

Human casualties and livestock depredation by black and brown bears in the Indian Himalaya, 1989–98

N.P.S. Chauhan¹

Wildlife Institute of India, P.O. Box 18, Chandrabani, Dehradun 248001, India

Abstract: We documented human casualties, livestock killings, and crop damage by Asiatic black bear (*Ursus thibetanus*) and brown bears (*Ursus arctos*) in the Great Himalayan National Park Conservation Area (GHNPCA), Himachal Pradesh, India, 1989–98. There were 3 human casualties by black bears and 355 livestock killings by black and brown bears. Maximum casualties occurred in alpine pastures and forests. More casualties occurred in September (41%) than any other month, followed by May (13%) and June (13%). Monthly variation in livestock killings was correlated with livestock seasonal movement from alpine pastures and forests to low altitude villages. Most cases of cattle depredation (61%) were in evening (1601–2200 hr); 37% were at night or early morning (2201–0400 hr). Recommendations to reduce conflicts and conservation of bears are provided.

Key words: Asiatic black bear, brown bear, cattle depredation, conflicts, conservation, Himalayas, human conflicts, management, mitigation, *Ursus arctos*, *Ursus thibetanus*

Ursus 14(1):84–87 (2003)

In India, the increase in human and livestock populations has created pressure on all natural resources. Most protected areas are fragmented, degraded, and disturbed from anthropogenic activities. Forests, pastures, and wastelands have been brought under cultivation to sustain increased demand for cereals and other food products (Chauhan and Sawarkar 1989). Unsustainable land-use patterns in rural areas have further altered landscapes. This habitat modification has caused many wildlife species to become ecologically dislocated (Chauhan and Ramveer Singh 1990). Although some species have adapted to humans and have become locally overabundant, others stray out of protected areas and damage human life and property to a varying degree.

The Greater Himalayan ranges cover 233,800 km² (7.4%) of India's geographical area (Rodgers and Panwar 1988) and supports one of the largest populations of Asiatic black bear in Asia (Sathyakumar 1999a, b). Asiatic black bears exist in and around 21 protected areas in Himachal Pradesh (Singh et al. 1990, Green 1993). The Himalayan brown bear is largely confined to the rolling uplands and alpine meadows above timberline, ecologically separated from the forest-dwelling Asiatic black bear (Schaller 1977).

In the Great Himalayan National Park Conservation Area (GHNPCA), which includes the Park and the Eco-Development area in Himachal Pradesh, black bears, brown bears, and other wildlife increasingly venture into human settlements and cultivation areas. In their search for food, they can cause extensive damage to the agricultural and horticultural crops or injure or kill livestock and people. In Jammu and Kashmir, Himachal Pradesh, Uttaranchal, and a few northeastern states, human casualties and livestock killing by leopard (*Panthera pardus*) and bears are common. Human casualties and crop depredation by sloth bears (*Melursus ursinus*) are common in many states. These problems have adversely affected the rural economy; thus, acceptance of conservation ideals by the local people is also greatly affected.

Study area

We conducted our study in the GHNPCA, which includes the Great Himalayan National Park (GHNP), Sainj Sanctuary, Tirthan Sanctuary, Jiwa Nal Valley, and the Eco-Development area (1,171 km²). The GHNPCA is situated in the northwestern Himalayas in Kullu District of Himachal Pradesh, about 60 km southeast of Kullu (31°38'–31°56'N; 77°20'–77°52'E). Elevations in GHNPCA range from 1,344 to 6,248 m, with sharp crests and steep terrain. The GHNPCA is characterized by temperate and alpine climates. Broadly, 3 seasons are

¹ email: npsc@wii.gov.in

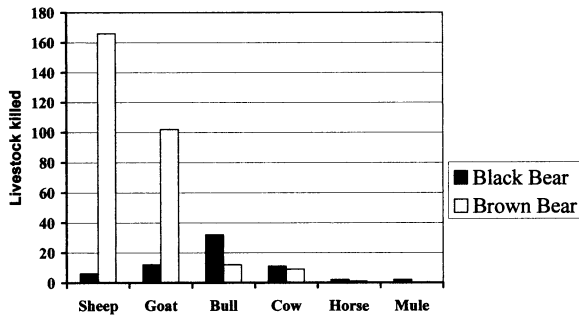


Fig. 1. Livestock killings by Asiatic black and brown bears in Great Himalayan National Park Conservation Area (GHNPCA), India, 1989–98.

recognized: summer (Apr–Jun), rainy (Jul–Sep), and winter (Oct–Mar).

Vegetation is semi-tropical forest, consisting of oak and coniferous forests, high altitude mixed forests, and sub-alpine as well as alpine pastures. The area supports a rich diversity of flora and fauna. The villages, hamlets, and cultivation areas are revenue lands under private ownership. Remaining areas are either Reserve Forest (RF) or Protected Forest (PF). In addition to black and brown bear, snow leopard (*Uncia uncia*), common leopard, wolf (*Canis lupus*), musk deer (*Moschus chrysogaster*), barking deer (*Muntiacus muntjak*), serow (*Naemorhedus sumatraensis*), Himalayan tahr (*Hemitragus jemlahicus*), Himalayan ibex (*Capra ibex*), blue sheep (*Pseudois nayaur*), goral (*Naemorhedus goral*), langur (*Semnopithecus entellus*), Rhesus macaque (*Macaca mulatta*), porcupine (*Hystrix indica*), and jackal (*Canis aureus*) are present.

Most of the human habitation is confined to the 124 villages of the peripheral Eco-Development area. Human population is about 15,000. In these villages, about 85% of the cultivated land is in agriculture and 15% in orchards. People depend on the forest resources; the economy is based on forest, agriculture, and livestock. There are about 28,000 sheep, goats, cattle, horses, and mules in these areas. Grazing is one of the major pressures on park resources.

Crop diversity in upland agriculture is high compared to relatively low areas of the valley. Wheat, maize, paddy rice, barley, mustard, sariyara, kodra, rajma, and vegetables are grown. Horticultural crops include apple, plum, pear, apricot, peach, jamu, almond, and cherry.

Methods

We conducted this study from May 1998 to April 1999. Information on human casualties and cattle depredation

by Asiatic black and brown bears was collected from the forest department, field staff, and villages. Data on compensation paid for various casualties were compiled from forest department records. We visited 14 villages in the Sainj Valley, 18 in the Tirthan Valley, and 8 villages in the Jiwa Nal Valley to interview affected families. Selection of villages was subjective and partly reflected accessibility and logistic constraints, but attempts were made to sample villages representing various elevations within each valley. Within each village, 2–5 families were selected by village leaders for interviews. We recorded information on the number, place of occurrence, date, and time of human casualties and livestock-depredation cases, as well as compensation, relief measures, and other problem species. We verified information obtained from villagers with data from forest department records.

Results and discussion

During 1989–98, there were 4 human casualties: 3 caused by black bear and 1 by leopard. All casualties were accidental and occurred when villagers ventured into the forests collecting fuel, fodder, medicinal plants, or to graze their livestock.

From 1989 to 1998, a total of 1,348 livestock killings were caused by black bear, brown bear, and leopard. Black and brown bears were responsible for 355 livestock casualties (26%), and leopards caused 993 killings (74%). Black and brown bears killed sheep (48%), goats (32%), cattle (18%) horses (<1%) and mules (<1%; Fig. 1, 2). Some cattle-depredation cases may not have been reported in a timely manner by villagers.

Of 355 depredation cases, maximum casualties occurred during September (41%), although livestock killings were also high during May (13%), June (13%), July (7%), and August (8%). Monthly variation in livestock killings seemed to be correlated with livestock movement from alpine pastures, forests, and villages to low lying areas during winter season and back to neighboring forests during spring time. Livestock graze in forests for considerable time, then move to higher pastures when the rainy season starts. Sheep and goats remain in alpine pastures until the end of the monsoon season in September. As livestock moves higher during the monsoon, predation increases and the casualties peak in September when livestock are in alpine pastures.

Of 257 livestock killings for which location was recorded, most (58%) occurred in alpine pastures. Fewer (35%) occurred in forest areas. In these 2 areas, livestock

remain for 3–5 months/yr without herders and thus are easy prey for black or brown bears. By contrast, only 4% of depredation cases were near villages and 3% near cowsheds. Only one cattle killing occurred in a crop field. Of 124 cases for which time-of-day was recorded, most (61%) occurred between 1600–2200 hr. Fewer (27%) took place between 2201–0400 hr.

Presence of an attendant (grazers) is an important factor in predicting cattle depredation. Although livestock casualties took place when attended by grazers and not attended by grazers, casualties were higher for unattended herds. We recorded presence or absence of grazers for 64 incidents involving 299 individual livestock. Two-hundred and thirty-six livestock were killed in the 38 incidents in which no grazers were present ($\bar{x} = 6.2$ cattle/incident). In contrast, 63 cattle depredation cases occurred in the 26 incidents in which grazers were present ($\bar{x} = 2.4$ cattle/incident).

Out of 347 casualties, 174 cases (50%) received compensation and 173 (50%) did not. Where compensation was awarded, funds were delivered within 4 months in 22 cases, 5–8 months in 98 cases, 9–12 months in 10 cases, and in 27 cases, compensation required >1 year to process.

Management recommendations

In the GHNPCA, human and livestock populations are increasing and as a result, there are increasing pressures on the park area. Reports of black bear attacking humans and killing livestock and subsequent public backlash are frequent in the Himalayan region (Sathyakumar 1999a, b). In Chamba district, the number of black bear attacks on humans gradually increased from 10 in 1988–89 to 21 in 1991–92. Livestock killed by black bear also increased from 29 to 45 (P. Thapliyal, Forest Officer, Himachal Pradesh, India, personal communication, 1994).

Economic losses in the form of livestock killings and crop damage cause hardship for people living in these areas. The human–wildlife conflicts arising due to these damages can not be contained fully because wild animals frequently invade and damage human settlements and cultivated areas located on the fringes of forest areas. To provide relief for losses occurring in the form of human casualties and cattle depredation, the forest

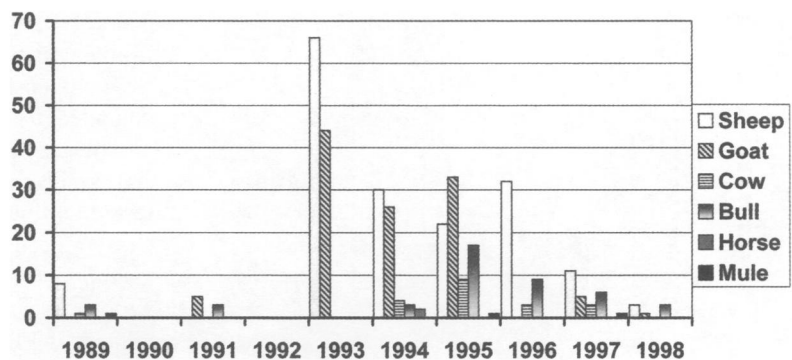


Fig. 2. Yearly variation in livestock killings by Asiatic black and brown bears in Great Himalayan National Park Conservation Area (GHNPCA), India, 1989–98.

department pays compensation. Verification of incidence and post-mortem reports in case of human death is required for compensation. However, there is no provision for compensation for crop damage, nor are there crop insurance systems.

We suggest that livestock grazing should be restricted in protected areas and fringes of forests. Although livestock casualties took place both when attended by herders and not, casualties were higher when unattended. Therefore, we suggest that herders should (1) avoid taking livestock into forests during crepuscular hours and (2) remove livestock from forests during night time. When taken to alpine pastures or forests for long time periods, livestock must be attended by 2–3 herders or more, depending on herd size and location. During evening and night hours, herders should light fires at 3–4 sites within pastures to scare away predators. We believe this will help reduce depredation by bears. Herders should also keep 2–3 trained Bhutia dogs with their cattle herds as well as sound producing firearms to scare away bears.

Payment of compensation by the state forest department is a good gesture. This would help develop understanding between affected people and forest department and help conserve wildlife. Compensation procedures for incidents occurring outside protected areas should be simplified and payment should be made immediately. However, we believe compensation should be discouraged in protected areas. Reduction or even a complete ban on livestock grazing within forests will help replenish habitat and increase the prey-base. By introducing high yielding local cattle breeds, which could be stall-fed, the cattle population can be reduced without sacrificing revenue.

Acknowledgments

S.K. Mukherjee and V.B. Sawarkar supported the study. B.M.S. Rathore, P.K. Mathur, and A.K. Bhardwaj provided help with study design. The chief wildlife warden of Himachal Pradesh and Sanjeeva Pandey provided help and co-operation for the field work. Nagesh Guleria, P.L. Chauhan, O.P. Guleria and their field staff provided technical support. I sincerely thank the Editor for his valuable suggestions and help for finalization of this paper. This study was funded by the Wildlife Institute of India.

Literature cited

- CHAUHAN, N.P.S., AND V.B. SAWARKAR. 1989. Problems of locally overabundant populations of 'nilgai' and 'blackbuck' in Haryana and Madhya Pradesh and their management. *Indian Forester* 115(7):488–493.
- , AND RAMVEER SINGH. 1990. Crop damage by overabundant populations of nilgai and blackbuck in Haryana (India) and its management. Pages 218–220 in *Proceedings Vertebrate Pest Control Conference*, Sacramento, California, USA.
- GREEN, M.J.B. 1993. *Nature Reserves of the Himalaya and the mountains of Central Asia*. World Conservation Monitoring Centre, IUCN, Cambridge, UK.
- RODGERS, W.A., AND H.S. PANWAR. 1988. *Planning a Wildlife Protected Area network in India*. Volumes I and II. Wildlife Institute of India, Dehradun, India.
- SATHYAKUMAR, S. 1999a. Status and management of the Himalayan brown bear in India. Pages 125–128 in C. Servheen, S. Herrero, and B. Peyton, editors. *Bears: Status survey and conservation action plan*. IUCN/SSC Bear Specialist Group IUCN, Gland, Switzerland.
- . 1999b. Status and management of the Asiatic black bear in India. Pages 202–207 in C. Servheen, S. Herrero, and B. Peyton, editors. *Bears: status survey and conservation action plan*. IUCN/SSC Bear Specialist Group, IUCN, Gland, Switzerland.
- SCHALLER, G.B. 1977. *Mountain monarchs: wild sheep and goats of the Himalaya*. University of Chicago Press, Chicago, Illinois, USA.
- SINGH, S., A. KOTHARI, AND P. PANDE. 1990. *Directory of National Parks and Sanctuaries in Himachal Pradesh—Management status*. Indian Institute of Public Administration, New Delhi, India.

Received: 28 May 2001

Accepted: 24 October 2002

Associate Editor: S.J. Riley