

A Survey of Depredation and Related Wildlife-Human Conflicts in Hemis National Park, Ladakh (India)

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Hemis National Park, situated in the Ladakh District of Jammu & Kashmir State, is considered a prime area for the conservation of snow leopards and other Trans-Himalayan wildlife. There are proposals for expanding the protected areas network, including increasing Hemis NP from its current size of 3,500 km² to over 4,000 km².

People inhabiting this region are primarily agropastoralists and nomadic herders. Some have suggested that traditional herders are increasingly leaving this occupation for alternatives, resulting in a decline in livestock numbers. While this may be true in some regions, in others the reverse appears to be happening. Data suggest that, at least regionally, livestock holdings are increasing with patterns changing due to evolving market forces. In some areas, livestock densities may be as high as 1,500 per km².

Even the most remote pasture is utilized by the residents for livestock grazing, and this close overlap between people and wildlife often leads to conflict. Livestock depredation can cause substantial economic losses, and makes the very idea of wildlife conservation unpopular among local residents.

There are approximately 19 villages within the boundaries of Hemis National Park and along its immediate fringe (Figure 1, p. 11). Depredation in the park seems to be increasing, but a reliable baseline dataset for ascertaining trends and the extent of this problem is lacking. According to local perception, the ban on hunting over the last decade has resulted in an increase in wildlife numbers and their 'boldness,' which is driving the increased conflict. However, livestock numbers have increased during this period, so the increased conflict could be resulting from more encounters between predators and livestock inhabiting their home ranges.

The objectives of this survey were to collect baseline data on snow leopard depredation; collect baseline socioeconomic and demographic data; assess attitudes of the local people towards wildlife conservation; examine the relative vulnerability of different corral designs and locations, and which village or group of villages suffered the greatest loss; identify possible solutions for resolving depredation and associated people wildlife conflict; and assess the willingness of villagers to help resolve such problems to better conserve the park's wildlife.

Snow leopards and wolves are the primary predators of the region, which supports ungulate prey species including the Ladakh urial, bharal, Tibetan argali, and ibex. Wild dog and red fox are other important carnivores. The high altitude pastures harbor marmot and Himalayan snowcock, while the main birds of prey are the golden eagle, Himalayan griffon, and bearded vulture.

Seventy-nine households, 80% of the park's inhabitants, were visited and interviewed during early March and April 1999, using a standard questionnaire and group meetings. Data on livestock holdings, depredation losses and wildlife occurrence and distribution were gathered. Wherever possible, we attempted to verify depredation incidents via interviews with neighbours or non-family members sharing the same pasture or corrals, and with herders known for their knowledge, honesty, and integrity. All suspicious cases were dropped.

We also examined depredation records filed with the Wildlife Department, and it appeared that villagers did not seek compensation for all the depredation incidents incurred. This is likely due to the long trek to make a report, and the fact that compensation usually amounts to less than 10 percent of the value of the animal lost.

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Families are relatively large by Indian standards, with approximately 70% of the households ranging between 5 and 10 persons. With approximately 42% of the population under the age of 18, the number of people in the area is likely to increase during the coming decades.

Only 37% of adult males and 18% of adult females were literate. Nearly all villages had primary schools, however only Markha village had a middle school (up to grade 8). 69% of the boys and the same proportion of girls were going to school.

The 79 families surveyed owned 3,977 animals, an average of 50.3 animals per household. Goats, followed by sheep, constituted the primary type of livestock. On average, each family owned no more than 2.5 animals of the remaining livestock species or breeds. Yaks are relatively rare.

Of the 3,977 animals owned, villagers reported that 492 or 12.4% were killed or seriously injured by predators during the 14 month period from January 1998 to February 1999. Most families (50.6%) lost 110% of their livestock herd during this time. All settlements suffered depredation loss, but 54% of the reported losses occurred in just three settlements, Markha (37.4%), Rumbak (9.1 %) and Chokdo (7.5%).

Each household lost an average of 6.2 animals worth US \$297.50 during the period sampled. Total losses were estimated at Rs. 9,98,750, or US \$23,500.

Animal husbandry practices differed according to the type of livestock and time of year. While yaks and adult horses were mostly free-ranging, other livestock were either herded and tended by a few shepherds when foraging in their traditional pastures, or left to graze unattended close to the settlements. Small-bodied livestock were generally herded at all seasons, although they were sometimes left to graze unattended if near a village, seasonal camp or otherwise close to human activity. During the growing season (late spring through summer) all livestock had to be kept out of the croplands, which are mostly located adjacent to the village. At these times they were either housed in a corral near the village and its fields, or far away in the summer pastures. Here they were contained in small, low

walled corrals during the hours of darkness. During the winter months, the herders kept their livestock in or near the village so that they could fertilize the fields and forage on the barley stubble. At night, animals were sheltered in corrals located beneath or attached to the houses.

Most predation reports were from the higher-elevation summer pastures, occurring while livestock were out grazing (86%). However, looking at the actual number of animals killed, a substantial proportion (38%) occurred while animals were housed in their nighttime corrals, whether in the winter pastures or within the settlement itself. However, this trend varied between the different settlements and in Markha, for example, about 65% of the deaths resulted after predators had entered a corral. Certainly the overall loss per incident is higher in corrals; 6.0 animals compared with about 1.5 animals per incident for open rangeland. A few households lost 15 or more animals, and one Markha family lost 53 animals in a single incident.

When depredation occurred on the pastures, where horses, yaks and crossbreeds are commonly grazed, monetary loss was higher because of the greater value of these animals.

Sheep and goats constituted 67% of the overall livestock holdings but predation losses to snow leopard and wolf amounted to 89.9% including lambs and kids. Furthermore, analysis showed that the predators selected for adult sheep and goats. Kids, lambs and horses were killed in approximate proportion to their availability, but the other species were relatively underutilized by these predators. These data suggest that large-bodied livestock such as yak are more immune to predation than small-bodied livestock such as sheep and goats.

Animals were killed throughout the year, with some obvious seasonal peaks. Over 38% of losses occurred during winter, followed by 32% during the summer. The data indicated a kill rate of about one animal per day throughout the year, except spring when the kill rate dropped to 0.38 per day. Over half of the reported incidents of depredation occurred during the daytime (57%), when livestock is usually being grazed in open pastures. As expected, most depredation incidents associated with corrals

The respondents reported 287 cases from 1996-February 1999, of which they could attribute 274 incidents to predators. They attributed 158 incidents (55%), to snow leopard, 89 (31 %) to wolf, 14 (5%) to red fox, 8 (3%) to wild dog, and 5 (2%) to lynx. Of these, they claimed to have seen the predator at or near the kill in 66 % of cases. Of the total of 184 animals killed in Markha village, 135 were attributed to snow leopard and were taken in only 9 incidents - testifying to the significant impact of surplus killing.

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Prior to the establishment of the national park, the local herders were known to hunt and attempt to kill any predator found attacking their livestock. However, this practice was fairly unusual due to the Buddhist religious belief system and its precept of the sanctity of life. Most often, it was only habitual predators or those implicated in multiple-killings that were at risk of retribution. Needless to say, a majority of herders complained about park regulations prohibiting them from protecting their livestock by being able to hunt or trap snow leopards and wolves. When questioned about the use of guard dogs, the people complained of the poor quality of their breeds. They felt that they could benefit by importing *chang ki* guard dogs from the Changtang region.

Our data indicate that herders in Hemis National Park are suffering from substantial livestock depredation by wild predators as suggested both by numbers lost and by the total monetary loss incurred. We found that Markha accounted for a major proportion (37%) of the total livestock loss. The financial burden of such losses must be very high - nearly US \$300 per household. It should be noted that these people, like many other pastoralists, also lose good numbers of animals to other types of mortality, including accidents, poisonous plants, inadequate forage, inclement weather and especially severe winters (which result

in periodically heavy loss due to starvation and hypothermia). The failure to quantify such factors represents an important shortcoming of this study.

Depredation incidents in corrals often resulted in multiple killings and seemed to have a far greater psychological impact upon the local people. This is exemplified by the situation in Markha, where 135 of the 184 stock lost to predators were killed by snow leopard during just 9 incidents. Since the snow leopard is the primary predator attacking corrals, attitudes toward this rare carnivore are negative in almost all of the settlements visited. However, the corrals are designed to keep stock inside rather than keeping predators out - a major flaw. While livestock deaths in corrals amounted to only 38% of the total loss to predators, they had a significantly greater psychological impact on the villagers than the 62% of deaths occurring while livestock were being pastured on the open range. This is an area where immediate action can be taken with simple innovative measures aimed at predator-proofing night-time pens. In order to minimize losses in pastures, measures would have to address shepherding skills, the improved use of communal shepherds, the avoidance of depredation "hotspots" during winter months, and the use of trained shepherd dogs.

This report provides the foundation for a followup workshop to develop environmentally-sound, socially responsible and cost-effective remedial interventions, conducted in collaboration with the Ladakh Ecological Development Group, the Wildlife Department, The Mountain Institute, and the villagers of Markha.

Acknowledgements:

The authors express their gratitude to Mr. Naseer Kitchloo, Regional Wildlife Warden, Kashmir, and to the residents of Hemis National Park. The survey was funded under ISLT's Natural Partnerships Program through grants provided by the Granby Zoo, the Metro Washington Park through the Oregon Zoo Foundation Conservation Fund, and the Sacramento Zoo. We have dedicated this project to the vision of the Mr. Chering Nurbu, former Wildlife Warden of Ladakh.