

Chapter 9

Conservation issues in the Himalayan region of India

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1. Introduction

The Himalayan region is bestowed with varied landscape features that provide multitude of habitats to a diverse array of faunal communities including several species of wild ungulates (Prater 1980, Section 1 of this issue). The region covers nearly 11% of India's geographical area and range from sub-tropical to alpine zones. The region is well known for extensive alpine biome, temperate conifer and broadleaf forests, sub-tropical (foothill) forests, temperate grassy slopes, and various other habitats. Despite tremendous potential, most of the areas in this region exhibit low abundance of wild ungulates. It is an irony that there are more Himalayan Tahr (*Hemitragus jemlahicus*) in New Zealand in comparison to the Himalayan region (Caughley 1967, 1970). This fact generally speaks of the status of wild ungulates in the region. Most of the ungulates are found in small isolated pockets and largely restricted to Protected Areas (PAs). Even within the PAs, especially in the eastern Himalaya and adjacent hill states, wildlife and ungulate densities are very low (Katti *et al.*, 1990). It is not surprising that a naturalist, having conducted large mammal surveys in the eastern Himalaya, is known to have commented, "the stage is beautiful but many of the actors are missing".

Questions on mountain ungulate conservation in the Greater Himalaya

range from 'What are the reasons for low ungulate abundance in the Himalayan region' to 'What are the major issues pertaining to their conservation' and 'What are the ways and means to achieve better conservation status for mammals in general and the ungulates in particular'. We address these issues and strategies for conservation for mountain ungulates in the Greater Himalaya in this article.

2. Major Conservation Issues

Several factors have led to low abundance and poor conservation status of ungulates in the Himalayan region. Firstly, the Himalayan ecosystem is relatively young, fragile and low in primary productivity. With the increase in human population the area has undergone rapid degradation, fragmentation and loss of wildlife habitat. Poaching and trade of animal parts, competitive exclusion by the domestic livestock, faulty land use practices, and human - wildlife conflicts are other factors affecting wild ungulates and other faunal communities (Gaston *et al.*, 1983, Green 1985, Sathyakumar 1994, Sathyakumar *et al.* 1993, Vinod & Sathyakumar 1999). Some of the issues related to conservation of wildlife ungulates are discussed below.

2.1. Habitat degradation and fragmentation

i. Alpine Habitats of the Greater Himalaya:
The region above natural tree line (ca. 3300 – 3600 m above mean sea level in



the western and north-western and ca. 3600 – 3800 m in the central and eastern Himalaya) represent alpine habitats which are characterized by treeless vegetation, alpine scrub and meadows. The ungulates frequently inhabiting this zone are Blue sheep (*Pseudois nayaur*), Himalayan musk deer (*Moschus chrysogaster*), and Himalayan tahr. The major causes leading to degradation and fragmentation of alpine habitats include overgrazing by livestock (Kala and Rawat 1999), commercial harvest of wild medicinal herbs, uncontrolled tourism and mountaineering in certain areas (Sathyakumar 1993a). The area is very prone to soil erosion, avalanches and landslides owing to steep and fragile terrain. Very few PAs in the region give complete protection to alpine habitats except a few (e.g., Valley of Flowers NP and Nanda Devi National Park [NP] in Uttarakhand). However, a majority of the PAs remain neglected in terms of management even though they represent important habitats for typical faunal communities (Kothari 1995, Rawal & Dhar 2001).

ii. Sub-alpine Forests: The area between ca. 3000 m and natural 'tree line' represents an important ecological belt throughout the Himalaya. Besides Himalayan musk deer and serow (*Nemorhaedus sumatraensis*), it forms summer habitat for two important ungulates viz., *Hangul* (*Cervus elaphus hanglu*) in the west (Kashmir Valley) and *Takin* (*Budorcas taxicolor*) in the east (Mishmi hills, Arunachal Pradesh). Of all the habitats in the Himalayan region, the sub-alpine forests have undergone maximum degradation and fragmentation owing to anthropogenic activities such as collection of non-timber forest produce (including montane bamboo, mushroom,

medicinal and aromatic plants), poaching, livestock grazing and camping by the herders (Awasthi *et al.* communicated). Sathyakumar *et al.* (1993) have reported that increased livestock grazing and associated impacts have led to low musk deer densities in many areas in Kedarnath Wildlife Sanctuary. The subalpine forests, 'tree line' and the alpine scrub interspersed with alpine meadows is the optimal habitat for musk deer but this habitat, particularly the 'tree line' has degraded in many parts of the Himalaya due to cumulative impacts of livestock grazing. Most graziers prefer to camp and graze their livestock in and around 'tree line' due to availability of fuel wood, water, food and cover for livestock.

iii. Montane forests of North-Western and Western Himalaya: The forested habitats in middle elevation ranges (1500 - 3000 m) in the western and north-western Himalaya exhibit a great diversity of flora and fauna. The major vegetation types include Himalayan Dry Temperate (conifer), Himalayan Moist Temperate (broadleaf), and several other categories (Champion & Seth 1967, Singh and Singh 1987). In many areas (especially on south facing gentle slopes) the forests have been transformed into the scrub jungle and cultivation. The common ungulates of the forested habitat include Himalayan musk deer, serow, goral, sambar (*Cervus unicolor*), barking deer (*Munitacus muntjac*) and wild pig (*Sus scrofa*). Much of the forested habitats in the region are affected by encroachment for habitation and cultivation, livestock grazing, lopping of trees for fodder. These activities have led to failure of regeneration and resultant change in the structure and composition of forests. Rawat *et al.* (1999) have reported that plant species diversity have changed with an increase in unpalatable



plant species in the fringes of Kedarnath Wildlife Sanctuary as a result of human use. The forests of Western Himalaya are rich in wild mushrooms including highly prized morel (*Morchella esculenta*). Local people, in large groups, visit several parts of such PAs in order to collect this mushroom thereby causing heavy disturbances and affecting the threatened and sensitive species of fauna such as Himalayan musk deer and pheasants (Vinod and Sathyakumar 1999, Ramesh *et al.* 1999).

iv. Central and East Himalayan Montane Forests: Major forest types in the middle elevation (1500-3000 m) ranges of Sikkim (Central Himalaya) and Arunachal Pradesh include Temperate Broadleaf Forests, Conifer forests and bamboo brakes. These forests support Himalayan musk deer, serow, takin, several other ungulates such as Asian elephant (*Elephas maximus*), gaur (*Bos gaurus*), sambar, wild pig and various other mammals including primates, and carnivores. But for the occasional fire (localized in certain areas) and slash and burn agriculture in some parts of Arunachal Pradesh, much of the forested habitats in the central and eastern Himalaya are intact (IIRS 2002).

v. The Shivaliks and sub-Himalayan Forests: This zone (<1500 m) represents the sub-tropical climate, varied topography, rich alluvial soils and intermingling of taxa from the Indo-malayan and Palaeartic regions. The major forest formations, according Champion & Seth (1968) include Sub-tropical Dry Evergreen Forests, Sub-tropical Pine Forests, Northern Dry Mixed Deciduous Forest, Dry Shivalik Sal Forest, Moist Mixed Deciduous Forest, Sub-tropical Broadleaf Wet Hill Forest,

Northern Tropical Semi-evergreen Forest, and Northern Tropical Wet-evergreen Forest. The Shivalik hills are best represented between the Ganges and Yamuna rivers in Uttaranchal. The entire belt all along covers an area of ca. 40,000 km² of which only <2100 km² area falls under PAs represented by Simbalbara WS, Rajaji and Corbett NPs. Ecologically, entire Shivalik belt is considered as highly sensitive zone. This region suffers heavy fragmentation and degradation of habitat due to human encroachment and proliferation of exotic weeds such as *Lantana camara*, *Parthenium hysterophorus*, *Cassia tora*, and *Sida* spp. Hajra (2002), based on the analysis of remote sensing data of Shivalik zone in Uttaranchal found that even though south facing slopes appear to be suitable for goral, but only about 13% area was moderately suitable and less than 1% area is highly suitable for this species. Rest of the area is either forested or very steep and not available for goral.

vi. The North – Eastern Hills: The natural landscapes and habitats in this region have been extensively modified due to shifting cultivation or slash and burn (*Jhum*) agriculture. Besides, pressure on the land due to exploitation of forest for timber and lack of a scientific forest management has led to proliferation of exotic weeds and degradation of forests. With tremendous increase in human population during recent decades the *jhum* cycle has come down from 20-30 years to about 5 years and even up to 3 years in many areas. Reduction in *jhum* cycle due to increase in pressure on land has accelerated the process of habitat degradation and fragmentation which has affected ungulates and other faunal groups in the region (Mishra *et al.*, 1994).



vii. Temperate Grassy Slopes: The temperate belt in the western and north-western Himalaya support an extensive grassland habitat which is largely anthropogenic in nature. These grassy slopes have developed largely on the south facing, steeper slopes which cannot be cultivated and are burned during winter to promote grass growth. Such slopes are grazed and maintained as hay slopes or 'Ghasnis' in many sectors of Western Himalaya. The steeper and inaccessible areas are occupied by Himalayan tahr and goral (Schaller 1973, Cavallini 1990, Johnsingh 1992, Lovari & Apollonio 1993, Sathyakumar 1994, Mishra & Johnsingh 1997). Goral is one of the prominent species of mountain ungulates that has evolved in this habitat in the region (Mishra 1993, Pendharkar 1993). The gentler slopes close to human habitation have degraded over the years and goral habitat has been reduced considerably. The temperate grassy slopes and adjacent woodlands of Dachigam NP, Kashmir valley support a highly threatened subspecies, the *Hangul* or Kashmir stag. The grassy slopes of Dachigam are also reported to have degraded considerably over the years (Khursheed Ahmed, *personal communication*).

2.2 Habitat Loss

Excessive degradation and fragmentation eventually leads to habitat loss. Systematic studies documenting loss of ungulate habitats in the Himalayan region are lacking. Hence, it is difficult to point out clear cases of this phenomenon. However, in most of the sectors, there are plenty of evidences indicating the shrinkage of wildlife / ungulate habitat. Green (1986) reported that over 70% of potential musk deer habitat has already been lost due to habitat loss and habitat

degradation in the southern side of the Greater Himalaya. Based on the spatial time-series analysis of remote sensing data, Awasthi (2001) has pointed out that in upper regions of Bhagirathi Valley, Garhwal Himalaya there has been a considerable increase in the area of human inhabitation and cultivation during last 30 years. This study also indicates that much of the sub-alpine and temperate broadleaf forests have converted into scrub vegetation. Conversion of forested habitat into scrub, is in a way loss of habitat especially for the sensitive ungulates such as Himalayan musk deer. Displacement of human populations for the developmental projects, construction of roads along the sensitive habitats, encroachment of forests for agriculture and heavy infestation of exotic weeds are other causes of habitat loss in the region.

2.3. Competition with domestic livestock

Owing to high seasonality and low primary productivity, the Himalayan region supports relatively low ungulate / herbivore biomass. It is therefore, obvious that with the increase in the biomass of domestic livestock in many areas, wild ungulates have suffered competitive exclusion. Rawat (1998) has pointed out that several areas in the Himalaya there is an overstocking of livestock leading to decreased productivity and degradation of pastures. Sathyakumar *et al.* (1993) have reported that increased livestock grazing and associated impacts have led to low musk deer densities in many areas in Kedarnath Wildlife Sanctuary. Although animal husbandry is one of the main stay of livelihood in the Himalayan region, the management of livestock especially disease surveillance, rotational grazing and pasture management have been



neglected leading to conflicts with wildlife as well as PA managers.

Poaching: All mountain ungulates of the Greater Himalaya are seriously threatened due to poaching for meat, skin/hide, and for products such as the 'musk' from Musk deer.

Poaching for meat (bush meat hunting) is common in many parts of the Greater Himalaya, particularly in the Eastern Himalaya (See Section II – Arunachal Pradesh State Report). Species such as the goral, tahr, serow, takin are poached for meat/hide by local villagers and indigenous people throughout their distribution range. There are instances of wild mountain ungulate meat served in local restaurants in towns or villages adjoining wilderness areas. Although, the extent of poaching by local villagers or indigenous people is not known, there are evidences of the consequences of high poaching levels in many areas where mountain ungulates have become either locally extinct or occur in very low densities. Poaching for sport and meat by the personnel of the security forces in the international border areas, also have led to serious impacts on mountain ungulate populations.

Poaching of musk deer for 'musk' is rampant through out the Greater Himalaya for its high commercial value (about US \$ 65,000/kg in 1985) in the international markets (Green 1986, Sathyakumar 1993b). This has led to local extinctions of this species in many parts of the Greater Himalaya. As a result, the once continuous distribution of musk deer is now confined to some isolated pockets and in most of these areas they occur in very low densities. Similarly, poaching of Himalayan tahr and goral

have either resulted in local extinctions or very low densities in many areas.

3. General Strategies for Conservation

1. Most of the protected areas in the Himalayan region lack adequate man power and funds for proper management. In addition, several PAs have ill defined boundaries leading to conflicts between the local communities and PA management. There is an urgent need to strengthen the management of most of the PAs allocating more well trained and motivated staff, budget and infrastructure.
2. Several PAs and Reserved Forests in the Himalayan region need to be brought under community reserves where local people could be made partners in conservation and management. Through various programmes such as community based eco-tourism and participatory management of natural resources the illegal activities such as trade of animal parts and poaching could be gradually brought down.
3. There is an urgent need to increase trans-boundary co-operation between India – Nepal, India – China and India – Myanmar to control the illegal trade of wildlife products. Measures should be taken to register all the arms (licensed guns, etc) with the Wildlife warden or the Divisional Forest/Wildlife Officer.
4. Currently, there is no organised system of harvesting wild medicinal and aromatic plants and uncontrolled harvest often results in the degradation of habitat. There is a need to evolve policies related to rotational harvest of medicinal plants for the benefit of communities and there is a need to control excessive pressure



on the land. As part of eco-development measure cultivation of medicinal plants needs to be promoted in the buffer zones of various PAs where human pressure for these commodities is excessive.

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