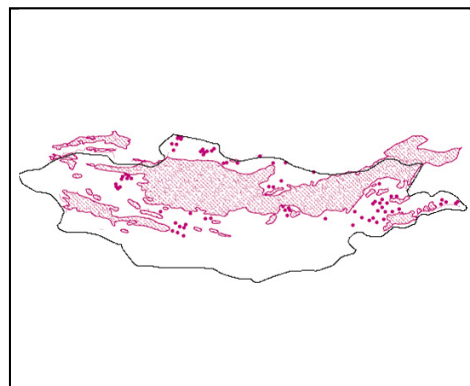
Regional status: Endangered, A2ad

Legal status: Hunting was completely banned during 2005 and 2006 by the Ministry of Nature and Environment. Prior to this ban, hunting was permitted between August 10th and October 15th, depending on population size (MNE, 2005). Local governments are required by law to conduct population surveys every four years, and have the authority to close areas for the protection of the species. In areas where industrial hunting takes place (when permitted), surveys must be completed on an annual basis and be funded by the hunting company (Wingard and Zahler, 2006). Approximately 6% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Russian Federation, China, Mongolia.

Regional distribution: *M. s. sibiricus* inhabits steppe and grassland habitats, from the extreme east to the Altai Mountains of the west (Wingard and Zahler, 2006). *M. s. caliginosus* inhabits higher mountains and ranges in northern, western, and central Mongolia, including Hangai, Hövsgöl, and Mongol Altai mountain ranges (Adiya, 2000).



Abundance

Over the past 60 years, this species has experienced an ongoing decline in population size. In 1940, as many as 40 million individuals were estimated to inhabit Mongolia (Eregdendagva, 1972). However, by 1990 the population was estimated to consist of 20 million individuals (Wingard and Zahler, 2006), with estimates further decreasing to just five million by the most recent assessment in 2001 (Batbold, 2002). Numbers are believed to have since declined even further (K. Olson, pers. comm.).

Habitat and ecology

Inhabits open steppe, alpine meadows, semi-desert, forest-steppe, mountain slopes, and river basin habitats. In Mongolia, typical elevations range from 600 to 3,000 metres (Demberel and Batbold, 1997). Marmots are considered to be a keystone species, as they are important to the overall structure and health of steppe and mountain habitats, upon which many other species depend (Zahler *et al.*, 2004). By creating burrows they bring buried soil to the surface, which recycles nutrients and aerates the soil. Their burrows also provide shelter for many other native species such as ground squirrels, pikas, hedgehogs, mustelids, foxes, and Pallas' cats (Adiya, 2000; Zahler *et al.*, 2004). Their feeding habits shape the diversity and composition of vegetation, and they are also an important food source for many carnivorous mammals and raptors, such as buzzards, snow leopards (*Uncia uncia*), and brown bears (*Ursus arctos*).

The reproductive season occurs during spring, with young born between April and June. This coincides with the preferred hunting period for this species, as the fur is at its most dense and is most valuable for trade. Removal of females during this time is greatly reducing survival prospects for this species (Wingard and Zahler, 2006). Approximately 25-30% of offspring do not survive their first year, leading to an estimated reproductive capacity of 60%. However, Mongolian scientists estimate that when the impact of hunting is accounted for, the actual reproductive capacity is more likely to be as low as 20% (Wingard and Zahler, 2006).

Dominant threats

Hunting for skins, meat and for use in traditional medicines, for local, national, and international trade. Marmot oil contains naturally high levels of corticosterone² and has several traditional uses in Mongolia, including as a leather conditioner, to treat burns, frostbite, anaemia and tuberculosis, and as a dietary supplement for animals and children (Adiya, 2000; Wingard and Zahler, 2006). At least 104.2 million marmot skins were prepared in Mongolia between 1906 and 1994 (Batbold, 1996), and it is estimated that more than 1.2 million skins per year have been traded since the late 1800s, with as many as three million individuals removed from the population in 2004 (Wingard and Zahler, 2006). Recent surveys estimate that actual trading numbers presently exceed hunting quotas by more than three times; in 2004 more than 117,000 illegally traded marmot skins were confiscated (Zahler *et al.*, 2004). Outbreaks of plague also constitutes a threat and human plague cases are known to have occurred as a result of marmot hunting, prompting extermination campaigns (Batbold, 2002). However, outbreaks are becoming less frequent as the population size declines.

Conservation measures in place

- This species is conserved under Mongolian Protected Area Laws and Hunting Laws, but no conservation measures specifically aimed at this species have been established to date.
- More than 120 people attended a workshop entitled 'Mongolian Wildlife Trade' held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Enhance enforcement of existing protective legislation.
- Conduct further ecological research and monitor population trends in order to develop a sustainable harvest management programme.
- Protect and maintain habitat through community based initiatives.
- Develop a public awareness programme to highlight the protective legislation in place for this species and its conservation status.
- Review and assess the effectiveness of reintroductions into areas of its former range.
- Implement recommendations from the 'Mongolian Wildlife Trade' workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: J.E.M. Baillie, J. Batbold, N. Batsaikhan, S. Dulamtseren, S.R.B. King, D. Mallon, K. Olson, R. Reading, R. Samiya, L. Simpson and M. Stubbe.

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Spermophilus alashanicus Büchner, 1888

Order: Rodentia

Family: Sciuridae

Common names: Alashan ground squirrel

(English), gozooroi zuram (Mongolian)

Subspecies in Mongolia: *S. a. dilutus*

Synonyms: *S. dilutus*, *S. obscurus*, *S. siccus* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of D. Yee

Description

Typically brown or grey in colour, with small pale spots on the back and a pale underside. The coloration of the coat becomes lighter in summer, with the head and shoulders turning a pale chestnut colour (Nowak, 1991). Internal cheek pouches are used for carrying food. Its legs and tail are short and it has a head-rump measurement of 22-23 cm (Sokolov and Orlov, 1980).

Conservation overview

Global status: Least Concern

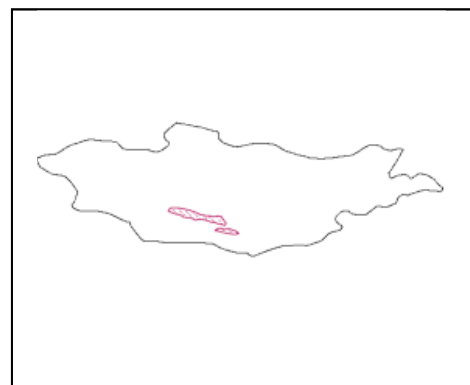
Regional status: Endangered, A3c

Legal status: Protected as Rare under the 2001 revision (Mongolian Government Act. No. 264) of the 2000 Mongolian Law on Fauna (Badam and Ariunzul, 2005). Listed as Rare under the 1995 Mongolian Hunting Law (MNE, 1996), and included as Rare in the 1997 'Mongolian Red Book' (Shiirevdamba *et al.*, 1997). Approximately 13% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: China, Mongolia.

Regional distribution: Occurs around Ikh, Baga Bogd, Gurvansaikhan and Öshög mountains in Govi Altai Mountain Range (Bannikov, 1954; Dawaa, 1972).



Abundance

Population data for this species are currently unavailable, although it is believed to be most abundant in areas around Gurvansaikhan Mountain.

Habitat and ecology

Steppe, mountain foothills and alpine meadow habitats, at elevations of up to 3,200 metres. Often associated with couch grasses, pea shrubs and false sedges, particularly *Amygdalus pedunculata* and *Allium polyrrhizum*. Not found in areas with dense vegetation (Nowak, 1991).

Dominant threats

Habitat degradation through grazing by increasing numbers of livestock (further evidence is required).

Conservation measures in place

- This species is conserved under Mongolian Protected Area Laws, Hunting Laws, and the Law on Fauna. However, no conservation measures specifically aimed at this species have been established to date.

Conservation measures required

- Conduct further ecological research to assess conservation requirements.
- Monitor and assess population trends and threats.

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, S.R.B. King, R. Samiya and M. Stubbe.

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Castor fiber

Linnaeus, 1758

Order: Rodentia

Family: Castoridae

Common names: Eurasian beaver (English),
Evrazi minj (Mongolian)

Subspecies in Mongolia: *C. f. birulai*. Recent molecular analyses on relict Eurasian beaver populations confirmed the taxonomic status of this subspecies to be genuine (Ducroz *et al.*, 2003; Durka *et al.*, 2005).

Synonyms: Including *C. birulai*, *C. bindai*, *C. flavus* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of R. Samiya

Description

This is the largest rodent species occurring within Mongolia, with a head-rump measurement of 75-120 cm, a tail length of 25-35 cm, and weight of up to 20 kg (Sokolov and Orlov, 1980). Adaptations for a semi-aquatic lifestyle include a large flat tail and a waterproof coat, consisting of dense underfur and a heavy outer layer of oiled guard hairs.

Conservation overview

Global status: Near Threatened. *C. f. birulai* has been infraspecifically assessed as Vulnerable, D1.

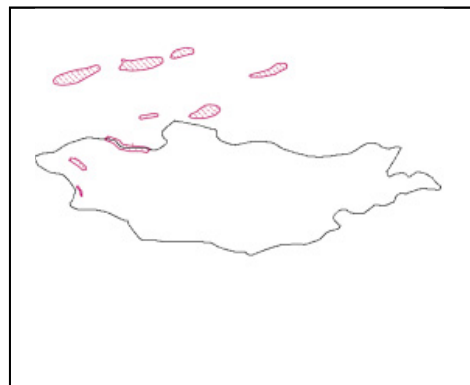
Regional status: Endangered, B1ab(iii)

Legal status: *C. f. birulai* is protected as Very Rare under part 7.1 of the Mongolian Law on Fauna (2000) (Badam and Ariunzul, 2005) and under the 1995 Mongolian Hunting Law (MNE, 1996). This species is included as Rare in the 'Mongolian Red Book' of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). Approximately 11% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: France, Netherlands, Germany, Liechtenstein, Switzerland [int], Norway, Austria [int], Czech Republic, Croatia, Sweden, Poland, Hungary, Slovakia, Finland, Latvia, Lithuania, Estonia, Ukraine, Belarus, Russian Federation, Republic of Moldova, China, Mongolia. *C. f. birulai* is found in China and Mongolia.

Regional distribution: A small population exists along Bulgan River in northern Dzungarian Gobi Desert, in the south-western corner of Mongolia. Mongolian-German biological expeditions carried out conservation introductions along Hovd River in Mongol Altai Mountain Range in 1974, 1975, and 1978, and along Tes River in northern Hangai Mountain Range in 1985, 1988, and 2002. In all cases Mongolian beavers from Bulgan River were used in order to protect the



gene pool in the central Asiatic hydro-geographic basin (Stubbe and Dawaa, 1982; Stubbe and Dawaa, 1986; Stubbe *et al.*, 1991; Stubbe *et al.*, 2005). A separate attempt to reintroduce beavers from Voronezh Reserve (Russian Federation) to Eröö River was unsuccessful (M. Stubbe, pers. comm.).

Abundance

In 1964, the population size was estimated to consist of 100-150 individuals (Stubbe and Chotolchu, 1968), rising to 200 individuals by 1973 (Zevegmid and Dawaa, 1973). In 1991, surveys estimated there to be approximately 300 individuals along Bulgan and Hovd rivers (Stubbe *et al.*, 1991). The most recent population assessment was conducted in 2004, which recorded 40 lodges along Hovd River and estimated the population to consist of 130-150 individuals (Shar, 2005). Ten beaver settlements were recorded in the Tuvan section of Tes River in 2005 (A. Saveljev, pers. comm.), and the Mongolian section of this river is believed to contain a population of a similar size (M. Stubbe, pers. comm.).

Habitat and ecology

Forest and wooded habitats, river basins, steppe, and riparian habitats associated with willow, aspen, poplar, birch, and alder trees. Freshwater sources are the primary determinant of distribution (Nowak, 1991).

Dominant threats

Illegal hunting for skins, meat, and castoreum (used in perfume production) still occurs in some areas such as along Tes River. Habitat loss through selective clear-cutting of willow, upon which this species relies for food and shelter is also a threat; this is known to be occurring along Bulgan River and is leading to isolation of small populations and inbreeding. Pollution of water systems is also a threat. A hydroelectric dam in the Chinese section of Bulgan River prevents migrations in this area, fragmenting the habitat (M. Stubbe, pers. comm.).

Conservation measures in place

- Bulgan Gol Nature Reserve was established along Bulgan River in 1965 to protect this species and its habitat.
- Many translocations and conservation introductions (into areas outside of its natural range) have taken place over the past 50 years to enhance the Mongolian population.
- More than 120 people attended a workshop entitled 'Mongolian Wildlife Trade' held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Habitat management and restoration, including reforestation of willow in riparian zones.
- Enhance enforcement of existing protective legislation.
- Conduct ecological research, monitor population trends, and assess threats impacting upon this species.
- Raise awareness and educate people on the conservation status of this species.
- Implement recommendations from the 'Mongolian Wildlife Trade' workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, S.R.B. King, D. Lkhagvasuren, D. Mallon, R. Reading, R. Samiya, S. Shar, L. Simpson and M. Stubbe.

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Allactaga elater (Lichtenstein, 1828)

Order: Rodentia
Family: Dipodidae

Common names: Small five-toed jerboa (English), davjaa alagdaaga (Mongolian)
Subspecies in Mongolia: *A. e. dzungariae*
Synonyms: Including *A. bactriana*, *A. dzungariae*, *A. strandi* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of G. Shenbrot

Description

The smallest species of its genus, the small five-toed jerboa has a body mass of 44-73 g (Ognev, 1962-1964). Coloration varies from sandy or buff coloured to dark russet or black, with pale underparts and a white stripe on the hip (Nowak, 1991). This species is well adapted for moving in large leaps if startled, and has been recorded moving at speeds of up to 48 km per hour (Roberts, 1977).

Conservation overview

Global status: Least Concern

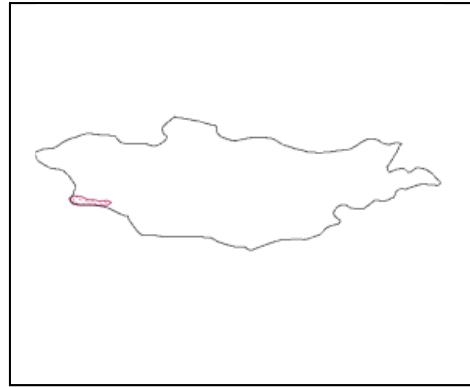
Regional status: Endangered, B1ab(iii)

Legal status: Approximately 54% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Turkey, Russian Federation, Georgia, Armenia, Islamic Republic of Iran, Azerbaijan, Afghanistan, Pakistan, Kazakhstan, Turkmenistan, Kyrgyzstan, Tajikistan, Uzbekistan, China, Mongolia (G. Shenbrot, pers. comm.).

Regional distribution: Recorded in the extreme south-west of the country, along Bodonch River in Dzungarian Gobi Desert (Stubbe and Chotolchu, 1968). Later recorded in Khonin Usnii Gobi in Dzungarian Gobi Desert (Sokolov *et al.*, 1998).



Abundance

Population data for this species are currently unavailable.

Habitat and ecology

Desert, semi-desert, and steppe habitats, preferentially with compacted soil and thick vegetation cover (Nowak, 1991). Creates burrows in hard soils, often in vehicle tracks or other depressions in the ground (Ognev, 1962-1964).

Dominant threats

Drying of water sources and droughts threaten this species, although it remains unclear if these represent natural environmental changes or are driven by anthropogenic activity.

Conservation measures in place

- As this species occurs within Great Gobi Section B Strictly Protected Area, it is conserved under Mongolian Protected Area Laws. However, no conservation measures specifically aimed at this species have been established to date.

Conservation measures required

- Conduct further ecological research and monitor population trends to establish conservation measures required.
- Investigate threats impacting upon this species.

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, S.R.B. King, R. Samiya and M. Stubbe.

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Stylodipus sungorus

Sokolov and Shenbrot, 1987

Order: Rodentia

Family: Dipodidae

Common names: Mongolian three-toed jerboa (English), Dzungarian daakhai (Mongolian)

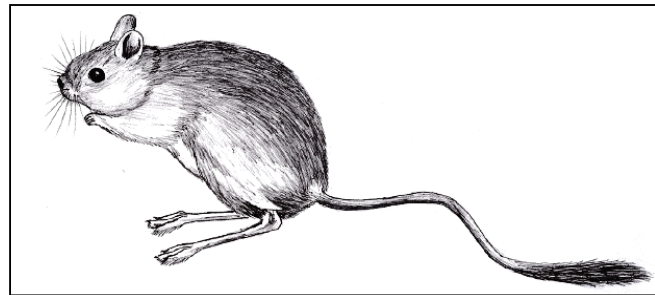


Illustration drawn by B. Gantulga

Description

This small jerboa is sandy or buff coloured, darkened with black-tipped or entirely black hairs. Hairs are buff-tipped with a white base on the sides of the body, and the underparts are white. It has a head-rump measurement of 100-130 mm, a tail length of 132-163 mm, short ears, and hairy feet (Nowak, 1991). Each hind foot has three digits, with the middle one being the longest (Nowak, 1991).

Conservation overview

Global status: Endangered, A3c●, all or most of its range is believed to occur within Mongolia.

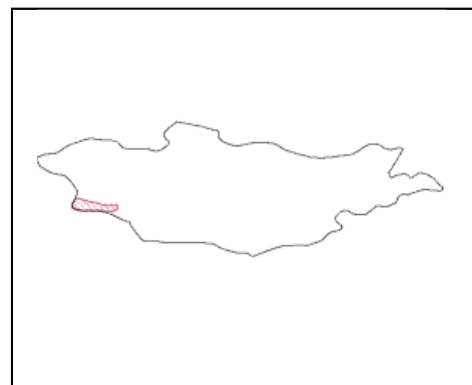
Regional status: Endangered, A3c

Legal status: Approximately 41% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Mongolia, possibly China.

Regional distribution: Dzungarian Gobi Desert (Sokolov and Shenbrot, 1987; Sokolov *et al.*, 1998).



Abundance

Population data for this species are currently unavailable.

Habitat and ecology

Constructs complex burrows in compacted soil in steppe and semi-desert habitats (Nowak, 1991).

Dominant threats

Drying of water sources and droughts threaten this species, although it remains unclear if these represent natural environmental changes or are driven by anthropogenic activity. Habitat degradation through grazing by increasing numbers of livestock (further evidence is required).

Conservation measures in place

- As this species occurs within Great Gobi Section B Strictly Protected Area, it is conserved under Mongolian Protected Area Laws. However, no conservation measures specifically aimed at this species have been established to date.

Conservation measures required

- Conduct further ecological research and monitor population trends to establish conservation measures required.
- Examine the impact of livestock grazing within its range.

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, S.R.B. King, R. Samiya and M. Stubbe.

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Meriones tamariscinus

(Pallas, 1773)

Order: Rodentia

Family: Gerbillidae

Common names: Tamarisk gerbil or tamarisk jird (English), sukhai chichuul (Mongolian)

Subspecies in Mongolia: *M. t. jaxartensis*

Synonyms: Including *M. kokandicus*, *M. satschouensis* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of A.Tchabovskiy

Description

Dorsal coloration varies from yellow through to sandy, grey, or dark brown, with a white or pale underside. The hairs on its back have black tips, giving the sides of the body a lighter appearance. The tail hairs become longer and more bushy towards the tip (Nowak, 1991). Head-rump measurements average 15-18 cm with a tail length of approximately 15 cm (Sokolov and Orlov, 1980).

Conservation overview

Global status: Least Concern

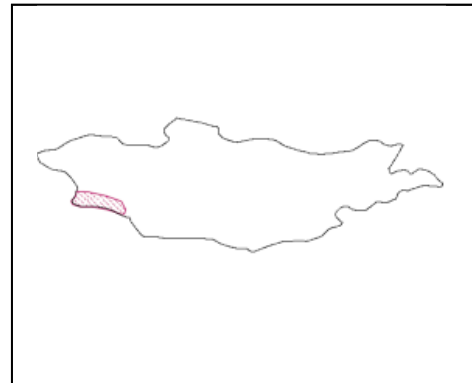
Regional status: Endangered, B1ab(iii)

Legal status: Listed as Rare in the 1997 'Mongolian Red Book' (Shiirevdamba *et al.*, 1997). Approximately 23% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Russian Federation, Kazakhstan, Turkmenistan, Uzbekistan, China, Kyrgyzstan, Mongolia.

Regional distribution: Recorded from the lower drainage of Bodonch and Bulgan rivers in Dzungarian Gobi Desert, and north-western Aj Bogd Mountain Range in Trans Altai Gobi Desert (Sokolov and Orlov, 1980).



Abundance

Population data for this species are currently unavailable.

Habitat and ecology

Semi-desert and open valley habitats with sparse vegetation, often near sandy hills and low dunes associated with oases and tamarisk plants (*Tamarix ramossima*) (Dulamtsere *et al.*, 1989).

Dominant threats

Habitat degradation, particularly through trampling and browsing of tamarisk plants (*Tamarix ramosissima*) by domestic camels. Low levels of human disturbance may constitute a threat. Drying of water sources and droughts also threaten this species, although it remains unclear if these represent natural environmental changes or are driven by anthropogenic activity.

Conservation measures in place

- As this species occurs within Great Gobi Section B Strictly Protected Area, it is conserved under Mongolian Protected Area Laws. However, no conservation measures specifically aimed at this species have been established to date.

Conservation measures required

- Conduct further ecological research and monitor population trends to establish conservation measures required.
- Assess the impact of domestic camels within its range.

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, S.R.B. King, R. Samiya and M. Stubbe.

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Uncia uncia
(Schreber, 1775)

Order: Carnivora
Family: Felidae

Common names: Snow leopard or ounce (English), tsoohor irves (Mongolian)
Synonyms: *U. irbis*, *U. schneideri*, *U. uncioides* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of E. Dragesco

Description

This species has a smoky-grey coat, with large dark brown spots and a white or pale underside. It has a large bushy tail which may be more than 100 cm in length. It has a head-rump measurement of 100-150 cm, stands at around 60 cm at the shoulder (McCarthy and Chapron, 2003), and weighs between 30 and 45 kg (Jackson, 1992). Adaptations to survive at high altitudes include an enlarged nasal cavity, shortened limbs, well developed chest muscles, and long hair with a dense woolly underfur (McCarthy and Chapron, 2003).

Conservation overview

Global status: Endangered, C2a(i)

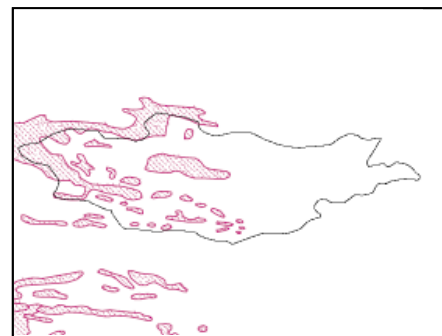
Regional status: Endangered, C1

Legal status: Listed under CITES Appendix I (UNEP-WCMC, 2006) and protected as Very Rare under part 7.1 of the Mongolian Law on Fauna (2000) (Badam and Ariunzul, 2005). Hunting has been prohibited since 1972, and it is currently protected as Very Rare under the 1995 Mongolian Hunting Law (MNE, 1996). Included as Rare in the ‘Mongolian Red Book’ of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). At least ten protected areas contain snow leopard populations (McCarthy 2000), which totals approximately 18% of the species’ range within Mongolia (McCarthy and Chapron, 2003).

Distribution

Global distribution: Russian Federation, Kazakhstan, Uzbekistan, Afghanistan, Pakistan, Tajikistan, China, India, Kyrgyzstan, Nepal, Mongolia, Bhutan.

Regional distribution: Rare in all parts of its range. McCarthy (2000) estimated the total Mongolian range size to be around 103,000 km², with most sightings occurring in central Trans Altai Gobi Desert and northern Gobi Altai Mountain Range. Remnant populations may still occur in Hövsgöl and Hangai mountain ranges, although the last recorded sightings there were during the 1960s (McCarthy and Chapron, 2003). Distribution is closely associated with that of its main prey species, Siberian ibex (*Capra sibirica*) and argali (*Ovis ammon*) (Munkhtsog, 2006).



Abundance

The global population of this species is estimated to consist of between 3,500 and 7,500 individuals (Wingard and Zahler, 2006) and Mongolia is considered to be one of the most

important areas for the survival of this species. Average density is estimated to be between 1 and 1.5 individuals per 100 km². Based on field surveys in Altai (Mongol Altai and Govi Altai mountain ranges) and South Gobi (Northern Govi, Alashan' Govi Desert, and Eastern Govi), Schaller *et al.* (1994) estimated the total population to consist of approximately 1,000 snow leopards. McCarthy (2000) produced a detailed range map and assessment of snow leopard status and distribution in Mongolia, based on 328 sign transects across its entire range; presence was reported or suspected in up to ten provinces. In 2000, the Mongolian population was estimated to consist of between 500 and 1,000 individuals (McCarthy and Chapron, 2003).

Habitat and ecology

Rocky or broken terrain, including cliffs, ridges, gullies, and rocky outcrops with shrub, grass or steppe vegetation (Jackson and Ahlborn, 1984; Chundawat, 1990; Fox *et al.*, 1991). Specifically to Mongolia, this species inhabits steep mountainous regions in alpine and sub-alpine zones at elevations of between 750 and 4,200 metres.

Dominant threats

Illegal hunting for skins and bones, which are used as a substitute for tiger bone in traditional medicines (Liao and Tan, 1988). Its meat is also considered to have medicinal properties. According to sources in Mongolia and China, snow leopard pelts are sold for as much as \$250 USD per metre (Wingard and Zahler, 2006). Increasingly threatened by loss of its prey base, as many large ungulates are now also threatened with extinction. It is also occasionally persecuted in some areas as a pest, as it has been known to prey on livestock.

Conservation measures in place

- Occurs within the following protected areas: Great Gobi Strictly Protected Area sections A and B (Trans Altai Govi Desert and Dzungarian Govi Desert), Hökh Serkh Strictly Protected Area, Turgen Uul Strictly Protected Area, Altai Tavan Bogd National Park, Alag Hairkhan Nature Reserve, Burkhan Buudai Nature Reserve and Tsagaan Shuvuut Strictly Protected Area (Mongol Altai Mountain Range), Otgontenger Strictly Protected Area (Hangai Mountain Range), Gobi Gurvansaikhan National Park (Govi Altai Mountain Range), and Eej Hairkhan Natural Monument (Trans Altai Govi Desert) (McCarthy and Chapron, 2003).
- The 'Mongolian Snow Leopard Conservation Plan' was developed in 1999 through collaboration between the Ministry of Nature and Environment, the Mongolian Academy of Sciences, the National Endangered Species Commission, the Nature Conservation Agency, WWF, the International Snow Leopard Trust, Irbis Mongolia, and other conservation organisations (McCarthy and Chapron, 2003).
- The 'National Snow Leopard Conservation Policy of Mongolia' was approved and endorsed by Mongolian government in 2005.
- Campaigns to raise awareness and funds have been established by the International Snow Leopard Trust.
- Anti-hunting units sponsored by WWF have been established (Wingard and Zahler, 2006).
- Further detailed information on snow leopard conservation is provided by Jackson and Hunter (1996), Nowell and Jackson (1996), McCarthy (2000), and McCarthy and Chapron (2003).
- More than 120 people attended a workshop entitled 'Mongolian Wildlife Trade' held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Investigate the level of illegal hunting occurring and enhance enforcement of existing protective legislation, including rigorous border checks to prevent illegal exports. Additional anti-hunting units should be established in Govi Altai Mountain Range, Ömnögovi Province (Alashan' Govi Desert, Eastern Govi, Govi Altai Mountain Range, eastern Trans Altai Govi Desert and southern parts of Northern Govi) and Bayan-ölgii in Mongol Altai Mountain Range. These actions should be supported by the Mongolian government and state law enforcement agencies.
- Assess population trends to determine if populations still exist in Hangai and Hövsgöl mountain ranges.
- Conduct further research on distribution and population trends of prey species.
- Develop a comprehensive mechanism to regulate livestock grazing in core snow leopard habitat. This should be accompanied by support for local people living near to snow leopard habitat, including damage management to compensate for livestock losses to snow leopard predation (M. Stubbe, pers. comm.).
- Implement recommendations from the 'Mongolian Wildlife Trade' workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, S.R.B. King, B. Munkhtsog, D. Mallon, R. Reading, R. Samiya and M. Stubbe.

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Equus hemionus

Pallas, 1775

Order: Perissodactyla

Family: Equidae

Common names: Asiatic wild ass (English), hulan or hulan aduu (Mongolian)

Subspecies in Mongolia: North Mongolian Asiatic wild ass *E. h.*

hemionus, Gobi Asiatic wild ass *E. h.*

luteus. These subspecies are currently interpreted as synonymous (Oakenfull *et al.*, 2000), a molecular study conducted jointly by the IUCN Equid Specialist Group and the Mongolian Academy of

Sciences is underway to clarify the taxonomy of this species in Mongolia (Feh *et al.*, 2002).

Synonyms: Including *E. bedfordi*, *E. castaneus*, *E. finschi*, *E. luteus* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of M. Stubbe

Description

Coloration varies from grey to fawn or pale chestnut, with a cream or white underside, and a dark brown stripe running from the dark mane to the upper portion of the short tufted tail. The mane is short and erect, with no forelock. This species has long legs, a large head, and elongated ears. It stands at around 120 cm at the shoulder, has a body length from nose to tail of 220-260 cm, and weighs between 200 and 300 kg (Burnie, 2001). However, there is considerable morphological variation between different subspecies (Feh *et al.*, 2002).

Conservation overview

Global status: *E. hemionus* is categorised as Vulnerable, A3bcd and C1. North Mongolian Asiatic wild ass (*E. h. hemionus*) and Gobi Asiatic wild ass (*E. h. luteus*) have both been infraspecifically assessed as Vulnerable, C1.

Regional status: Endangered, A4abd

Legal status: *E. hemionus* is listed under CITES Appendix II, and both subspecies in Mongolia are listed under Appendix I (UNEP-WCMC, 2006). Protected as Rare under the 2001 revision (Mongolian Government Act No. 264) of the 2000 Mongolian Law on Fauna (Badam and Ariunzul, 2005). Hunting has been prohibited since 1953 (Shiirevdamba *et al.*, 1997), and it is currently listed as Rare under the 1995 Mongolian Hunting Law (MNE, 1996). Included in Appendix II of the Convention on Migratory Species (CMS) in 2002, and listed as Rare in the 'Mongolian Red Book' of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). Approximately 29% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Once distributed throughout the Near East, including the Arabian Peninsula, Asia Minor and northwest India, but now extinct throughout most of its former range. Currently distributed in Israel [re-int], Saudi Arabia [re-int], Islamic Republic of Iran, Kazakhstan [re-int], Turkmenistan [including re-int populations], Uzbekistan [re-int], China (northern Xinjiang Province), India, Mongolia (Feh *et al.*, 2002).

Regional distribution: Formerly widely distributed throughout steppe and semi-desert habitats, from the extreme west of the country to the Mongolian-Russian-



Chinese border in the extreme north-east (Feh *et al.*, 2002). Asiatic wild ass have experienced a major decline in population and range size (Bannikov, 1981) and are currently only found in Trans Altai Gobi Desert, Northern Gobi, Alashan' Gobi Desert and Dzungarian Gobi Desert (Reading *et al.*, 2001), as far north as Ikh Nartiin Chuluu Nature Reserve in Eastern Gobi (Reading *et al.*, 2006). Recent evidence suggests that the population has either expanded or shifted further north and east over the past 20-25 years, but rarely crosses the Ulaanbaatar-Beijing railway line (Kaczensky *et al.*, in prep.). There are important populations in Great Gobi Section B Strictly Protected Area in Dzungarian Gobi Desert, and Great Gobi Section A Strictly Protected Area in Trans Altai Gobi Desert (Feh *et al.*, 2002; Stubbe *et al.*, 2005; Kaczensky *et al.*, in prep.).

Abundance

Southern Mongolia currently holds the largest population of Asiatic wild ass in the world, representing more than 80% of the global population (Feh *et al.*, 2002). However, census data is unavailable for China, and it is possible that more than 20,000 individuals occur close to the Mongolia-China border. In 2003, the Mongolian population was estimated to consist of approximately 19,000-20,000 individuals (B. Lkhagvasuren, pers. comm.). However, population estimates based on ground surveys have limited precision due to the species' wide range, seasonal movements, clumped distribution, and due to non-standardized survey methods (AWAC, 2005).

Habitat and ecology

Mountain steppe, steppe, semi-desert, and desert habitats, generally in rocky or sandy areas associated with *Artemisia* grasses, *Anabasis* spp., Russian thistle (*Salsola* spp.), saxaul (*Haloxylon ammodendron*), and pea shrubs (*Caragana* spp.) (Harris and Miller, 1995; Feh *et al.*, 2001). Herds can number up to 1,200 individuals. Water sources are an important determinant of distribution; during summer months the species occurs within 10-15 km of standing water, and this range increases five-fold in winter, when they are not restricted by water availability. In Mongolia, this species has been observed digging holes as deep as 60 cm in dry riverbeds to access water, and eating snow during winter as a substitute (Feh *et al.*, 2002; Stubbe *et al.*, 2005).

Dominant threats

Illegal hunting for meat and skins for commercial use in some areas (Duncan, 1992; Stubbe *et al.*, 2005). The off-take rate via illegal hunting may be as many as 3,000 individuals per year (Wingard and Zahler, 2006). Habitat degradation/loss as a result of new human settlements

(which restrict access to oases), resource extraction (mining), and possibly increasing numbers of livestock grazing (further evidence is required). Habitat fragmentation and restriction of wide-scale movements due to fencing is a significant problem along the Ulaanbaatar-Beijing railway and the China-Mongolia border (Kaczensky *et al.*, in prep), and is also caused by developing roads and railway lines associated with increasing resource extraction.

Conservation measures in place

- In 1999, the Mongolian Government created two protected areas specifically for the conservation of this species, Little Gobi B Strictly Protected Area (Dzungarian Gobi Desert) and Zagiin Us Nature Reserve (Northern Gobi) (Feh *et al.*, 2002).
- Research projects have been conducted to investigate the status, distribution, ecology, and social structure of Asiatic wild ass in Mongolia (Feh *et al.*, 2001; Reading *et al.*, 2001).
- Activities in Great Gobi Section B Strictly Protected Area include monthly wildlife transects, monitoring of Asiatic wild ass and other species such as wolves (*Canis lupus*) and Przewalski's horse (*Equus przewalskii*) to understand interactions, vegetation mapping, and workshops to integrate park management with sustainable livelihoods (Kaczensky *et al.*, 2004).
- Several conservation organisations were brought together at the 'First Asiatic Wild Ass Conference' held in Mongolia in 2005 (AWAC, 2005), where a range of conservation management issues were addressed. The results of this conference will be published in the forthcoming report entitled 'Exploration into the Biological Resources of Mongolia'.
- An in-depth study of the ecological impact of the Ulaanbaatar-Beijing railway has been conducted, including trials using Mongolian gazelles (*Procapra gutturosa*) to investigate the possibility of them crossing bridges or tunnels. This research may also benefit Asiatic wild ass migration.
- More than 120 people attended a workshop entitled 'Mongolian Wildlife Trade' held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Enhance enforcement of existing protective legislation, including strict control at border posts between Mongolia and China to prevent the illegal export of carcasses. This should be combined with control of meat markets, to prevent illegal trade in carcasses within Mongolia.
- Map critical habitat and movement corridors, and consider these areas and migration routes when planning transportation routes and fences, including implementation of mitigation measures along fenced transportation routes (e.g. Ulaanbaatar-Beijing railway) (P. Kaczensky, pers. comm.).
- Raise public awareness and establish education programmes to highlight the international importance and socio-economic benefits of Mongolian populations (e.g. herders benefit from Asiatic wild ass digging waterholes in dry riverbeds) (C. Feh, pers. comm.).
- Establish livelihood aid for local people (e.g. alternative income strategies). Conflicts over land use also need to be addressed.
- Conduct further research on population numbers, habitat use, and migrations, including further research to clarify the sub-specific taxonomy of Mongolian populations of Asiatic wild ass (Feh *et al.*, 2002) and rigorous annual population monitoring, preferably using aerial surveys.

- Encourage stronger co-operation between Mongolia and China to facilitate conservation efforts (e.g. formation of trans-border protected areas).
- Assess the effectiveness of reintroduction programmes for this species.
- Implement recommendations from the ‘Mongolian Wildlife Trade’ workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, C. Feh, P. Kaczensky, S.R.B. King, P. Moehlman, D. Mallon, R. Reading, R. Samiya, L. Simpson, A. Stubbe, M. Stubbe and C. Walzer.

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Camelus bactrianus ferus

Przewalski, 1878

Order: Artiodactyla

Family: Camelidae

Common names: Bactrian camel or wild camel (English), havtgai or havtgai temee (Mongolian)

Synonyms: *C. ferus* (see Wilson and Reeder (1993) for further details).

Preliminary genetic research indicates that wild Bactrian camels may represent a distinct species from domestic Bactrian camels (Han *et al.*, 2002), although further taxonomic research is required.



Photograph courtesy of D. Enkhbileg

Description

There are many morphological differences between domestic camels and its wild ancestor. The wild camel is taller and leaner, with a greater brain capacity and a distinctive skull shape. The pelage is more uniform, with beige or sandy-brown coloration, the paired humps along the back are smaller and more cone-shaped, and the front legs lack callosities. The head-rump measurement is approximately 225-245 cm, with a weight of 450-690 kg (Danzig, 1992). Wild Bactrian camels are one of the hardiest of all mammals, able to withstand extreme environments of -40 °C to +40 °C (Vevers and Pinner, 1948).

Conservation overview

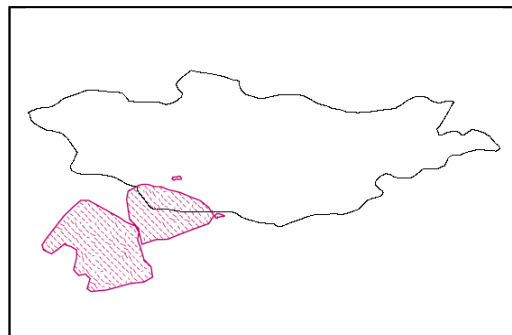
Global status: Critically Endangered, A3de and A4ade

Regional status: Endangered, C1

Legal status: Protected as Very Rare under part 7.1 of the Mongolian Law on Fauna (2000) (Badam and Ariunzul, 2005). Hunting has been prohibited since 1930, and it is protected as Very Rare under the 1995 Mongolian Hunting Law (MNE, 1996). Listed as Very Rare in the 'Mongolian Red Book' of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997) and recognised by the Convention on Migratory Species (CMS). Its entire range in Mongolia occurs within protected areas.

Distribution

Global distribution: Restricted to four subpopulations in China and Mongolia: Gashun Govi (Gansu, China); Taklamakan Desert (Xinjiang, China) - this population has declined and may now be extinct; northern slopes of Arjin Shan mountains and adjacent areas in Lop Nur Wild Camel National Reserve (China); Great Gobi Section A Strictly Protected Area (Mongolia) and adjacent areas in China (Reading *et al.*, 1999; Mix *et al.*, 2002; Wang *et al.*, 2002).



Regional distribution: Trans Altai Gobi Desert (Mix *et al.*, 2002), from the foothills of the Edren Range to Shiveet Ulaan, and from Hühk Tömörtei Range to the state border (Mix *et al.*, 2002; Adiya *et al.*, 2004; Adiya and Dovchindorj, 2005).

Abundance

An aerial survey in 1997 sighted over 300 individuals, leading to a total population estimate of 909-4,335 individuals (Reading *et al.*, 1999, Mix *et al.*, 2002). However, the most recent assessment (conducted using a ground survey over a portion of the total range) estimated the population to consist of 463 ±92 mature individuals (Adiya and Dovchindorj, 2005). Further surveys are recommended to confirm population size.

Habitat and ecology

Found near oases in semi-desert and desert habitats, particularly around salt marshes, foothills, and southern mountain slopes. Wild Bactrian camels feed on *Calligonum* spp., *Populus diversifolia*, and saxaul (*Haloxylon ammodendron*) (Wang *et al.*, 2002). Halophytes are also believed to be an important component of the diet, and weight loss may be incurred in their absence (J. Hare, pers. comm.). Although there are few data available on home ranges of wild Bactrian camels, it is thought that they move over great distances in search of forage and water (Adiya *et al.*, 2004; Reading *et al.*, 2005). Observations between 2003 and 2005 indicate that the level of reproduction has remained stable (Adiya and Dovchindorj, 2005).

Dominant threats

Hybridisation with domestic camels is the primary threat. The extent to which this occurs remains unclear, but it is known that many herders breed their domestic camels with wild camels (R. Reading, pers. comm.). Movements of domestic camels into Great Gobi Section A Strictly Protected Area have been observed on many occasions, posing potential threats for disease transmission and hybridisation (Walzer and Kaczensky, 2005). Habitat loss and human disturbance through increasing resource extraction (gold mining) also constitute threats, especially since this is often conducted illegally within protected areas (J. Hare, pers. comm.). In addition, potassium cyanide used for processing ore in gold mining pollutes water sources (Hare, 2006). A fence along the Mongolia-China border currently prevents camels from migrating into areas of suitable habitat, thus preventing gene flow with Chinese populations. Oases are believed to be drying up, either through natural environmental change or anthropogenic activity, although it remains uncertain whether current levels of oasis decline exceed natural patterns of flux in ephemeral water bodies in the region (R. Reading, pers. comm.). Predation on young camels by wolves is also believed to threaten the small remaining populations (M. Stubbe, pers. comm.).

Conservation measures in place

- During the 1990s, the Mongolian Academy of Sciences, the Great Gobi Strictly Protected Area Administration, and co-operating researchers from Germany, the United Kingdom, and the United States of America established a satellite telemetry project to gather data on wild Bactrian camel home ranges, movement patterns, habitat use, and sources of mortality. A pro-active conservation programme has been proposed to use this data to establish effective conservation measures (Reading *et al.*, 2004).
- The Wild Camel Protection Foundation was established in 1997, and a captive-breeding program was established in Zakhyn Us near Great Gobi Section A Strictly Protected Area in 2003. There are currently 13 wild Bactrian camels in captivity and there were three live births during 2005 (J. Hare, pers. comm.).

- In 2002, the United Nations Development Programme and the Global Environment Facility initiated the Conservation of the Great Gobi and its Umbrella Species Project, which focuses much of its efforts on wild Bactrian camel conservation. This project is a co-operative venture between the Ministry of Nature and Environment, the Mongolian Academy of Sciences, the Great Gobi Strictly Protected Area Administration, and other conservation organizations.
- In February 2005, the Wild Camel Protection Foundation organised a ranger training programme for Mongolian and Chinese rangers. The programme took place in Kenya and was supported by the Zoological Society of London (J. Hare, pers. comm.).
- The first official meeting between Chinese Provincial Government officials and Mongolian Government officials took place in October 2005, organised by the Wild Camel Protection Foundation. The aims of this meeting were to discuss enhanced co-operation and communication to aid conservation of this species (J. Hare, pers. comm.).
- In 2006, a multi-institutional genetic research project was established (C. Walzer, pers. comm.).

Conservation measures required

- Increase public awareness of the potential negative impacts of cross-breeding.
- Resolve the genetic status of the wild Bactrian camel. This constitutes one of the foundations on which future management must be based, however insufficient data are available at present (Walzer and Kaczensky, 2005).
- Conduct further research on life history and ecology, particularly factors inhibiting wild Bactrian camel expansion beyond the Great Gobi (R. Reading, pers. comm.).
- Enforce Mongolian Protected Area Laws and monitor within protected areas to prevent illegal mining.
- Support further ranger training and capacity development, building upon the training programme held in Kenya in 2005 (J. Hare, pers. comm.).
- Review the effectiveness and conservation contribution of captive breeding efforts.
- Encourage further communication and co-operation between China and Mongolia to facilitate conservation efforts.
- Investigate the risks and impacts of disease at the interface between wild Bactrian camels, livestock, and humans, to reduce potential conflict. Conduct a detailed risk analysis, addressing the possibility of pathogen transfer from the buffer zone to the wild Bactrian camel population, to assess the specific wildlife-livestock interface and to conform to IUCN guidelines. The captive breeding facility in Zakhyn Us could support this initiative (Walzer and Kaczensky, 2005).

Compilers and reviewers: Yad. Adiya, J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, J. Hare, B. Huffman, S.R.B. King, H. Mix, K. Olson, D. Mallon, R. Reading, R. Samiya, M. Stubbe and C. Walzer.

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Ovis ammon

(Linnaeus, 1758)

Order: Artiodactyla

Family: Bovidae

Common names: Argali (English), argali khony (Mongolian), arkhar (Altai and Kazakh regions of Mongolia)

Subspecies found in Mongolia: Two subspecies were formerly recognised, Altai argali *O. a. ammon* and Gobi argali or Mongolian argali *O. a. darwini*. However, recent genetic studies (Tserenbataa, 2003; Tserenbataa *et al.*, 2004) suggest that all argali in Mongolia represent a single subspecies, *O. a. ammon*.

Synonyms: Including *O. altaica*, *O. argali*, *O. blythi* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of R. Reading

Description

Argali have characteristic large, curled horns, which can reach more than 150 cm in length. Males stand at up to 127 cm at the shoulder; females are approximately 30-40% smaller and their horns seldom exceed 50 cm in length (Amgalanbaatar and Reading, 2000). Argali are generally light to dark brown or grey in colour, with white coloration on the face, abdomen, inner leg, and rump patches (Amgalanbaatar and Reading, 2000). Males develop a white or grey coloured 'saddle' during the breeding season.

Conservation overview

Global status: Vulnerable, A2cde. Gobi argali (*O. a. darwini*) have been infraspecifically assessed as Endangered, C1 and Altai argali (*O. a. ammon*) have been infraspecifically assessed as Vulnerable, A2cde and C1.

Regional status: Endangered, A2acde and A3cde

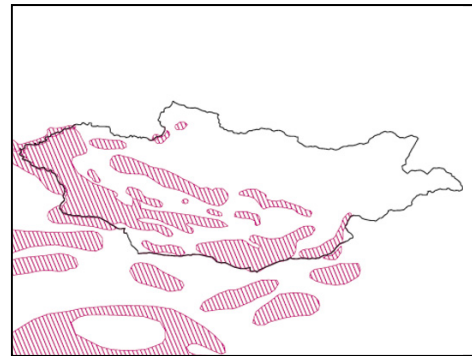
Legal status: Protected as Rare under the 2001 revision (Mongolian Government Act No. 264) of the 2000 Mongolian Law on Fauna (Badam and Ariunzul, 2005). Hunting has been

prohibited since 1953, and it is protected as Rare under the 1995 Mongolian Hunting Law (MNE, 1996). Included in Appendix II of CITES with an export quota of 80 hunting trophies with horns, and 44 skins and horns in 2005 (UNEP-WCMC, 2006). Trophy hunters can purchase hunting licenses, from which \$18,000 USD and \$9,000 USD respectively is allocated to the government (MNE, 2005). According to the Mongolian Law on Reinvestment of Natural Resource Use Fees, a percentage of this fee is designated to conservation efforts (Wingard and Zahler, 2006). Listed as Rare in the ‘Mongolian Red Book’ of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). Approximately 14% of the species’ range in Mongolia occurs within protected areas.

Distribution

Global distribution: Russian Federation, Kazakhstan, Uzbekistan, Afghanistan, Kyrgyzstan, Pakistan, Tajikistan, China, India, Nepal, Mongolia, Bhutan. Altai argali occur in the Russian Federation, China, Mongolia; Gobi argali occur in China and Mongolia.

Regional distribution: Argali historically displayed a disjunct distribution across all but eastern Mongolia, in areas with rolling hills, mountains, rocky outcrops and plateaus. However, this distribution has become increasingly fragmented over the past few decades



(Mallon *et al.*, 1997; Amgаланбаатар and Reading, 2000; Amgаланбаатар *et al.*, 2002a; 2002b). Currently distributed in mountainous habitats in Mongol Altai and Gobi Altai mountain ranges, Dzungarian Gobi Desert, Trans Altai Gobi Desert, Eastern Gobi, and Alashan’ Gobi Desert (Bannikov, 1954; Sokolov and Orlov, 1980; Fedosenko and Blank, 2005). Isolated populations exist in mountain-steppe and forested habitats in Middle Halh Steppe, Han Hökhii in western Hangai Mountain Range, and at the source of Arsain River in Hövsgöl Mountain Range (Dulamtsere, 1970; Sokolov and Orlov, 1980; Reading *et al.*, 1997; Reading, 2000; Adiya and Tumursukh, 2001; Amgаланбаатар *et al.*, 2002b; Fedosenko and Blank, 2005).

Abundance

The population has been relatively well studied, however inconsistencies in sampling and methodology have occurred. In 1970, the total Mongolian population was estimated to consist of 40,000 individuals (Dulamtsere, 1970), rising to 50,000 from a government survey in 1975, and in 1985 this estimate increased again to 60,000. However, by 1994, it was concluded that no more than 20,000 individuals were present (Reading *et al.*, 1997). The population size has continued to decline, with the most recent nationwide survey in 2001 estimating the Mongolian population to consist of between 13,000 and 15,000 individuals (Amgаланбаатар *et al.*, 2002b), representing a 72% decline over the past 26 years (Zahler *et al.*, 2004).

Habitat and ecology

Inhabits mountains, steppe valleys, and rocky outcrops (Reading *et al.*, 1997; Amgаланбаатар and Reading, 2000), also occurring in open desert habitats at the south-eastern limit of its range (Reading *et al.*, 2003; Tserenbataa *et al.*, 2004; Reading *et al.*, 2005). This species migrates from high mountain habitats to lower elevations during winter and are present all year round at lower elevations in the Gobi Desert (Reading *et al.*, 2005). Argali congregate in

large single-sexed herds which can sometimes include up to 100 individuals. In Mongolia, the mating season lasts from late September until early October, with litters of one or two lambs born in April or May (Dawaa *et al.*, 1983).

Dominant threats

The principal threat is illegal or unsustainable hunting, particularly for its impressive horns as trophies (Amgalanbaatar *et al.*, 2002b). The number of licences issued for argali trophy hunting is increasing despite its threat status (Zahler *et al.*, 2004) and currently exceeds the recommended quota established by the Mongolian Academy of Sciences (Zahler *et al.*, 2004; Wingard and Zahler, 2006). A large percentage of illegal hunting is carried out by domestic border guards (Reading *et al.*, 2003; 2005). Severe droughts and harsh weather conditions during winter are also a source of high mortality. Possible competition for resources and habitat degradation through grazing by increasing numbers of livestock, and habitat loss through increasing resource extraction (mining) may also constitute threats, although further evidence is required (Reading *et al.*, 1997; 2003; 2005; Wingard, 2005).

Conservation measures in place

- WWF and the Ministry of Nature and Environment organised a workshop in 2000 entitled ‘Conservation of Argali in Mongolia’, which resulted in the production of the ‘Argali Conservation Management Plan’ in 2002. Unfortunately, this plan has not been implemented to date.
- Mongolia’s Argali Wildlife Research Centre, the Denver Zoological Foundation, and the Mongolian Academy of Sciences are co-operating on a number of conservation and research projects, including an interdisciplinary research project in Ikh Nartiin Chuluu Nature Reserve in Eastern Govi which was established during the late 1990s. This collaboration has resulted in many conservation publications (see Reading *et al.* (2001); Amgalanbaatar *et al.* (2002a) and (2002b); Reading *et al.* (2003); Tserenbataa *et al.* (2004); Reading *et al.* (2005); Wingard (2005) for further details).
- More than 120 people attended a workshop entitled ‘Mongolian Wildlife Trade’ held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Implement recommendations in the ‘Argali Conservation Management Plan’.
- Enhance enforcement of existing protective legislation.
- Improve management and capacity of protected areas where argali are found at highest densities, including Hökh Serkh Strictly Protected Area, Myangan Ugalzat Nature Reserve, Turgen Uul Strictly Protected Area and Tsagaan Shuvuut Strictly Protected Area (Mongol Altai Mountain Range), Gobi Gurvansaikhan National Park (Govi Altai Mountain Range), Ikh Nartiin Chuluu Nature Reserve, and Great Gobi Strictly Protected Area sections A and B.
- Support local community livelihoods in areas where argali are protected by local initiatives. Community based wildlife management programmes may also be beneficial (Amgalanbaatar *et al.*, 2002b).
- Establish public education programmes to raise awareness of the status of this species and the threats it faces.
- Conduct further ecological research, monitor population trends, and investigate the impacts of threats, particularly in Altai (Mongol Altai Mountain Range and Govi Altai

Mountain Range) to complement research presently occurring in Gobi Desert (R. Reading, pers. comm.).

- Implement recommendations from the ‘Mongolian Wildlife Trade’ workshop (see Wingard and Zahler (2006) for details of recommended actions).

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Procapra gutturosa

(Pallas, 1777)

Order: Artiodactyla

Family: Bovidae

Common names: Mongolian gazelle (English), tsagaan zeer (Mongolian)

Synonyms: *P. altaica*, *P. orientalis* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of B. Lkhagvasuren

Description

Light tan in colour with a white underside, but lacking the eye patches or stripes often seen in other members of the subfamily *Antilopinae* (Lei *et al.*, 2003). Males have short horns and an enlarged larynx; both of these features are absent in females. The lyrate horns are dark grey or black coloured, and are close-set at the base, diverging gradually distally before turning slightly inward at the tips (Sokolov and Lushchekina, 1997). The average adult autumn body weight is 35 ± 2.5 kg for males, and 28 ± 2.8 kg for females. Head-rump measurements for both sexes average 124 ± 5 cm (Jiang *et al.*, 2002; Olson, unpubl. data).

Conservation overview

Global status: Least Concern

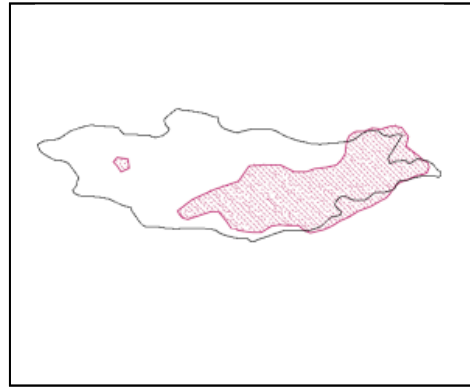
Regional status: Endangered, A4cde

Legal status: Hunting has been state controlled since 1932, and quotas for subsistence hunting are provided at a regional level through an official harvest. Hunting is permitted between September 1st and December 1st (MNE, 2005). The 1995 Mongolian Hunting Law banned the use of motor vehicles to hunt Mongolian gazelle and established a fine of \$30-40 USD for each individual killed illegally. Trophy hunters can purchase hunting licenses, from which \$90 USD is allocated to the government (MNE, 2005). According to the Mongolian Law on Reinvestment of Natural Resource Use Fees, a percentage of this fee is designated to conservation efforts (Wingard and Zahler, 2006). Approximately 8% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Russian Federation, China, Mongolia.

Regional distribution: Formerly widely distributed in steppe and semi-desert habitats throughout Mongolia, with an estimated range size of around 780,000 km² (Bannikov, 1954). Populations have become fragmented in central and southern Mongolia (Lkhagvasuren *et al.*, 2001). Current distribution includes Northern Govi, Eastern Govi, Middle Halh Steppe, Eastern Mongolia, and eastern Valley of the Lakes. This species has recently been recorded wintering in Dornod province, in north-eastern Mongolia, and in southern and eastern regions of Hentii Mountain Range (K. Olson, pers. comm.). An isolated population in Homiin Tal Steppe in Great Lakes Depression has been augmented by successful translocations from eastern Mongolia, conducted during the end of the 1980s and at the beginning of the 1990s. The species is highly nomadic and is often absent from areas for extended periods of time, giving the false impression that its range is expanding or contracting (Dulamtsuren *et al.*, 1989).



Abundance

Mongolia is estimated to hold 92-96% of the global population of Mongolian gazelle (Lkhagvasuren *et al.*, 2001). This species has experienced significant global declines over the past 50 years (Lkhagvasuren *et al.*, 2001). As many as 4.75 million gazelle may have occurred in Mongolia as recently as 80 years ago (Milner-Gulland and Lkhagvasuren, 1998), however, in 1978 and 1979, two population assessments estimated the total Mongolian population to consist of 250,000-270,000 and 250,000 individuals respectively (Tsagaan, 1980; Sokolov and Lushchekina, 1997). Epizootic disease and extreme droughts in 1980 reduced the population to approximately 150,000-180,000 individuals, but by 1981, the number of Mongolian gazelles had increased to 300,000-400,000 (Lushchekina *et al.*, 1983). In 2002, a nationwide population assessment estimated the total population to consist of 800,000-900,000 individuals (Olson *et al.*, 2005), and in 2005, a vehicle survey using distance sampling methodology estimated there to be 1.29 million individuals east of the Beijing-Ulaanbaatar railway line and an additional 200,000-300,000 individuals west of the railway line (Olson, unpubl. data; B. Lkhagvasuren pers. comm.). Over the past two decades the population may have fluctuated between a low of 180,000 individuals (Lushchekina, 1990) and a high of 2.67 million individuals (results from an unpublished aerial survey with a standard error of 472,000), due to intense hunting, natural mortality, and disease outbreaks. However, estimates vary widely due to differences in survey methodology and intensity, and should be treated with caution (Milner-Gulland and Lkhagvasuren, 1998). Further surveys are required to clarify the current population size.

Habitat and ecology

Level or undulating steppe habitats at altitudes of 800-1,000 metres are optimal in Mongolia, but this species also occurs in arid steppe and plains, hilly steppe, broad valleys, mountain steppe, and semi-desert habitats (Mallon and Kingswood, 2001). It avoids rocky or broken terrain, narrow valleys, forests, shrub thickets, sand dunes, and high altitude steppe habitats (Bannikov, 1954). Mongolian gazelle migrate in search of high quality forage which is free of insects in summer, or areas of shallow snow depth in winter (Milner-Gulland and Lkhagvasuren, 1998; Leimgruber *et al.*, 2001; Olson, unpubl. data).

Dominant threats

Despite established hunting quotas, the primary threat is illegal hunting for meat on top of the legal harvest limit (Lkhagvasuren and Milner-Gulland, 1997). A harvest model was developed by Milner-Gulland and Lkhagvasuren (1998), and based on a population size of one million individuals, the sustainable off-take is 60,000 gazelles per year; current harvest estimates exceed this by more than 300 percent (Wingard and Zahler, 2006). In the winter of 1977, nearly 70,000 Mongolian gazelle were harvested by hunters in eastern Mongolia (Sokolov and Lushchekina, 1997), and in 2004, the total estimated off-take was 250,000 (Wingard and Zahler, 2006). The development of the double-fenced Ulaanbaatar-Beijing railway and a paved road running parallel to the railway line has isolated smaller populations from the core population in eastern Mongolia. Fences along the Russia-Mongolia and China-Mongolia borders prevent this species from reaching good quality habitat (Takahaiko *et al.*, 2005). Human disturbance associated with increasing resource extraction (particularly oil extraction) constitutes a threat in parts of its range, and areas of high livestock density may lead to competition for resources and exposure to diseases such as foot-and-mouth disease and foot rot (Schaller and Lkhagvasuren, 1998; Campos-Arceiz *et al.*, 2004). Sporadic severe winters can also cause high mortality.

Conservation measures in place

- The Society for the Conservation of the Mongolian Gazelle was established by Mongolian scientists and specialists to focus on the conservation of this species. It collaborates extensively with the Mongolian Association for Conservation of Nature and Environment and other local and international non-government organisations.
- A long-term research project focussing on distribution and beneficial conservation measures is currently being conducted by K. Olson of the Wildlife Conservation Society and B. Lkhagvasuren of the Mongolian Academy of Sciences, in collaboration with Japanese researchers. The Wildlife Conservation Society is also working with the United Nations Development Programme and the Global Environment Facility Eastern Steppe Biodiversity Project to conduct extensive research on movement patterns and ecology. The Wildlife Conservation Society is also involved in organising workshops and lobbying to establish a sustainable harvest program and to balance sustainable wildlife use with traditional livelihoods.
- An in-depth study of the ecological impact of the Ulaanbaatar-Beijing railway has been conducted, including trials to investigate the possibility of this species crossing bridges or tunnels.
- In 2004, a workshop entitled the 'International Research Symposium/Management Workshop on Conservation and Management of the Mongolian Gazelle' resulted in the production of the 'Mongolian Gazelle Management and Action Plan' along with a 'Memorandum of Understanding' between Mongolia, China and Russia, outlining collaborative actions to conserve ungulates across Asia (Zahler *et al.*, 2003; Zahler, 2004).
- A north-westward extension corridor to Dornod-Mongol Strictly Protected Area has been proposed to protect migration routes and calving grounds.
- A nature reserve (Herlen-Menen Nature Reserve) has been proposed for the eastern border of Mongolia. If established, this could form the basis of a trans-border reserve between Mongolia and China (Lkhagvasuren *et al.*, 2001).

- The isolated population in the west of the country has been successfully augmented by translocations from eastern populations, and is currently increasing in size. Between 1988 and 1990, a total of 600 individuals were translocated from eastern Mongolia to Homiin Tal Steppe in Great Lakes Depression, where the local population had declined to around 600 individuals. By 1995, a population assessment estimated this population to have increased to approximately 3,500 individuals (Lkhagvasuren and Milner-Gulland, 1997).
- More than 120 people attended a workshop entitled ‘Mongolian Wildlife Trade’ held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Implement actions recommended in the ‘Mongolian Gazelle Management and Action Plan’ and the ‘Memorandum of Understanding’ between Mongolia, China and Russia.
- Conduct further ecological research and monitor population trends.
- Monitor and research migration routes using satellite telemetry (Lkhagvasuren *et al.*, 2001), and conduct aerial surveys twice per year to determine current population size and to identify calving areas
- Enhance enforcement and raise awareness of existing protective legislation. This should include education and funding for local inspectors and integrated rural development programmes (Lkhagvasuren *et al.*, 2001).
- Develop subsistence-use quotas based on accepted population management guidelines; allocate to both state and industry needs.
- Prevent further fragmentation of habitat by creating buffers around protected areas, implementing multiple land-use strategies, and by clustering infrastructure and road developments (Mallon and Kingswood, 2001).
- Establish clear objectives and professional management in protected areas, accompanied by training and capacity building for rangers (Mallon and Kingswood, 2001).
- Encourage collaborations between Mongolia and China to conserve this species (R. Reading, pers. comm.).
- Investigate further translocations to augment fragmented populations west of the Ulaanbaatar-Beijing railway line (Lkhagvasuren *et al.*, 2001). Any translocations should be conducted in accordance with the ‘IUCN Reintroduction Guidelines’ (IUCN/SSC, 1995) and the ‘IUCN Position Statement on Translocation of Living Organisms’ (available online at the IUCN website; <http://www.iucn.org>).
- Implement recommendations from the ‘Mongolian Wildlife Trade’ workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, V. Buuveibaatar, S. Dulamtseren, B. Huffman, S.R.B. King, B. Lkhagvasuren, D. Mallon, H. Mix, K. Olson, R. Reading, R. Samiya, M. Stubbe and T. Wachter.

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Saiga tatarica

(Linnaeus, 1766)

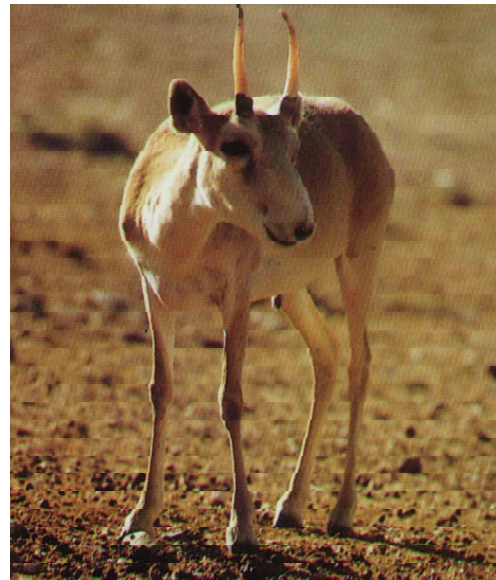
Order: Artiodactyla

Family: Bovidae

Common names: Saiga antelope (English), bokhon or tataar bokhon (Mongolian)

Subspecies in Mongolia: Mongolian saiga *S. t. mongolica*. The subspecies *S. t. tatarica* has been considered Regionally Extinct in Mongolia for the past 40 years (Dulmaa and Shagdarsuren, 1973; Lkhagvasuren *et al.*, 2001).

Synonyms: *S. colus*, *S. mongolica*, *S. saiga*, *S. scythica* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of L. Amgalan

Description

Saiga have a characteristic bulbous nose which serves as an adaptation to dry, dusty environments, to warm and moisten inhaled air and to reduce heat and water loss during exhalation. This species is generally light brown in colour, although in winter the coat may turn pale or white. Males have a pair of lyrate semi-translucent horns extending up to 25 cm in length, a head-rump measurement of 110-116 cm and a weight of 30-51 kg; females are smaller (108-125 cm) and weigh less (21-41 kg) (Sokolov and Orlov, 1980). There are notable morphological differences between Russian saiga and Mongolian saiga; the latter is smaller in size and has less curved horns (Bannikov, 1951; Stubbe and Chotolchu, 1968).

Conservation overview

Global status: Critically Endangered, A2a; Mongolian saiga (*S. t. mongolica*) has been infraspecifically assessed as Endangered, A2ad and C1 and 2a(ii)

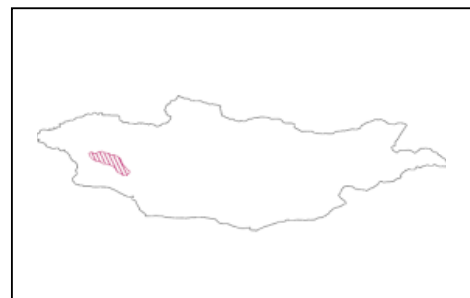
Regional status: Endangered, A2acde

Legal status: Listed under CITES Appendix II (UNEP-WCMC, 2006). Both Mongolian subspecies of saiga are protected as Very Rare under part 7.1 of the Mongolian Law on Fauna (2000) (Badam and Ariunzul, 2005). Hunting has been prohibited since 1930, and this species is protected as Very Rare under the 1995 Mongolian Hunting Law (MNE, 1996). Listed as Very Rare in the 'Mongolian Red Book' of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). Approximately 24% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Russian Federation, Kazakhstan, Turkmenistan, Uzbekistan, Mongolia. Mongolian saiga are endemic to Mongolia. *S. t. tatarica* are Regionally Extinct in Mongolia and Ukraine.

Regional distribution: *S. t. tatarica* was formerly found in Dzungarian Gobi Desert in south-western Mongolia (Bannikov, 1954; Dulmaa and Shagdarsuren,



1973; Lkhagvasuren *et al.*, 2001). Mongolian saiga (*S. t. mongolica*) now occupy only 20% of its former range, restricted to two small regions in western Mongolia. The majority of the population (90%) occurs in and around Sharga Nature Reserve in Mongol Altai Mountain Range, covering an area of approximately 2,000 km². The second population is situated 200 km north-west, in Mankhan Nature Reserve in Great Lakes Depression (Dulamtsere and Amgalan, 1995). This species occasionally occurs in surrounding areas of Huis Govi and Hüren Tal in Great Lakes Depression (Lushchekina and Dulamtsere, 1997; Dulamtsere and Amgalan, 2003). The total potential range of this species covers an area of approximately 13,000 km².

Abundance

This species has experienced significant global declines over the past 50 years (Lkhagvasuren *et al.*, 2001). Annual surveys by WWF and the Mongolian Academy of Sciences estimated the total Mongolian population to consist of 2,950 individuals in 1998, rising to 5,240 individuals in 2000. In 2001, the Sharga population was estimated to consist of 1,600-3,000 individuals, with a further 35 individuals in the isolated Mankhan population (Mallon and Kingswood, 2001). Just twenty years ago the population in Mankhan was estimated to consist of around 200 individuals (Dulamtsere and Amgalan, 1995). The total Mongolian population declined to approximately 1,020 individuals in 2002, further decreasing to 750 individuals in 2003. An assessment by WWF in 2004 estimated the population to consist of approximately 800 individuals (WWF, 2004; Zahler, 2004), rising to 1,500 individuals in 2005 (L. Amgalan, pers. comm.). This species is subject to natural population fluctuations.

Habitat and ecology

Gently sloping stony areas in steppe and semi-desert habitats at altitudes of 900-1,600 metres, associated with food plants *Stipa glareosa* and *S. gobica* (Dulamtsere and Amgalan, 1994). Not present in even slightly broken terrain, deserts, or bushy areas (Lkhagvasuren *et al.*, 2001). Mongolian saiga (*S. t. mongolica*) move around their range in search of food and water, but do not undertake large-scale migrations as observed in populations of Russian saiga (*S. t. tatarica*) (Lkhagvasuren *et al.*, 2001).

Dominant threats

The population is very small and therefore vulnerable to stochastic events such as severe winters (Lkhagvasuren *et al.*, 2001). Hunting levels in Mongolia may still be relatively low in comparison to other species, although even low levels can have a large impact on a small population (Lkhagvasuren *et al.*, 2001). Illegal hunting for the horns of males, used in traditional medicines, still occurs and results in skewed sex ratios (Zevvegmid and Dawaa, 1973). Increasing numbers of livestock are also believed to be driving declines in population size through habitat degradation due to overgrazing and probable competition for pasture and water resources, although further evidence is required (Dulamtsere and Amgalan, 1995; Zahler *et al.*, 2004). Transmission of diseases and parasites (e.g. parasitic botfly *Pallasiomyia antilopum*) from livestock may also constitute a threat to this species.

Conservation measures in place

- In 1993, Sharga Nature Reserve (2,869 km²) and Mankhan Nature Reserve (300 km²) were created to protect the two remaining populations of saiga (Lkhagvasuren *et al.*, 2001). Unfortunately, it has proved difficult to implement management plans in these areas, and a lack of funding for research, protective measures, rangers, or scientific staff hinders protection (Lushchekina *et al.*, 1999).

- The Mongolian Academy of Sciences has conducted extensive research into the behaviour and ecology of this species.
- In 2004, the Wildlife Conservation Society and WWF held a workshop entitled ‘Current Status, Problems, Conservation Needs and Management of Mongolian Saiga’. Participants recommended prevention of illegal hunting, improved winter feeding, and radio and satellite collaring to monitor behaviour and movements. A detailed action plan for saiga (unpublished) has been developed following the workshop, and the Mongolian Government has submitted a request to CITES for the re-categorisation of this species to Appendix I (Zahler, 2004). In addition, a conservation project was established by WWF as a result of this workshop.
- Introduction of field actions (e.g. patrols, wardening) coupled with alternative livelihood programmes resulted in an increase in saiga numbers, but was discontinued due to a lack of funding.
- More than 120 people attended a workshop entitled ‘Mongolian Wildlife Trade’ held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Restore field actions (e.g. patrols, wardening), provision of communication equipment, and training and capacity building for rangers to enforce hunting laws should be included.
- Formulate a comprehensive management plan for Sharga Nature Reserve, where 90% of the population is found, with the involvement of local herdsman (Mallon and Kingswood, 2001). Reduction in grazing should be negotiated where necessary and adequate compensation should be provided (Mallon and Kingswood, 2001).
- Establish integrated land-use programmes and resolve livestock-wildlife conflict.
- Establish education programmes to raise awareness of threats to this species.
- Reduce the number of new vehicle routes by restricting off-road driving in core areas of its range (Lkhagvasuren *et al.*, 2001).
- Habitat corridors, if any, should be identified and protected (Berger and Berger, in press).
- Continue long-term ecological monitoring programmes, using reliable and regular population censuses combined with research into effective conservation measures (Lushchekina *et al.*, 1999).
- Implement recommendations from the ‘Mongolian Wildlife Trade’ workshop (see Wingard and Zahler (2006) for details of recommended actions).

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Moschus moschiferus

Linnaeus, 1758

Order: Artiodactyla

Family: Moschidae

Common names: Siberian musk deer (English), huder or badanga huder (Mongolian)

Subspecies in Mongolia: *M. m. moschiferus* (see Tsendjav, 2002). Musk deer taxonomy remains unresolved.

This species is often included within the family *Cervidae*.



Photograph courtesy of R. Reading

Description

Musk deer have long, dark fur which is often mottled with white spots on the rump and white stripes on the neck, but there is considerable variation in coat colour. This small ungulate stands at 83-93 cm to the shoulder, with a head-rump measurement of 69-82 cm, and a weight of 9.4-14 kg (Dulamtsersen, 1977; Dulamtsersen *et al.*, 1989). Instead of horns or antlers, males are adorned with tusks (elongated canines), which can grow up to 10 cm in length; these are also present in females but do not protrude beyond the upper lip. As the common name suggests, males secrete musk from a preputial gland (the 'musk-pod'). Each male produces only around 25 g of musk during its lifetime (Dulamtsersen *et al.*, 1989; Tsendjav, 2002). This musk forms the basis of perfumes and is highly valued for traditional medicines (Wemmer, 1998).

Conservation overview

Global status: Vulnerable, A1acd

Regional status: Endangered, A3d

Legal status: Listed under CITES Appendix II (UNEP-WCMC, 2006), and protected as Very Rare under part 7.1 of the Mongolian Law on Fauna (2000) (Badam and Ariunzul, 2005). Hunting has been prohibited since 1953, and it is protected as Very Rare under the 1995 Mongolian Hunting Law (MNE, 1996). Listed as Very Rare in the 1997 'Mongolian Red Book' (Shiirevdamba *et al.*, 1997). Approximately 13% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Russian Federation, Kazakhstan, Afghanistan, Pakistan, China, India, Kyrgyzstan, Nepal, Mongolia, Bhutan, Myanmar, Viet Nam, Republic of Korea, Democratic People's Republic of Korea (Tsendjav, 2002).

Regional distribution: Forested habitats in northern Mongol Altai Mountain Range (Togtokhbayar *et al.*, 2000), Hangai Mountain Range (Sosorburam, 1970; Dulamtsersen, 1977; Dulamtsersen *et al.*, 1989), Hentii and Hövsgöl mountain ranges, and possibly around Han Höhii Mountain in western Hangai Mountain Range (Dulamtsersen *et al.*, 1989; Wemmer, 1998; Tsendjav, 2002).



Abundance

During the 1920s and 1930s numbers were sharply reduced through hunting. In the 1970s the Mongolian population size was estimated to consist of 60,000-80,000 individuals (Dulamtsereen, 1977). In 1986, the Institute of Biology of the Mongolian Academy of Sciences assessed the Mongolian population size over 53,000 hectares covering 63 units of six provinces, resulting in an estimate for the total population of 44,000 individuals. The population is continuing to decline; densities fell from 1.2 per km² to 0.2 per km² in one observed population between 1990 and 2000 (Tsendjav and Bujinkhand, 2000; Tsendjav, 2002). No national surveys of Siberian musk deer population size have been conducted during the past 30 years (Homes, 2004).

Habitat and ecology

Typically found in dense pine (*Pinus sibirica*) and larch (*Larix* spp.) forests, and on shrub-covered slopes in sub-alpine zones (Dulamtsereen, 1977; Dulamtsereen *et al.*, 1989; Tsendjav, 2002). Forbs and woody plants constitute the bulk of the diet in summer and winter respectively, and mosses and lichens are also eaten when other food is in short supply (Green, 1987). This species occurs in open areas and does not move to lower altitudes during winter, as it has a thick coat for insulation and is well adapted for walking through deep snow (Green, 1987).

Dominant threats

Illegal hunting for musk is the principal threat. An estimated 25,000 adult males were killed between 1990 and 2001 (Homes, 2004). As hunting is often indiscriminate of sex and age, four to five Siberian musk deer are estimated to be killed per musk-pod harvested (Green, 1987). As cheaper, synthetic alternatives are becoming more popular, the use of musk in perfume production is decreasing, but its value for traditional medicines to treat cardiac, circulatory, and respiratory health problems remains high. Resource extraction (logging and mining) is not causing a substantial loss of habitat at present, but the resulting human disturbance from this activity does constitute a threat. Habitat fragmentation may also threaten this species (Tsendjav and Bujinkhand, 2000).

Conservation measures in place

- More than 1.5 million hectares of the range of this species is included within Horgo Terkhiin Tsagaan Nuur National Park (Hangai Mountain Range), Hövsgöl Nuur National Park (Hövsgöl Mountain Range), Gorkhi Terej National Park, Bogd Khan Uul Strictly Protected Area, and Khan Hentii Strictly Protected Area in Hentii Mountain Range (Wemmer, 1998).
- Very few conservation measures are in place for this species, despite it being relatively well studied in Mongolia.
- More than 120 people attended a workshop entitled 'Mongolian Wildlife Trade' held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Enhance enforcement of existing protective legislation, particularly relating to trade in musk, through increased vigilance within protected areas and by customs agents at border crossings.
- Conduct further ecological research and monitor population trends, including dynamics, dispersal, and off-take.

- Reduce mining activities and regulate toxic waste disposal into water sources within its range. Logging should also be regulated to prevent fires which cause habitat loss and degradation (R. Reading, pers. comm.).
- Organise a workshop including representatives from Mongolia, China and Russia to focus international efforts on conservation, and to agree upon realistic yet effective solutions to threats faced by this species (Homes, 2004).
- Identify substitutes for musk which would be acceptable in traditional forms of East Asian medicine (Homes, 2004).
- Implement recommendations from the ‘Mongolian Wildlife Trade’ workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, B. Huffman, S.R.B. King, D. Mallon, H. Mix, K. Olson, R. Reading, R. Samiya, M. Stubbe, D. Tsendjav and T. Wachter.

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Alces alces

(Linnaeus, 1758)

Order: Artiodactyla

Family: Cervidae

Common names: Elk or Eurasian elk (English, Eurasian populations), moose (English, North American populations), handgai or moltsog handgai (Mongolian)

Subspecies in Mongolia: Ussurian elk *A. a. cameloides*, East Siberian elk or Yakut moose *A. a. pfizenmayeri* (see Geist, 1998)

Synonyms: Including *A. americanus*, *A. columbae*, *A. pfizenmayeri* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of B. Lkhagvasuren

Description

Alces alces has a dark brown coat with long, slender legs, which are lighter brown or grey in colour. This species has an average head-rump measurement of 200-300 cm, stands around 140-194 cm at the shoulder, and has an average body weight of 280-650 kg (Bannikov, 1954). The muzzle is flexible and adapted for browsing on twigs and branches of poplar and willow. Only males develop large palmate antlers and a dewlap (or bell) under the throat. *A. a. cameloides* is of a similar size to *A. a. pfizenmayeri*, but is physically distinct with smaller branched antlers rather than large palmate ones (Wingard and Zahler, 2006).

Conservation overview

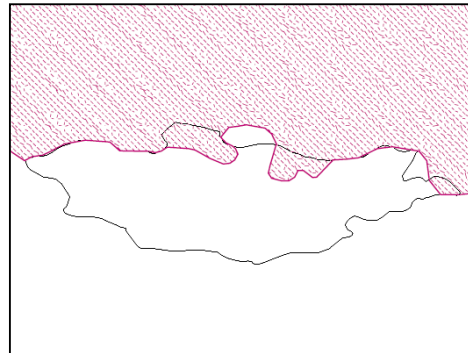
Global status: Least Concern

Regional status: Endangered, A2cd and A3d

Legal status: Both Mongolian subspecies are protected as Very Rare under part 7.1 of the Mongolian Law on Fauna (2000) (Badam and Ariunzul, 2005). Hunting has been prohibited since 1953, and both subspecies are protected as Very Rare under the 1995 Mongolian Hunting Law (MNE, 1996). Listed as Rare in the ‘Mongolian Red Book’ of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). Approximately 20% of the species’ range in Mongolia occurs within protected areas and the range of *A. a. cameloides* occurs entirely within Nömrög Strictly Protected Area in Ikh Hyangan Mountain Range.

Distribution

Global distribution: Canada, USA, Norway, Czech Republic, Croatia, Sweden, Poland, Hungary, Slovakia, Finland, Romania, Latvia, Lithuania, Estonia, Ukraine, Belarus, Russian Federation, Kazakhstan, China, Mongolia. *A. a. cameloides* are found in the Russian Federation, China, eastern Mongolia. *A. a. pfizenmayeri* are found throughout Central Asia (Hundertmark *et al.*, 2002).



Regional distribution: *A. a. cameloides* occur along Halh River and in Nömrög River Basin in Ikh Hyangan Mountain Range (Shagdarsuren and Stubbe, 1974; Shiirevdamba *et al.*, 1997). *A. a. pfizenmayeri* occur in taiga habitats, particularly along Onon and Herlen rivers in north-eastern Hentii Mountain Range, and along Eröö and Minj rivers in western Hentii Mountain Range. Also distributed in Ikh Dalbai River Basin, Horidol Saridag and Tsagaan mountains in Hövsgöl Mountain Range, Buteel Mountain in northern Hangai Mountain Range, and upstream of Tuul River in Hentii Mountain Range (Bannikov, 1954; Geptner *et al.*, 1961; Dulamtseren *et al.*, 1989).

Abundance

Only a small population of *A. a. cameloides* occurs in Mongolia. In 2004, 73 were sighted in Nömrög Strictly Protected Area in Ikh Hyangan Mountain Range (K. Olson, pers. comm.). *A. a. pfizenmayeri* has a greater abundance in Mongolia; a survey conducted in 1989 estimated there to be 10,000 individuals inhabiting Hentii and Hangai mountain ranges, with the total Mongolian population consisting of greater than 14,000 individuals (Sokolov and Orlov, 1980; Shagdarsuren *et al.*, 1987; Dulamtseren *et al.*, 1989). Very few population estimates have been conducted for this species in Mongolia.

Habitat and ecology

Coniferous and riparian forest habitats, associated with willow and birch shrubs. It browses on leaves, bark, and shoots, and may also feed on aquatic plants and herbs (Wemmer, 1998). During winter this species may move over distances of up to 2,000 km in search of food. Sexual maturity is attained at two years and females are at their reproductive peak at four or five years. Mating occurs between September and October, and females give birth during spring (Franzmann, 1981).

Dominant threats

Trophy hunting and illegal hunting for meat and skins, and antlers and muzzles which are used for traditional medicines. Populations are known to be declining based on levels of exploitation; between 1926 and 1985, 1.5 million tons of antlers were exported to Russia

(Wingard and Zahler, 2006). Hunting pressure on this species is increasing as other large mammals experience regional declines (Pratt *et al.*, 2004). Habitat loss and pollution of water sources through resource extraction (gold mining and mineral extraction) also constitute threats. Competition with other large mammals for resources may also constitute a threat to this species, although further evidence is required.

Conservation measures in place

- A project to prevent illegal hunting is underway by the Society for Technical Cooperation (GTZ).
- More than 120 people attended a workshop entitled 'Mongolian Wildlife Trade' held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Enhance enforcement of existing protective legislation.
- Reduce mineral extraction and mining causing habitat loss and water pollution.
- Conduct further ecological research and monitor population trends.
- Increase the capacity of protected area management.
- Raise public awareness concerning the threats impacting upon this species.
- Initiate a local community livelihood improvement programme.
- Implement recommendations from the 'Mongolian Wildlife Trade' workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, D. Bazardorj, A. Bräunlich, B. Dorjgotov, S. Dulamtseren, J. Jargal, S.R.B. King, D. Mallon, O. Monkhtogokh, R. Samiya and M. Stubbe.

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VULNERABLE

Euchoreutes naso

Sclater, 1891

Order: Rodentia

Family: Dipodidae

Common names: Long-eared jerboa (English), sooton alagdaakhai or sooton alagdai (Mongolian)

Synonyms: *E. alashanicus*, *E. yiwuensis* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of R. Samiya

Description

This nocturnal species has a long tail with a black mid-section and a white tip, and a grey coat with a white underside. One of the larger jerboa species in Mongolia, males have a head-rump measurement of 95-107 mm, an average tail length of 147-180 mm, a hind foot length of 44-46 mm, an ear length of 39-45 mm, and weigh 23.7-37.8 g. Females generally weigh less (27.4-33.0 g) and have slightly shorter body and tail lengths (Sokolov *et al.*, 1996).

Conservation overview

Global status: Endangered, A1c

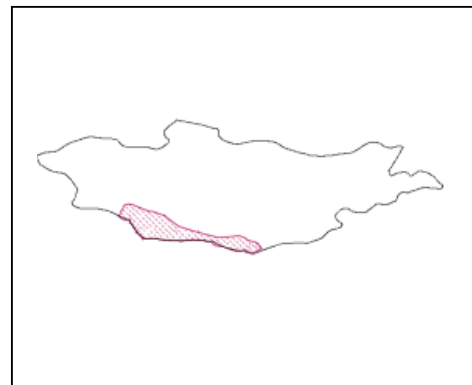
Regional status: Vulnerable, A3c

Legal status: Listed as Rare in the 'Mongolian Red Book' of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). Approximately 44% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: China, Mongolia.

Regional distribution: Sokolov *et al.* (1996) reported this species from ten localities in desert habitats of Trans Altai Gobi Desert and Alashan' Gobi Desert. Mongolia represents the northern limit of its global distribution.



Abundance

In 1975, surveys using 200 pitfall traps per day in Trans Altai Gobi Desert found three individuals in Zuun-Mod oases, five individuals over a 46 km transect during night surveys in Hatan suudal Mountain, and six individuals over a 50 km transect in Zam Bilkhiin Gobi (Sokolov *et al.*, 1978). Studies in the desert zones between 1979 and 1983 found an average of 0.5 ± 0.2 individuals per hectare. No new population data are currently available.

Habitat and ecology

Inhabits desert habitats, favouring sandy river basins with low shrub cover, associated with pea shrubs (*Caragana* spp.), *Kalidum foliatum*, tamarisk (*Tamarix ramosissima*), and saxaul (*Haloxylon ammodendron*). Its range overlaps with the Gobi jerboa (*Allactaga bullata*), midday gerbil (*Meriones meridianus*), hairy footed jerboa (*Dipus sagitta*) and Gobi hamster (*Cricetulus obscurus*) (Shiirevdamba *et al.*, 1997). Unlike other jerboa species, insects comprise 95% of its diet (Sokolov *et al.*, 1996).

Dominant threats

Habitat degradation, possibly through grazing by increasing numbers of livestock (further evidence is required). Human disturbance may constitute a minor threat. Drying of water sources and droughts also threaten this species, although it remains unclear if these represent natural environmental changes or are driven by anthropogenic activity.

Conservation measures in place

- As this species occurs within protected areas, it is conserved under Mongolian Protected Area Laws. However, no conservation measures specifically aimed at this species have been established to date.

Conservation measures required

- Further habitat protection and management within existing protected areas.
- Conduct further ecological research and monitor populations to determine range, population trends, and the impact of threats.

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, S.R.B. King, D. Mallon, R. Samiya and M. Stubbe.

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Martes zibellina (Linnaeus, 1758)

Order: Carnivora

Family: Mustelidae

Common names: Sable (English), oin bulga (Mongolian)

Subspecies in Mongolia: *M. z. sajanensis*, *M. z. princeps*, *M. z. averini*. Further research on the designation of subspecies within Mongolia is required.

Synonyms: *M. brachyura* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of V. Medvedev

Description

Males have a long and thick coat, varying in colour from pale grey-brown to dark brown-black. The summer coat is coarser and shorter than the winter coat (Novikov, 1956; Grzimek, 1975; Chotolchu, 1978). This species has a head-rump measurement of 35-45 cm, a tail length of 11-19 cm, and a body weight of 0.7-1.2 kg. Females are slightly smaller with a head-rump measurement of 30-41 cm and a body weight of 0.6-0.9 kg (Chotolchu, 1978).

Conservation overview

Global status: Least Concern

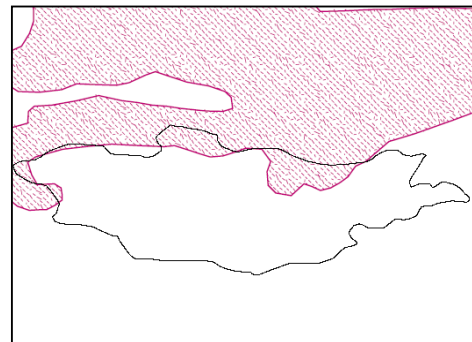
Regional status: Vulnerable, A3cd

Legal status: Hunting was entirely prohibited between 1953 and 2000, but is currently permitted between October 21st and February 16th (MNE, 2005). Approximately 20% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Finland, Russian Federation, China, Mongolia, Democratic People's Republic of Korea, Japan.

Regional distribution: Coniferous forest habitats in Hövsgöl and Hentii mountain ranges, and north-western Mongol Altai Mountain Range (Bannikov, 1954; Chotolchu, 1976; Chotolchu, 1980). *M. z. sajanensis* is distributed in Hövsgöl Mountain Range, *M. z. princeps* occurs in Hentii Mountain Range and Mongol Daguur Steppe, and *M. z. averini* is found in Mongol Altai Mountain Range.



Abundance

Between 1966 and 1968, densities were estimated at 11.7 individuals per 1,000 hectare in central Hentii Mountain Range (Chotolchu, 1968), and during the 1970s this region was estimated to contain a total of 10,000 individuals (Chotolchu, 1978). No recent population data currently exists for this species in Mongolia.

Habitat and ecology

Inhabits pine and larch forest (*Pinus* and *Pinus-Larex*) in high mountain habitats, forming several burrows and temporary dens in tree hollows and dead wood (Bannikov, 1954).

Dominant threats

Illegal and unsustainable hunting for skins and traditional medicines, for international trade. Sable have been hunted extensively through recent history, and its skins are still in high demand for the fur trade. Between 1910 and 1920 an estimated 4,000-5,000 skins were collected from Hövsgöl and Hentii mountain ranges, and around Soyon Mountain in northern Hövsgöl Mountain Range (Namnandorj, 1976). The level of hunting declined in accordance with the species decline by the end of the 1920s, and between 1927 and 1929 only around 300-500 skins were collected annually (Bannikov, 1954). Habitat loss is an important threat, primarily caused by increasing resource extraction (logging). Habitat degradation through human-caused and natural wildfires also constitutes a threat to this species, particularly during spring when newborns may become trapped in dens (M. Stubbe, pers. comm.).

Conservation measures in place

- This species is conserved under Mongolian Protected Area Laws and Hunting Laws. However, no conservation measures specifically aimed at this species have been established to date.
- More than 120 people attended a workshop entitled 'Mongolian Wildlife Trade' held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Amend legislation to ensure hunters record the number and sex of all individuals removed for trade.
- Conduct further ecological research and monitor populations, with particular attention to the impact of hunting on population densities in Hövsgöl and Mongol Altai mountain ranges.
- Improve conservation management, monitoring, and maintenance within existing protected areas.
- Implement recommendations from the 'Mongolian Wildlife Trade' workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, S.R.B. King, R. Samiya and M. Stubbe.

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Gazella subgutturosa (Güldenstädt, 1780)

Order: Artiodactyla

Family: Bovidae

Common names: Goitered gazelle or black-tailed gazelle (English), khar suultii (Mongolian)

Subspecies in Mongolia: *G. s. hillieriana*. Taxonomy of designated subspecies within Mongolia requires further research.

Synonyms: Including *G. mongolica*, *G. hillieriana*, *G. gracilicornis* (see Wilson and Reeder (1993) for further details)



Photograph courtesy of B. Huffman (UltimateUngulate) and the Zoological Society of San Diego

Description

The back and sides of the body vary in coloration from rich brown to pale fawn, with a white underside and a black tail (Nowak, 1991). This species has a head-rump measurement of 90-115 cm, a shoulder height of 60-80 cm, and a body weight of 18-33 kg. Males have ringed horns, which diverge backwards and turn inwards at the tips. The common name ‘goitered gazelle’ refers to the enlargement of the larynx which occurs during the mating season.

Conservation overview

Global status: Vulnerable, A2ad

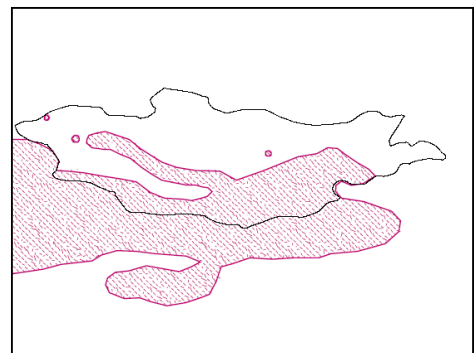
Regional status: Vulnerable, A3cde

Legal status: Protected as Rare under both the 2001 revision (Mongolian Government Act No. 264) of the 2000 Mongolian Law on Fauna (Badam and Ariunzul, 2005), and the 1995 Mongolian Hunting Law (MNE, 1996). Trophy hunters can purchase hunting licenses, from which \$450 USD is allocated to the government (MNE, 2005). According to the Mongolian Law on Reinvestment of Natural Resource Use Fees, a percentage of this fee is designated to conservation efforts (Wingard and Zahler, 2006). Listed as Rare in the ‘Mongolian Red Book’ of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). Approximately 15% of the species’ range in Mongolia occurs within protected areas.

Distribution

Global distribution: Turkey, Syrian Arab Republic, Saudi Arabia, Bahrain, Jordan, Iraq, Yemen, Islamic Republic of Iran, Azerbaijan, Kazakhstan, United Arab Emirates, Oman, Turkmenistan, Uzbekistan, Afghanistan, Pakistan, Tajikistan, Kyrgyzstan, China, Mongolia.

Regional distribution: Occurs across a wide geographical area but at low densities. Currently most abundant in Dzungarian Gobi Desert, but also present in Great Lakes Depression, Valley of the Lakes, Trans



Altai Gobi Desert, Eastern Gobi, and Alashan' Gobi Desert (Bannikov, 1954; Sokolov and Orlov, 1980; Amgalan, 1984; 1986; Lkhagvasuren *et al.*, 1999).

Abundance

Goitered gazelle have experienced significant global declines over the past 50 years, and Mongolia is thought to contain 40-50% of the global population (Lkhagvasuren *et al.*, 2001). Between the 1940s and 1960s the range and population size of this species declined in Mongolia by 30% (Lkhagvasuren *et al.*, 2001), and an assessment in the 1990s estimated the total population to consist of 60,000 individuals (Amgalan, 1995).

Habitat and ecology

Mountain slopes and valleys in semi-desert and desert habitats, feeding on *Stipa gobica*, *Anabasis brevifolia*, *Allium* spp., and *Halogeton* spp. (Bannikov, 1954). Ascends to altitudes of up to 2,700 metres in summer (Bannikov, 1954), and migrates seasonally in search of pasture and water.

Dominant threats

Illegal hunting for meat and sport is the primary threat. Although this species requires very little water, increasing numbers of livestock may compete for use of oases, resulting in pasture degradation (further evidence is required). Increasing resource extraction (mining) is not causing a substantial loss of habitat at present, but associated human disturbance is a threat in some areas.

Conservation measures in place

- Range includes nine protected areas in Great Gobi Strictly Protected Area sections A and B (Trans Altai Gobi Desert and Dzungarian Gobi Desert), Gobi Gurvansaikhan National Park (Gobi Altai Mountain Range), and Sharga and Mankhan nature reserves (Mongol Altai Mountain Range) (Lkhagvasuren *et al.*, 2001).
- A number of new protected areas have been proposed in South Gobi (Northern Gobi, Alashan' Gobi Desert and Eastern Gobi), which include parts of the known Mongolian range of this species.
- The German Technical Co-operation (GTZ) began a ten year project in 1994 to strengthen the management of protected areas in South Gobi, which will benefit this species.
- More than 120 people attended a workshop entitled 'Mongolian Wildlife Trade' held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Involve the public in gazelle conservation, utilising integrated rural development programmes.
- Conduct further ecological research and monitor population trends.
- Regulate use of water sources in dry areas (Lkhagvasuren *et al.*, 2001).
- Enhance enforcement of existing protective legislature (Lkhagvasuren *et al.*, 2001).
- Assess the effectiveness of reintroduction programmes in northern Great Lakes Basin in Great Lakes Depression (Lkhagvasuren *et al.*, 2001).
- Implement recommendations from the 'Mongolian Wildlife Trade' workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: L. Amgalan, J.E.M. Baillie, N. Batsaikhan, S. Dulamtseren, S.R.B. King, R. Samiya and M. Stubbe.

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Rangifer tarandus (Linnaeus, 1758)

Order: Artiodactyla

Family: Cervidae

Common names: Reindeer or caribou (English),
tsaa buga (Mongolian)

Subspecies in Mongolia: *R. t. valentinae*

Synonyms: *R. caribou*, *R. valentinae*, *R. granti*
(see Wilson and Reeder (1993) for further details).
Domestic populations are genetically distinct from
wild populations (Geptner *et al.*, 1961).



Photograph courtesy of B. Huffman
(Ultimate Ungulate) and Toronto Zoo

Description

Reindeer have a thick, heavy coat, with a layer of woolly underfur covered by stiff guard hairs. Coloration varies from very dark to very pale, but generally it is brown or grey with pale underparts and a lighter coloured summer coat. This large deer species has a head-rump measurement of 180-220 cm, a shoulder height of 110-140 cm, and a tail length of 7-20 cm. (Sokolov and Orlov, 1980). Unlike all other deer species, both sexes grow broad antlers, with forward projecting brow tines (Nowak, 1991). One antler is always larger than the other and is used as a shovel, digging away snow to reach the mosses on which it feeds (Vevers and Pinner, 1948). Feet are large and spatulate, enabling movement in deep snow.

Conservation overview

Global status: Least Concern

Regional status: Vulnerable, D1

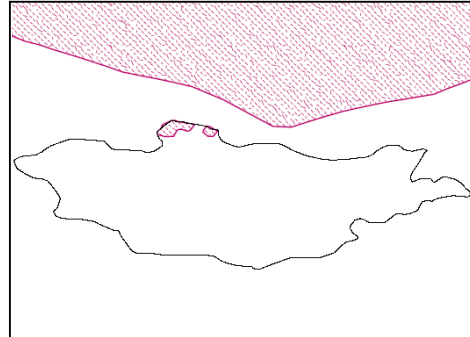
Legal status: *R. t. valentinae* is protected as Very Rare under part 7.1 of the Mongolian Law

on Fauna (2000) (Badam and Ariunzul, 2005). Hunting has been prohibited since 1953, and it is protected as Very Rare under the 1995 Mongolian Hunting Law (MNE, 1996). Listed as Very Rare in the 'Mongolian Red Book' of 1987 and 1997 (Shagdarsuren *et al.*, 1987; Shiirevdamba *et al.*, 1997). Approximately 13% of the species' range in Mongolia occurs within protected areas.

Distribution

Global distribution: Canada, USA, Greenland, Norway, Finland, Russian Federation, Mongolia.

Regional distribution: Distributed upstream of Jodog River, and also along Byaranga, Tengis, Nariin Horoo, Sharga, Heven, and Zалуu Uur rivers, all of which are in Hövsgöl Mountain Range (Bannikov, 1954; Namnandorj, 1976; Bazardorj and Sukhbat, 1984; Litvinov and Bazardorj, 1992).



Abundance

Two separate populations of this species are present in Mongolia (Litvinov and Bazardorj, 1992). No robust data on population trends or abundance are currently available, although the total Mongolian population is believed to consist of fewer than 1,000 individuals.

Habitat and ecology

Forested habitats with moss and dry grass, in Mongolia this species favours high mountain slopes at elevations of 2,300-3,000 metres (Vevers and Pinner, 1948). Reindeer migrate seasonally in Mongolia, but not over long distances (Litvinov and Bazardorj, 1992).

Dominant threats

Illegal hunting for meat and skins has caused a significant population decline, and remains the dominant threat. Possible habitat degradation through grazing by increasing numbers of domesticated reindeer may constitute a threat in some areas (further evidence is required), and livestock can transmit diseases such as brucellosis. Hybridisation with domestic reindeer also constitutes a potential threat, although the level of occurrence is not yet known.

Conservation measures in place

- This species is conserved under Mongolian Protected Area Laws and Hunting Laws. However, no conservation measures specifically aimed at this species have been established to date.
- More than 120 people attended a workshop entitled 'Mongolian Wildlife Trade' held in Ulaanbaatar in August 2005. Working groups outlined cross-cutting and sector-based recommendations for the effective management of wildlife trade in Mongolia.

Conservation measures required

- Enhance enforcement of existing protective legislature, coupled with alternative incomes and livelihood programmes, in order to establish sustainable management.
- Improve conservation management and maintenance within protected areas.
- Conduct further ecological research and monitor population trends.
- Implement recommendations from the 'Mongolian Wildlife Trade' workshop (see Wingard and Zahler (2006) for details of recommended actions).

Compilers and reviewers: J.E.M. Baillie, N. Batsaikhan, D. Bazardorj, S. Dulamtseren, S.R.B. King, R. Samiya and M. Stubbe.

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ANNEXES

Annex I. List 1: Species identified as occurring within Mongolia and assessed at the Mongolian Biodiversity Databank Workshop.

N.B. The Red List of Mongolian Mammals and its associated documents contain taxa that were on the agreed list for the Mongolian Biodiversity Databank Workshop, i.e. those that were known to occur in Mongolia in 2005. Subsequent to the workshop, several additional species have been suggested to occur in Mongolia, based on recent range expansions or their occurrence close to the Mongolian border. Those which are likely to occur in Mongolia have been added to List 1, but are marked with a plus sign (+) to indicate that they were not assessed during the workshop.

a) Rodentia

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
Sciuridae			
<i>Marmota baibacina</i> Kastschenko, 1899	Grey marmot	Data Deficient	Least Concern
<i>Marmota sibirica</i> (Radde, 1862)	Siberian marmot	Endangered, A2ad	Least Concern
<i>Pteromys volans</i> (Linnaeus, 1758)	Russian flying squirrel	Data Deficient	Near Threatened
<i>Sciurus vulgaris</i> Linnaeus, 1758	Eurasian red squirrel	Near Threatened	Near Threatened
<i>Spermophilus alashanicus</i> Büchner, 1888	Alashan ground squirrel	Endangered, A3c	Least Concern
<i>Spermophilus dauricus</i> Brandt, 1843	Daurian ground squirrel	Data Deficient	Least Concern
<i>Spermophilus erythrogegens</i> Brandt, 1841	Red-cheeked ground squirrel	Least Concern	Least Concern
<i>Spermophilus undulatus</i> (Pallas, 1778)	Long-tailed ground squirrel	Least Concern	Least Concern
<i>Tamias sibiricus</i> (Laxmann, 1769)	Siberian chipmunk	Least Concern	Least Concern
Gliridae			
<i>Dryomys nitedula</i> (Pallas, 1778)	Forest dormouse	Data Deficient	Near Threatened
Castoridae			
<i>Castor fiber</i> Linnaeus, 1758	Eurasian beaver	Endangered, B1ab(iii)	Near Threatened

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
Dipodidae			
<i>Allactaga balikunica</i> Hsia and Fang, 1964	Balikun jerboa	Least Concern	Least Concern
<i>Allactaga bullata</i> Allen, 1925	Gobi jerboa	Data Deficient	Near Threatened
<i>Allactaga elater</i> (Lichtenstein, 1828)	Small five-toed jerboa	Endangered, B1ab(iii)	Least Concern
<i>Allactaga sibirica</i> (Forster, 1778)	Siberian jerboa	Least Concern	Least Concern
<i>Cardiocranius paradoxus</i> Satunin, 1903	Five-toed pygmy jerboa	Data Deficient	Vulnerable, A1c
<i>Dipus sagitta</i> (Pallas, 1773)	Northern three-toed jerboa	Least Concern	Least Concern
<i>Euchoreutes naso</i> Sclater, 1891	Long-eared jerboa	Vulnerable, A3c	Endangered, A1c
<i>Pygeretmus pumilio</i> (Kerr, 1792)	Dwarf fat-tailed jerboa	Least Concern	Least Concern
<i>Salpingotus crassicauda</i> Vinogradov, 1924	Thick-tailed pygmy jerboa	Data Deficient	Vulnerable, A1c
<i>Salpingotus kozlovi</i> Vinogradov, 1922	Kozlov's pygmy jerboa	Data Deficient	Near Threatened
<i>Stylodipus andrewsi</i> Allen, 1925	Andrews's three-toed jerboa	Least Concern	Least Concern
<i>Stylodipus sungorus</i> Sokolov and Shenbrot, 1987	Mongolian three-toed jerboa	Endangered, A3c	Endangered, A3c●
Cricetidae			
<i>Allocricetulus curtatus</i> (Allen, 1925)	Mongolian hamster	Least Concern	Least Concern
<i>Cricetulus barabensis</i> (Pallas, 1773)	Striped dwarf hamster	Least Concern	Least Concern
<i>Cricetulus longicaudatus</i> (Milne-Edwards, 1867)	Long-tailed dwarf hamster	Least Concern	Least Concern
<i>Cricetulus migratorius</i> (Pallas, 1773)	Grey hamster	Data Deficient	Near Threatened
<i>Cricetulus sokolovi</i> Orlov and Malygin, 1988	Sokolov's dwarf hamster	Data Deficient	Least Concern
<i>Phodopus campbelli</i> (Thomas, 1905)	Campbell's hamster	Least Concern	Least Concern

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
<i>Phodopus roborovskii</i> (Satunin, 1903)	Desert hamster	Least Concern	Least Concern
Arvicolidae			
<i>Alticola barakshin</i> Bannikov, 1947	Gobi Altai mountain vole	Data Deficient	Least Concern
<i>Alticola macrotis</i> (Radde, 1862)	Large-eared vole	Data Deficient	Least Concern
<i>Alticola semicanus</i> (Allen, 1924)	Mongolian silver vole	Least Concern	Least Concern
<i>Alticola strelzowi</i> (Kastschenko, 1899)	Flat-headed vole	Data Deficient	Least Concern
<i>Alticola tuvunicus</i> Ognev, 1950	Tuva silver vole	Data Deficient	Least Concern
<i>Arvicola terrestris</i> (Linnaeus, 1758)	European water vole	Data Deficient	Least Concern
<i>Clethrionomys rufocanus</i> (Sundevall, 1846)	Grey red-backed vole	Least Concern	Least Concern
<i>Clethrionomys rutilus</i> (Pallas, 1779)	Northern red-backed vole	Least Concern	Least Concern
<i>Ellobius tancrei</i> Blasius, 1884	Zaisan mole vole	Least Concern	Least Concern
<i>Eolagurus luteus</i> (Eversmann, 1840)	Yellow steppe lemming	Data Deficient	Lower Risk, conservation dependant
<i>Eolagurus przewalskii</i> (Büchner, 1889)	Przewalski's steppe lemming	Data Deficient	Least Concern
<i>Lagurus lagurus</i> (Pallas, 1773)	Steppe lemming	Data Deficient	Least Concern
<i>Lasiopodomys brandti</i> (Radde, 1861)	Brandt's vole	Least Concern	Least Concern
<i>Lasiopodomys mandarinus</i> (Milne-Edwards, 1871)	Mandarin vole	Data Deficient	Least Concern
<i>Microtus arvalis</i> (Pallas, 1778)	Common vole	Data Deficient	Least Concern
<i>Microtus fortis</i> Büchner, 1889	Reed vole	Data Deficient	Least Concern
<i>Microtus gregalis</i> (Pallas, 1779)	Narrow-headed vole	Least Concern	Least Concern
<i>Microtus limnophilus</i> Büchner, 1889	Lacustrine vole	Data Deficient	Least Concern

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
<i>Microtus maximowiczii</i> (Schrenk, 1859)	Maximowicz's vole	Data Deficient	Least Concern
<i>Microtus mongolicus</i> (Radde, 1861)	Mongolian vole	Least Concern	Least Concern
<i>Microtus oeconomus</i> (Pallas, 1776)	Root vole	Least Concern	Least Concern
<i>Myopus schisticolor</i> (Lilljeborg, 1844)	Wood lemming	Data Deficient	Near Threatened
Muridae			
<i>Apodemus agrarius</i> (Pallas, 1771)	Striped field mouse	Data Deficient	Least Concern
<i>Apodemus peninsulae</i> (Thomas, 1907)	Korean field mouse	Least Concern	Least Concern
<i>Micromys minutus</i> (Pallas, 1771)	Eurasian harvest mouse	Data Deficient	Near Threatened
Gerbillidae			
<i>Meriones meridianus</i> (Pallas, 1773)	Mid-day gerbil	Least Concern	Least Concern
<i>Meriones tamariscinus</i> (Pallas, 1773)	Tamarisk gerbil	Endangered, B1ab(iii)	Least Concern
<i>Meriones unguiculatus</i> (Milne-Edwards, 1867)	Mongolian gerbil	Least Concern	Least Concern
<i>Rhombomys opimus</i> (Lichtenstein, 1823)	Great gerbil	Least Concern	Least Concern
Spalacidae			
<i>Myospalax aspalax</i> (Pallas, 1776)	False zokor	Data Deficient	Least Concern
<i>Myospalax psilurus</i> (Milne-Edwards, 1874)	Manchurian zokor	Data Deficient	Least Concern

b) Lagomorpha

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
Ochotonidae			
<i>Ochotona alpina</i> (Pallas, 1773)	Alpine pika	Least Concern	Least Concern
<i>Ochotona dauurica</i> (Pallas, 1776)	Daurian pika	Least Concern	Least Concern

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
<i>Ochotona hoffmanni</i> Formozov, Yakhontov and Dmitriev, 1996+		Not Evaluated	Vulnerable, D2
<i>Ochotona hyperborea</i> (Pallas, 1811)	Northern pika	Least Concern	Least Concern
<i>Ochotona pallasii</i> (Gray, 1867)	Pallas's pika	Least Concern	Least Concern
Leporidae			
<i>Lepus tibetanus</i> +		Not Evaluated	Not Evaluated
<i>Lepus timidus</i> Linnaeus, 1758	Arctic hare	Least Concern	Least Concern
<i>Lepus tolai</i> Pallas, 1778	Tolai hare	Least Concern	Not Evaluated

c) Erinaceomorpha

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
Erinaceidae			
<i>Hemiechinus auritus</i> (Gmelin, 1770)	Long-eared hedgehog	Least Concern	Least Concern
<i>Mesechinus dauuricus</i> (Sundevall, 1842)	Daurian hedgehog	Least Concern	Least Concern

d) Soricomorpha

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
Soricidae			
<i>Crocidura sibirica</i> Dukelsky, 1930	Siberian shrew	Data Deficient	Least Concern
<i>Neomys fodiens</i> (Pennant, 1771)	Eurasian water shrew	Least Concern	Least Concern
<i>Sorex caecutiens</i> Laxmann, 1788	Laxmann's shrew	Least Concern	Least Concern
<i>Sorex daphaenodon</i> Thomas, 1907	Large-toothed Siberian shrew	Least Concern	Least Concern
<i>Sorex isodon</i> Turov, 1924	Even-toothed shrew	Data Deficient	Least Concern

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
<i>Sorex minutissimus</i> Zimmermann, 1780	Least shrew	Data Deficient	Least Concern
<i>Sorex roboratus</i> Hollister, 1913	Flat-skulled shrew	Data Deficient	Least Concern
<i>Sorex tundrensis</i> Merriam, 1900	Tundra shrew	Data Deficient	Least Concern
Talpidae			
<i>Talpa altaica</i> Nikolsky, 1883	Siberian mole	Data Deficient	Least Concern

e) Chiroptera

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
Vespertilionidae			
<i>Eptesicus gobiensis</i> Bobrinskii, 1926	Gobi big brown bat	Least Concern	Least Concern
<i>Eptesicus nilssonii</i> (Keyserling and Blasius, 1839)	Northern bat	Least Concern	Least Concern
<i>Eptesicus serotinus</i> Schreber, 1774+	Serotine	Not Evaluated	Lower Risk, conservation dependant
<i>Hypsugo savii</i> (Bonaparte, 1837)	Savi's pipistrelle	Data Deficient	Least Concern
<i>Murina leucogaster</i> Milne-Edwards, 1872	Greater tube-nosed bat	Data Deficient	Least Concern
<i>Myotis brandti</i> (Eversmann, 1845)	Brandt's bat	Data Deficient	Least Concern
<i>Myotis daubentonii</i> (Kuhl, 1817)	Daubenton's bat	Least Concern	Least Concern
<i>Myotis ikonnikovi</i> Ognev, 1912	Ikonnikov's bat	Data Deficient	Least Concern
<i>Myotis mystacinus</i> (Kuhl, 1817)	Whiskered bat	Least Concern	Least Concern
<i>Nyctalus noctula</i> (Schreber, 1774)	Noctule	Data Deficient	Least Concern
<i>Plecotus auritus</i> (Linnaeus, 1758)	Brown long-eared bat	Least Concern	Least Concern
<i>Plecotus austriacus</i> (Fischer, 1829)	Grey long-eared bat	Data Deficient	Least Concern

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
<i>Vespertilio murinus</i> Linnaeus, 1758	Particoloured bat	Least Concern	Least Concern
<i>Vespertilio superans</i> Thomas, 1899	Asian particolored bat	Data Deficient	Least Concern

f) Carnivora

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
Felidae			
<i>Felis silvestris</i> Schreber, 1775	Wild cat	Data Deficient	Least Concern
<i>Lynx lynx</i> (Linnaeus, 1758)	Eurasian lynx	Near Threatened	Near Threatened
<i>Otocolobus manul</i> (Pallas, 1776)	Pallas's cat	Near Threatened	Near Threatened
<i>Uncia uncia</i> (Schreber, 1775)	Snow leopard	Endangered, C1	Endangered, C2a(i)
Canidae			
<i>Canis lupus</i> Linnaeus, 1758	Grey wolf	Near Threatened	Least Concern
<i>Cuon alpinus</i> (Pallas, 1811)	Asiatic wild dog	Regionally Extinct	Endangered, C2a(i)
<i>Nyctereutes procyonoides</i> (Gray, 1834)	Raccoon dog	Least Concern	Least Concern
<i>Vulpes corsac</i> (Linnaeus, 1768)	Corsac fox	Near Threatened	Least Concern
<i>Vulpes vulpes</i> (Linnaeus, 1758)	Red fox	Near Threatened	Least Concern
Mustelidae			
<i>Arctonyx collaris</i> Cuvier, 1825	Hog badger	Data Deficient	Least Concern
<i>Gulo gulo</i> (Linnaeus, 1758)	Wolverine	Least Concern	Vulnerable, A2c
<i>Lutra lutra</i> (Linnaeus, 1758)	Eurasian otter	Data Deficient	Near Threatened
<i>Martes foina</i> (Erxleben, 1777)	Beech marten	Data Deficient	Least Concern
<i>Martes zibellina</i> (Linnaeus, 1758)	Sable	Vulnerable, A3cd	Least Concern

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
<i>Meles meles</i> (Linnaeus, 1758)	Eurasian badger	Least Concern	Least Concern
<i>Mustela altaica</i> Pallas, 1811	Alpine weasel	Least Concern	Least Concern
<i>Mustela erminea</i> Linnaeus, 1758	Stoat	Least Concern	Least Concern
<i>Mustela eversmanni</i> Lesson, 1827	Steppe polecat	Least Concern	Least Concern
<i>Mustela nivalis</i> Linnaeus, 1766	Least weasel	Least Concern	Least Concern
<i>Mustela sibirica</i> Pallas, 1773	Siberian weasel	Least Concern	Least Concern
<i>Vormela peregusna</i> (Güldenstädt, 1770)	Marbled polecat	Data Deficient	Least Concern
Ursidae			
<i>Ursus arctos</i> Linnaeus, 1758	Brown bear	Data Deficient	Least Concern
<i>Ursus arctos gobiensis</i> Sokolov and Orlov, 1992	Gobi bear	Critically Endangered, D	Critically Endangered, D●●

f) Perissodactyla

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
Equidae			
<i>Equus ferus przewalskii</i> (Groves, 1986)	Przewalski's horse	Critically Endangered, D	Critically Endangered, D●
<i>Equus hemionus</i> Pallas, 1775	Asiatic wild ass	Endangered, A4abd	Vulnerable, A3bcd and C1

g) Artiodactyla

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
Suidae			
<i>Sus scrofa</i> Linnaeus, 1758	Wild boar	Near Threatened	Least Concern
Camelidae			
<i>Camelus bactrianus ferus</i> Przewalski, 1878	Bactrian camel	Endangered, C1	Critically Endangered, A3de and A4ade

<i>Scientific name</i>	<i>Common name</i>	<i>Regional assessment</i>	<i>Global assessment</i>
Bovidae			
<i>Capra sibirica</i> (Pallas, 1776)	Siberian ibex	Near Threatened	Least Concern
<i>Gazella subgutturosa</i> (Güldenstädt, 1780)	Goitered gazelle	Vulnerable, A3cde	Vulnerable, A2ad
<i>Ovis ammon</i> (Linnaeus, 1758)	Argali	Endangered, A2acde and A3cde	Vulnerable, A2cde
<i>Procapra gutturosa</i> (Pallas, 1777)	Mongolian gazelle	Endangered, A4cde	Least Concern
<i>Saiga tatarica</i> (Linnaeus, 1766)	Saiga antelope	Endangered, A2acde	Critically Endangered, A2a
Moschidae			
<i>Moschus moschiferus</i> Linnaeus, 1758	Siberian musk deer	Endangered, A3d	Vulnerable, A1acd
Cervidae			
<i>Alces alces</i> (Linnaeus, 1758)	Elk	Endangered, A2cd and A3d	Least Concern
<i>Capreolus pygargus</i> (Pallas, 1771)	Siberian roe deer	Least Concern	Least Concern
<i>Cervus elaphus</i> Linnaeus, 1758	Red deer	Critically Endangered, A2acd and A3d	Least Concern
<i>Rangifer tarandus</i> (Linnaeus, 1758)	Reindeer	Vulnerable, D1	Least Concern

List 2: Possible species occurring within Mongolia.

N.B. Species included in the Red List relate to species known to occur in the country in 2005, additional species whose presence is suspected or likely based on occurrence close to the borders/expanding ranges but have not yet been confirmed are included in the possible species list.

<i>Scientific name</i>	<i>Common name</i>
RODENTIA	
Dipodidae	
<i>Sicista subtilis</i> (Pallas, 1773)	Southern birch mouse
<i>Sicista betulina</i> Pallas, 1779	Northern birch mouse
Muridae	
<i>Microtus agrestis</i> (Linnaeus, 1761)	Field vole
SORICOMORPHA	
Soricidae	
<i>Sorex araneus</i> Linnaeus, 1758	Eurasian shrew
<i>Sorex minutus</i> Linnaeus, 1766	Eurasian pygmy shrew
CHIROPTERA	
Vespertilionidae	
<i>Eptesicus bottae</i> (Peters, 1869)	Botta's serotine
