

# Wildlife conservation and management in Mongolia

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**American and Asian biologists provide a recent view of a less traveled but intriguing area previously explored by the naturalist who was the model for Indiana Jones.**

Mongolia, a landlocked Asian country (88°–120°E longitude and 41°30'–52°N latitude) between China and Russia, encompasses 1,565,000 km<sup>2</sup> (see map). Mongolia was the second country to become communist and remained under the influence of the Soviet Union for 69 years until its independence in 1990 (Academy of Science 1990). Mongolia is in the process of adapting to a capitalistic economy and a democratic government.

Mongolia had a human population of 2.2 million in 1992, making it one of the least densely populated countries in the world, with approximately 1.4 people/km<sup>2</sup> (Neupert and Goldstein 1994). One quarter of the population lives in the capital, Ulaan Baatar, and the economy is pastoral. In 1985, the country had an estimated 22.5 million livestock, including sheep (59%), goats (19%), cattle (11%), horses (9%), and camels (2%). Domestic yaks (1%) are pastured in mountainous areas, principally the Altai region (Sanders 1986).

Mongolia's landscape consists of high mountains, plateaus and uplands of varied elevation from about 540 m in the Gobi Desert to 4,653 m in the western Altai Mountains, which form the western boundary with China and extend into the Gobi Desert. Mongolia's northern and western mountainous landscape gradually descends to an eastern and central desert

lowland. Other prominent mountain ranges are the Hangai and Hentel. Asia's largest desert, the Gobi is 1,200 x 600 km and extends into southern Mongolia and northern China. Mongolia's vast rangelands are unfenced with no paved roads connecting major cities and only 1 rail line connecting the capital with China and Russia. Approximately 79% of the land area is rangeland, 10% is forest, and <1% is arable (Academy of Science 1990).

Mongolia's has long, cold winters and short, humid summers. January is the coldest month with temperatures of -40°C or colder in contrast to >38°C during summer. Rainfall is highly variable, averaging 46 cm in the mountains and 10 cm in the Gobi Desert. Most precipitation occurs between May and September, the wettest months being July and August. Extensive flash flooding caused by sudden downpours is common. Frequent clear sunny days accentuate a visual openness across the landscape (Academy of Science 1990).

## Mongolia's natural setting

Mongolia became prominent in western zoological literature due to 4 monumental expeditions led by Roy Chapman Andrews of the American Museum of Natural History during the 1920's (Andrews 1921, 1926, 1932). The expeditions included as many as 8

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General geographic location and vegetation zones of Mongolia.

Dodge touring cars, 125 camels, and a staff of 40. The principal mission of the expeditions was paleontological and they were the first to find dinosaur eggs. However, expedition members also extensively collected extant vertebrates resulting in the treatises of Allen (1938, 1940) on mammals, Vaurie (1964) on birds, and numerous popular and technical publications. Soviet, East European, and Mongolian biologists subsequently reported faunal and floral studies, including Bannikov (1954), Stubbe and Chotolchu (1968), and Piechocki et al. (1981).

Mongolia's vegetation includes >2,100 species of vascular plants, of which 110 are endemic and 70 are relict species (Sokolov et al. 1991). Bupalov (1964) and Vaurie (1964) divided Mongolia into several major zones, which generally correspond to broad vegetation types and landscapes.

### ***Vegetation types from north to south***

Bupalov (1964) described alpine and high mountain tundra zones as having poorly developed soil cover with vegetation in small, turfy patches. Fescue (*Festuca ovina*), meadowgrass (*Poa attenuata*), and reed grasses (*Calamagrostis* spp.) are common. Sedges and rushes also occur.

The forest type is described by Vaurie (1964) and Bupalov (1964) as limited in distribution and comprising about 10% of Mongolia's land base. Forests occur chiefly along northern slopes in a patchy distribution. Mongolia's forests are a southern extension of

the Siberian taiga, mainly Siberian pine (*Pinus sibiricus*) in the north, while in the south or at lower elevations species of fir (*Abies* spp.), Scotch pine (*Pinus sylvestris*), and birch (*Betula verrucosa*) dominate. Larch (*Larix* spp.), cedar (*Juniperus* spp.), poplar (*Populus* spp.) and a variety of berry bushes also grow within forest communities.

Bupalov (1964) described steppe communities as occurring on either gently rolling plains, or as grasslands at the edge of forests, or sometimes within forest clearings. Grass covers 60–80 % of the soil surface. Species of *Stipa*, *Festuca*, *Agropyron*, *Bromus* and other meadow grasses commonly occur. A variety of forbs, shrubs, and sedges also contribute floral diversity. Vaurie (1964) divided steppes into 2 zones, mountain steppe and grassy steppe. Mountain steppe

communities occur at highest elevations where they merge with the alpine zone. Forest is absent in this zone, but groves of larches, birches, poplars, hawthorns (*Crataegus* spp.), and dense thickets of willows (*Salix* spp.) occur in suitable moist areas. The grassy steppe and arid steppe (described within the desert type) form the dominant landscape of Mongolia. Together these 2 steppe communities comprise about 50% of the landscape. Various grasses dominate the grassy steppe. Grasses are replaced by sagebrush (*Artemisia* spp.) and halophytic plants as the grassy steppe merges into the arid steppe.



A ger, or yurt, the home of Mongolian pastoralists. Mongolian culture has primary origins in nomadic pastoralist traditions.

The desert zone comprises most of the Gobi region and is characterized by extremely sparse, low growing vegetation, especially in southern portions. Large areas in the Gobi are described as semidesert or arid steppe (Vaurie 1964). Many brackish or saline lakes and swamps are scattered in the arid steppe. This zone includes small groves of willows and poplars in the more sheltered gullies and valleys in the Gobi Altai. A variety of low bushes are common, including creeping junipers, sagebrushes, and halophytic plants.

True desert as described by Vaurie (1964) occupies about 15% of Mongolia and lies south of the Altai in the extreme southeast. Some patches of true desert are also found intermixed within the arid steppe community. Although many desert plants are hard and coarse, succulents are more common in the Gobi than in other deserts. Wild onion (*Allium* spp.), leguminous shrubs, and feather grasses (*Stipa* spp.) are other key components of the Gobi's plant communities. Gobi desert soils are very stony, gravelly, or pebbly and characterized by relatively little sand.

### Vertebrate fauna

Mongolia has a diverse vertebrate fauna including 130 species of mammals, about 370 bird species, 70 fish species, 9 reptile species, and 7 amphibian species (Sokolov et al. 1991). It supports a temperate Palearctic fauna and shares several conspecific ungulates, carnivores, and birds with North America.

Wild argali sheep (*Ovis ammon*) and ibex (*Capra sibirica*) are widespread ungulates occurring in deserts and arid and montane steppes. Goitered gazelles (*Gazella subgutturosa*) occur in deserts and arid steppes. White-tailed gazelles (*Procapra gutturosa*) are common in the eastern grasslands. Maral or red deer (*Cervus elaphus*), wild pigs (*Sus scrofa*), roe-

buck (*Capreolus capreolus*), moose (*Alces alces*) and brown bears (*Ursus arctos*) occur principally in northern forests, and an isolated brown bear population occurs in the arid Great Gobi National Park (Schaller et al. 1993). Wolves (*Canis lupus*) and red foxes (*Vulpes vulpes*) are common and widespread. The wild progenitor of the Bactrian or two-humped camel (*Camelus bactrianus*) is restricted to a small area in southwestern Mongolia (Tulgat and Schaller 1992). Snow leopards (*Felis uncia*), a threatened species, occur principally in the Altai Mountains (Schaller et al. 1994). Other threatened mammals include Asiatic wild asses (*Equus hemionus*), caribou (*Rangifer tarandus*), saiga antelope (*Saiga tatarica*), and beavers (*Castor fiber*). Otters (*Lutra lutra*) are endangered. Przewalski's horse (*Equus caballus przewalskii*) was extirpated but is being reestablished (Bouman et al. 1994).

### Wildlife laws and administration

Mongolia has a long history of wildlife conservation probably originating even before the hunting preserves of Genghis Khan in the 12th century. All land and natural resources were nationalized in 1921 and private ownership was abolished. Several laws passed since 1924 established hunting regulations and prohibited the hunting of certain species (Sokolov et al. 1991). The Ministry for Nature and the Environment is responsible for wildlife conservation and protected areas. The major conservation law, enacted in 1972, is the Decree on the Rational Utilization of Natural Environment. The Mongolian Society for Nature Conservation and Environmental Protection, divided into commissions covering nature reserves, natural monuments, and landscape protection, is responsible for applying the 1972 Decree (Green et al. 1991).

Most wildlife research in Mongolia is the responsibility of the Institute for General and Experimental Biology of the Mongolia Academy of Sciences. The Division for Animal Ecology within the Institute employs biologists to conduct research. Game surveys are the responsibility of the Institute of Forestry and Hunting, the research branch of the Ministry for Nature.

### Conservation and management challenges

Mongolia currently faces stringent economic constraints because of the loss of Russian economic support. Mongolians are again almost totally dependent on a live-



Domestic Bactrian camels in a Gobi landscape.

Raul Valdez's wild sheep surveys in Mongolia in 1993 were the realization of a dream that began as a teenager after reading the thrilling adventures of Roy Chapman Andrews in Mongolia. Andrews, the model for Indiana Jones, was one of the most charismatic and popular explorer-naturalists of the twentieth century. He vividly recorded his scientific, hunting, and travel adventures in numerous adult and children's books and magazine articles. Mongolia remains much as he described it—vast, remote, uninhabited landscapes with large herds of wild ungulates roaming deserts and steppes unblemished by fences and paved roads and a paradise for fossil hunters. One still encounters herds of over 100 goitered gazelles and wild asses and most of the low, erosive uplands and mountain ranges support populations of wild sheep and ibex.

Valdez participated in wild sheep surveys in the eastern Gobi Desert and western Altai Mountains in 1993. Sheep observations were usually made from high points overlooking extensive areas after driving, walking, or riding a horse. Elevations in the Gobi ranged from 1,000 to 1,300 m and those in the Altai from 2,100 to 3,100 m. Argalis in the Gobi were widespread. A total of 494 Gobi argalis were sighted, and of those sexed and aged, 233 were males, 124 were females, and 54 were lambs. Several wolves also were seen as were numerous wild asses and gazelles in the Gobi. Wild sheep in the Altai are less widespread and numerous than in the Gobi. This may be because of greater grazing by domestic animals in the Altai due to greater availability of water. There is widespread localized overgrazing in both regions. Much of Mongolia's rangelands occur in fragile desert and semidesert environments. Rangelands and wildlife management expertise is greatly needed to develop efficacious multispecies grazing systems.

The best travel guide to Mongolia is R. Storey's *Mongolia—a travel survival kit* (1993, Lonely Planet Publications, Berkeley, CA.). There is no comprehensive publication in English on Mongolia's natural history. *A field guide to the birds of the Soviet Union* (1984, V. E. Flint et al., Princeton Univ. Press, Princeton, N.J.) is a useful guide to the bird fauna of Mongolia.—**R. Valdez**

stock industry based on inefficient methods. Although some rangelands remain in excellent condition, especially in the eastern grasslands, some rangelands are being locally overgrazed, greatly stressing wildlife that share the plant resources with domestic livestock. With such limited economic capacity, the government has few resources to devote to wildlife conservation programs. Through the Mongolia Biodiversity Program, the United Nations has initiated a cooperative program with Mongolian and foreign specialists to derive socioeconomic benefits from wildlife, expand nature reserves, promote ecotourism, improve the present wildlife legal framework, and develop a national conservation strategy.

Hunting has been a traditional activity. Most rural Mongolian families own weapons, which ostensibly are used to protect domestic herds from wolves. However, these weapons are also used to hunt wild ungulates to supplement the normal fare of domestic sheep (Mallon 1985a). Each province has an assigned wildlife warden; however, they lack vehicles and are poorly equipped.

Fourteen nature preserves have been established in Mongolia ranging from 5,300,000 ha (Great Gobi National Park) to 2,000 ha. However, most of these are not staffed or managed. The preserve system also is inadequate to protect Mongolia's biodiversity (Sokolov et al. 1991).

## Resource management considerations

A successful wildlife management program for Mongolia must integrate management of native species with the dominant land use of domestic livestock graz-



Gobi argali ewes in rocky uplands that are also grazed by domestic ungulates.

ing. Past efforts to manage or protect wildlife species by setting aside large units of land as wildlife reserves or sanctuaries has generally not succeeded because the local populace did not derive economic benefits.

For wildlife to be considered an important resource in an economically deprived country like Mongolia, the rural populace must benefit from this resource. Currently an ecotourism and hunting industry dependent on clients from foreign countries provides the potential for meeting this need. These industries will provide incentive to improve management and protection of wildlife because of the economic benefit derived. Wildlife already provides meat and byproducts for local and foreign consumption. Currently, several thousand white-tailed gazelles are cropped each year, and the meat is sold in foreign markets. Domestic hunters harvest millions of furbearers, principally marmots (*Marmota bobak*), and the furs are sold in domestic and foreign markets (Mallon 1985b). Big game hunting also provides money from foreign sources. Mongolia became a mecca for foreign hunters in 1967 when it allowed American hunters access to its numerous big game populations despite the lack of diplomatic relations between Mongolia and the United States. Hunters were particularly attracted by Mongolia's wild sheep populations, which included the world's largest wild sheep, the Altai argali, and the large populations of ibex and elk. Altai argali rams can attain horn lengths of 178 cm (70 inches) and basal circumferences of 50 cm (20 inches; Valdez 1982).

Wildlife management for Mongolia must implement programs that maintain multiple values. Programs that provide the products of society and maintain wildlife populations over most of the land base must be emphasized. The approach we recommend emphasizes implementing strategies for managed livestock grazing that maintain the health of soils and vegetation while providing for the habitat needs of wild animals and the human society. To be successful, this multispecies approach must integrate western range management techniques, such as grazing systems that incorporate rest-rotation schemes, and the knowledge Mongolian herders have gathered over several thousand years of interdependency with Mongolia's landscape (Frisina and Valdez 1994). It will also require a trained cadre of wildlife and range managers.

Resolving Mongolia's wildlife conservation problems will be difficult because of its depressed economic situation and its nondiversified agricultural base. It is imperative that Mongolia obtain better economic benefit from its rangelands, consistent

with the well-being of associated natural resources. Rangelands are difficult to develop for increased economic return because of their relatively low productivity, unreliable climates and markets, and complex land use issues (Smith and Foran 1993), but this is the ultimate long range solution. Fortunately, a knowledge base for judicious management of Eurasian steppes exists (Bo and Shiping 1993). Development of a diversified ecotourism industry offers the best immediate prospects, but its infrastructure will have to be improved to attract clients. Wildlife is an economically important natural resource that has not realized its full potential in Mongolia. However, Mongolia still maintains abundant and diverse wildlife populations inhabiting large landscapes that allow traditional migrations between seasonal ranges. Also, Mongolia has a low human population density and is not subjected to the burdensome sociopolitical and economic pressures common to overpopulated countries. Improved management of Mongolia's wildlife is 1 of its best options for diversifying an agriculturally based economy which will likely continue to depend on resources produced from rangelands.

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