Local People's Attitudes toward Wildlife Conservation

in the Hemis National Park

with Special Reference to the Conservation of Large Predators

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July, 2003

The Snow Leopard Conservancy. 2003. *Local People's Attitudes toward Wildlife Conservation in the Hemis National Park, with Special Reference to the Conservation of Large Predators.* SLC Field Series Document No 7. Prepared by R. Jackson, R. Wangchuk, and J. Dadul. Sonoma, California. 29 pages.

SLC is dedicated to promoting community-based stewardship of the endangered snow leopard, its prey and habitat

1. Introduction

Studies in the Himalayan region have documented increasing levels of livestock and crop damage from wildlife (Kharel 1997, Jackson et al. 1996, Jackson and Wangchuk 2001, Oli et al 1994). For example, in India's Kibber Wildlife Sanctuary, Mishra (1997) reported 18% of local livestock holdings were killed by snow leopard (*Uncia uncia*) and wolf (*Canis lupus*). He estimated losses valued at US $128 per household per annum, a very significant economic impact given per annual cash incomes of $200-400. The villagers claimed predation rates increased following the establishment of the sanctuary, but surveys indicated a dramatic increase in livestock numbers accompanying changes in animal husbandry systems (Mishra 2000).

A similar situation in the Hemis National Park (HNP) of Ladakh, Jammu and Kashmir State led to the establishment of a compensation scheme in 1996. However, within two years the sponsoring agency, the Ladakh Department of Wildlife Protection, found itself committing 60% of its annual $26,000 budget to the compensation program. Payment may take up to two years, with claimants being paid 40% or less of their animals' worth. Currently, unsettled claims exceed the Department's annual budget, so it is hardly surprising that local people have increasingly voiced their dissatisfaction with the program.

Such conflict will only complicate management of a park that is ranked as India's premier protected area for the endangered snow leopard and ungulates of Tibetan biogeographic affinity. Because local people's livelihoods are intimately bound with long-standing patterns of agro-pastoralism, relocating people or excluding their livestock from the park is not a feasible option. Rather, the local people's willingness to co-exist with large predator will depend upon reducing depredation to acceptable levels, while also improving household incomes to help offset unavoidable loss of livestock.

Toward this goal, the Snow Leopard Conservancy (SLC) is working closely collaboration with local communities and non-governmental organizations to foster co-existence between people and predators, reduce livestock depredation losses and to improve household incomes in environmentally friendly, socially responsible and economically viable ways. Under this stewardship program, initiatives were launched in late 1999 to reduce depredation losses and enhance the capture of revenue from tourists trekking along the Markha Circuit (Jackson and Wangchuk 2001).

As part of this effort, detailed household interview surveys were undertaken in representative communities to establish baseline data against which to measure the effectiveness of these other interventions, and to document possible changes in attitudes toward predators among the targeted communities. This report describes the findings of baseline surveys conducted in 10 settlements, with special emphasis upon local people'/s perceptions toward predators and their conservation.

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Background on Hemis National Park and Wildlife Conflicts: Established in 1981, this park covers 3,350 square kilometers in the TransHimalayan Range (Fox and Nurbu 1990). Besides offering excellent habitat for snow leopards, the park harbors four species of wild sheep and goats that provide it with internationally significant biodiversity importance. These ungulates are the Ladakh urial or *shapo* (*Ovis orientalis vignei*), the more common blue sheep (bharal) or *napo* (*Pseudois nayaur*), a small population of Tibetan argali or *nayan* (*Ovis ammon hodgsoni*) and the ibex or *skin* (*Capra ibex sibirica*). Dhole or wild dog (*Cuon alpinus*) and red fox (*Vulpus vulpus*) are also present. The high altitude pastures harbor Himalayan marmot (*Marmota bobak*) and snow cock (*Tetraogallus himalayensis*), while golden eagles (*Aquila chrysaetos*), Himalayan griffon (*Gyps himalayensis*) and the bearded vulture (*Gypaetus barbatus*) are the main birds of prey.

Hemis occupies much of the catchment of the lower Zanskar River, from its confluence with the Markha river to its junction with the Indus. There are three main valleys in the park: the Sumdah in the north, the Markha in the south, and the Rumbak in the northeast. The valleys are rugged, narrow, and littered with boulders and rocks, and rimmed by peaks exceeding 5,000 m and up to 6,000 m.

Vegetation is predominantly alpine and steppe in nature. Shrublands cover less than 5% of the total land area (Fox *et al*., 1986). Grasses, sedges and herbaceous plants are the main vegetation type, usually covering less than 15% of the total area. Dominant species include woundwort (*Stachys tibetica*), cinquefoils (*Potentilla* spp.), wormweeds (*Artemesia* spp.), *Bistorta* spp. and *Agrostis* spp. The more moist upper mountain slopes support limited stands of alpine vegetation, characterized by genera such as *Anemone, Gentiana, Thallctrwn, Lloydia, Veronica, Deiphinum, Carex* and *Kobresia.* The remaining mountain slopes and open hillsides, comprising the major portion of the park, support primarily steppe vegetation dominated by *Caragana, Artemisia, Stachys,* and *Ephedra*. Shrubland (*Hippophae, Salix,*and *Myricaria*) with poplar (*Populus*) and a very few birch trees (*Betula*) occur along the lower river courses, and are an important source of wood for the park residents.

The Markha valley is noted for its dense stands of buckthorn (*Hippophae salicifolia*), willow (*Salix* spp.), *Myricaria elegans* and rose (*Rosa webbiana*) shrubland. Some juniper (*Juniperus macropoda*) occurs on valley bottoms and slopes at 3,300 m to 4,000 m, and is best developed in the less disturbed Khurnak Chu valley. From 3,500 m to 4,000 m, the shrub is shorter. Above 4,000 m there are scattered individuals of rose, (*R. webbiana)*, honeysuckle (*Lonicera* spp.), *Ephedra gerardiana* and juniper. *Caragana* dominates the uplands at elevations of 4,300 m to 5,000 m. The meadows on valley bottoms are dominated by two sedges, *Carex* spp. and *Kobesia* spp.

Some 1,600 people live in the 15 villages of the three major valleys: the Rumbak valley (Rumchung, Zingchen, Rumbak and Yurutse), the Markha valley (Skyu, Kaya, Shingo, Markha, and the three Hankar settlements of Umlung, Doltokling and Hankar itself), and the Shang valley (Chogdo, Shang-Dun, Shang-Nakding and Shang-Sumdo). In winter many village clusters are cut off from one another by high snow bound passes like Ganda La (4,900 m) and Kongmaru La (5,200 m), or by the Zanskar river (unless it is ice-bound during late December and January). They grow barley and a few vegetables, and own more than 4,000 head of livestock, of which 81% are sheep and goats, and 11% are yaks, cattle and crossbreeds. There

are also a few horses and donkeys, used to transport goods and as pack animals for the growing tourism base, an increasingly important source of supplementary income. Along with other socio-economic factors this has led to shifts in livestock number and type, including a significant decline in the number of yaks with increase in horse, goat and sheep numbers (Fox et al. 1994). Ladakh was opened to tourism in 1974, and the Markha Valley circuit through Hemis National Park (HNP) has become the most popular trekking route with some 5,000 visitors annually, at least up until the events of September 11th, 2001.

A survey of livestock owners from 15 settlements was undertaken to document the extent of depredation by snow leopard, wolves and other predators in the HNP (Bhatnagar et al. 1999). The 79 households interviewed reported a total of 492 domestic animals were killed between January 1998 and March 1999. The worst case involved a snow leopard that entered a night-time corral in Markha village and killed 53 sheep and goats belonging to a few households. The market value of the all depredated livestock was estimated at US $ 23,780 or about $300 per household (Table 1).

Table 1: Summary of Livestock Losses in Hemis National Park (January 1998 – January 1999)

Name of Village	No of households sampled	Total Livestock Killed	Rank in total number of livestock lost	Average Household Loss (US dollars)	Total Losses of Village
Chokdo	9	37	3	$286	$2,571
Doltokli (Hankar)	4	23	8	$190	$762
Umlung (Hankar)	3	22	9	$504	$1,512
Hankar	7	26	6	$261	$1,827
Kaya	6	31	5	$229	$1,375
Markha	13	184	1	$623	$8,101
Rumbak	9	45	2	$171	$1,536
Rumchung	2	14	10	$188	$375
Shang Du	8	12	11	$134	$1,071
Shang Na	4	7	13	$73	$292
Shang	4	6	14	$122	$488
Shingo	2	28	7	$777	$1,554
Skyu	5	34	4	$271	$1,357
Yurutse	1	11	12	$458	$458
Zingchen	2	12	11	$250	$500

Seventy percent of losses occurred during the winter or summer season. While depredation incidents were more prevalent on the open pasture, 38% of all predator-related mortality occurred when snow leopards entered nighttime pens and made multiple kills (Table 2).

Table 2: Comparison of Livestock Losses in Corrals and Open Pastures

Parameter	Within Corral	Open Pasture
Number of depredation events	29	181
Mean number animals lost per incident	6.5	1.7
Total number animals killed	188	304
Percent of total	38.2	61.8

Most of the lost livestock (89.8%) consisted of small-bodied stock like goats and sheep, which are easily killed by wolf and snow leopard. The remaining losses involved yak and cattle-yak crossbreeds (1.2%), cattle (3.5%), horses (3.5%) and donkeys (2%). Local herders reported that snow leopards were the primary predator (58% of depredation incidents), followed by wolf (32%), fox (5%), wild dog (3%) and lynx (2%).

The survey documented the root causes of depredation as lax livestock guarding practices, with animals often left to graze untended or housed within poorly constructed nighttime corrals. Also, stock foraged in areas dominated by well-broken terrain and cliffs that constitute prime habitat for snow leopards (Jackson et al. 1996). Predators are more likely to encounter livestock than their natural prey, as domestic animals now substantially outnumber the natural prey population (primarily blue sheep and ibex). Historically, there has been better emphasis on daytime guarding, and problem predators were controlled through periodic trapping or related traditional control methods. Hunting and trapping have now been banned for several decades. With more children going to school and youths reticent to assume the hard livelihood of livestock herding, even highly vulnerable small-bodied livestock are often left to graze unattended. While baseline data are lacking, predator numbers appear to have increased due to the regulations against hunting and occasional limited patrolling by park guards. Finally, this survey found that that depredation rates varied with locality, presumably reflecting differences in predator densities, habitat suitability and livestock herding patterns (Figure 1, next page).

2. Objectives of the Survey

The primary objectives of the present survey were to:

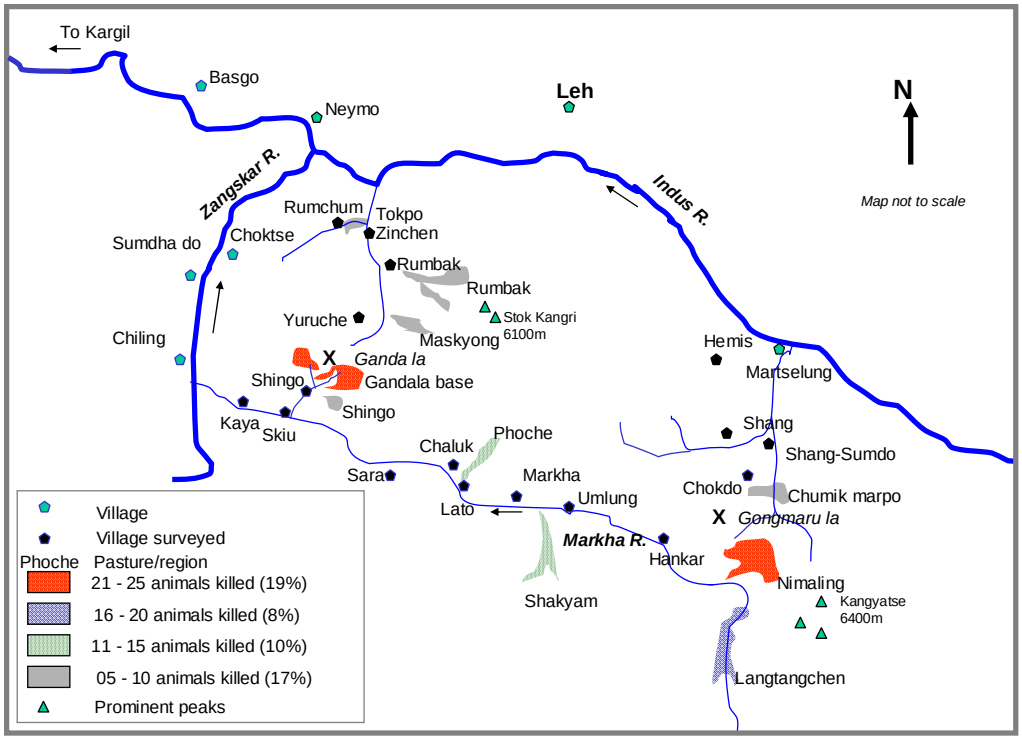
1) Assess the local residents' attitudes toward large predators and other wildlife found in Hemis National Park;

2) Gather additional baseline information of livestock husbandry and guarding practices for developing more effective remedial measures to reduce loss of domestic stock to predators

snow leopard, wolf, wild dog and fox; and

3) To establish baseline data against which to assess the effectiveness of project initiatives like the construction of predator-proof corrals and training of shepherds in improved techniques of animal husbandry, and to document any subsequent shifts in attitudes toward predators among the these communities.

Figure 1: Depredation "Hotspots" in Hemis National Park (Bhatnagar et al. 1999).



3. Methods

We developed a structured survey instruction in the form of an interview-based questionnaire. Little information was available on human attitudes in developing countries to guide us. Therefore we relied upon the extensive predator-focused human dimension literature from developed countries (e.g., Manfredo et al. 1998; Teel et al. 2002). Three questionnaires, covering key topics like livestock ownership and herding patterns, depredation loss, traditional guarding or protection measures, and perceptions toward conservation, management of Hemis National Park and predators, were developed.

The questions were composed in English and then translated into spoken Ladakhi, since very few rural adults are able to read or write Ladakhi or the national language, Hindi. We trained staff in the delivery of the questionnaire. Following pre- testing in the settlements of Skyu-Kaya, SLC staff, well known to the communities, administered revised questionnaires to all households in 10 settlements during 2001 and 2002. The enumerators visited each household and fixed a time for interviewing the head of the household, or another elderly adult in the event of their absence. Most interviews were conducted in late morning, around mid-day or in the evening, after people had returned from their work in the fields.

At the start of the interview, respondents were informed that their participation in the survey was completely voluntary, and that the information they provide would be confidential. We told them that only that information relevant to the entire community shall be made available for public discussions. After introducing the project and purpose of the interview questionnaire survey, we encouraged them to ask questions at any time, and noted that they did not have to answer a question if they did not wish to do so. However, we requested that they tried to answer each of our questions as accurately and honestly as possible. All households were given a number in order to better ensure confidentiality. At the end of each interview, all respondents were given an opportunity to make any comment after which the numerators thanked for their collaboration.

All questions were given in Ladakhi, and the respondent's answer circled in the case of multiple choice questions, or recorded in English (or Hindi) on standard data forms in the case of open-ended questions.

The completed forms were collated and reviewed for their content, completeness, potentially confusing answers, and other possible sources of bias. Relevant information was abstracted, coded and entered into Excel spreadsheets or directly into SPSS © (Statistical Package for the Social Sciences) files. Over 50 variables were developed and the data screened for entry errors, and outliers. Information was tabulated, summarized and presented in the form of tables or graphs. The results were evaluated in light of our understanding of these communities, including their present and past attitudes toward wildlife and the protection of natural resources in HNP.

4. Surveys Results and Findings

4.1 Profile of Respondent Households: Our sample totaled 108 households from 11 settlements, amounting to 73% of all settlements located within the boundaries of Hemis National Park (Table 3). These data show that most settlements are small, with only a few villages having 15 or more households. Household size ranged from 2 to 15 persons (mean = 7.0), with a female / male ratio of 101.6:100.0. Fifty two percent indicated farming as their primary livelihood, with 9.2% employed by the government, 4.2% working as laborers, and 21.9% earning income from the tourism sector, primary through pack animal rentals and teahouse operations.

For a detailed description of household characteristics and their economic status, readers are referred to the companion report covering household characteristics, livestock ownership patterns, livelihoods and alternative incomes (Snow Leopard Conservancy, in preparation).

Table 3: Settlements and human population sampled in this survey

Name of Settlement	Number of Households	Population	Average Household Size
Hankar	17	134	7.9
Kaya	11	77	7.0
Markha	15	107	7.1
Rumbak	9	73	8.1
Runchung	2	24	12.0
Shang	38	228	6.0
Shingo	2	12	6.0
Skyu	7	??5	8.3
Tsogsti	4	24	6.0
Yurutse	1	8	8.0
Zingchen	2	11	5.5

4.2 Wildlife Damage Patterns: An overwhelming percentage of households (90.7%) reported losing some livestock to predators over the last two years. Forty-five percent of households lost domestic stock to fox (mostly lambs and kids), 18.2% to wild dog, 9.1% to lynx, 83.3% to wolf and 90.0% to snow leopard. When asked to rank the major predators in their order of importance, 75.9% of respondents listed the snow leopard first, 73.1% the wolf second and 65.7% the fox third. However, nine percent (N=10) of the 108 respondents felt that the wolf was most serious depredator within the park, but less than one percent considered wild dog as the major livestock depredator. Only ten percent and two percent respectively of persons interviewed, placed the snow leopard as the second and third most important depredator. This clearly confirms the overall importance of snow leopard, closely followed by wolf, primary livestock depredators within HNP. Very few households complained about the lynx, in part a reflection of the scarcity of this felid within the protected area. By contrast, nearly a third of households from Khatphoo, a settlement in the Changtang plain area, reported livestock losses to lynx, although significantly more livestock are taken by snow leopards.

Ninety-six percent of households reported suffering some crop damage to wildlife, primarily blue sheep (95%), chukor partridge and marmot with urial more likely to cause problems in the lowest-lying villages along the Indus and lower Zanskar rivers. Villagers cited the most frequently damaged crops to be barley, wheat and peas, but noted that marmots tended to consume much needed livestock forage in the form of non-cultivated grasses and forbs. Respondents were asked to ranked the amount of damage they incurred annually, according to four levels of severity (Table 4)

The majority of households reported that spring (May-June) and early autumn (late July to early September) were the most damage prone periods of the growing season. These are the times when barley and wheat are germinating and then again just prior to the grain being harvested.

Table 4: Extent of Crop Damage Reported in HNP (11 Settlements).

Extent of Damage	Frequency	Valid Percent
Heavy	63	58.3
Medium	40	37.0
None	4	3.7
Slight	2	0.9
Total	108	100.0

4.3 Damage Prevention Measures: While nearly all households deputed family members to guard their cultivated fields and livestock herds, the demand of protecting cropland was more demanding in terms of the actual number of persons involved (Table 5). Given the relatively small size of households, human-power obviously is a major constraint within HNP.

Table 5: Number of family members responsible for protection of livestock and crops during the daytime

Number of family members	Guard Livestock		Guard Crops	
	Sample Size	Percent	Sample Size	Percent
One	85	78.7	80	75.5
Two	12	11.1	23	21.3
Three	0	0	3	2.8
Not specified	11	10.2	2	1.9
Total	108		108	

Only 7.4% of households reported that they did not guard their sheep and goats during the daytime: some of these households owned none or very few livestock, while others (especially those from small villages and richer households) paid other family members to undertake this daily chore for them. Surprisingly 34 respondents, or over 31% of the 108 households interviewed, did not guard their sheep and goats during the night-time when they are most vulnerable to attack from predators (especially snow leopard). However, the respondents could have misunderstood this question, for all sheep and goats are housed within enclosures during the night.

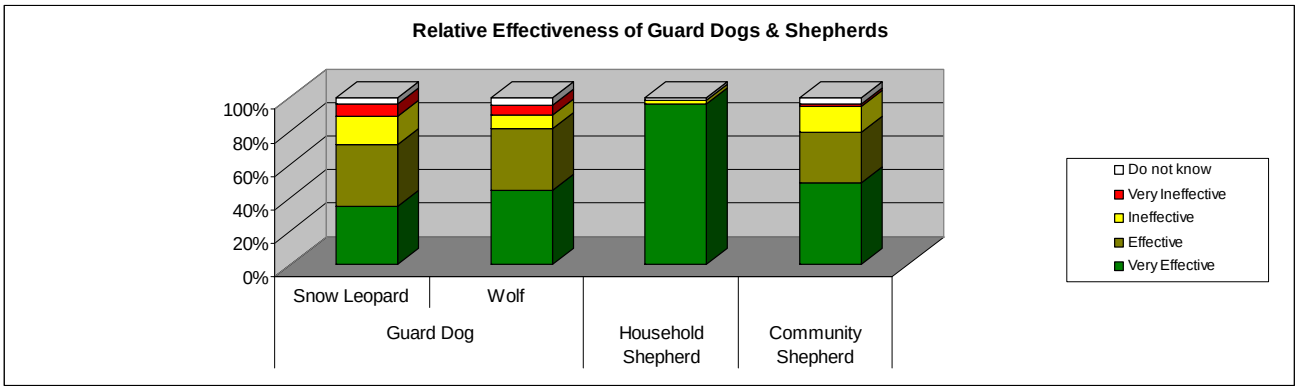
Daytime guarding is accomplished through the use of shepherds (91.7% of respondents), aided by dogs (74.1%) and the use of slingshots (72.2%) and/or shouting, aided by other noise-making (79.6%) such as the beating of metal pots and pans. Night-time protection is afforded almost entirely through the use of stone corrals (92.4%), which are often tended by dogs (68.9%) and/or shepherds (73.1%) who sleep within or very close to the structure. During the

night far less use is made of noise (10.9%), which is replaced by the burning of smoky fires, especially in corrals that located away from the village.

Large-bodied livestock are allowed to graze on the open pastures with little or no human supervision. The villagers reported that they would check on their horses, yak or cattle-yak crossbreeds at varying intervals ranging from two days (for horses) to 15 days (for fully-grown yak). Typically, cattle are permitted, and indeed, encouraged to graze close to the village itself, thus allowing owners to watch over them (except where livestock cannot be easily kept away from growing crops). Many respondents noted that they checked on their livestock several times daily while they were being grazed in the summer pasturages, presumably reflecting the greater risk of wolf predation at higher elevations and in those pastures well removed from permanent settlements.

We asked respondents to rank the various traditional guarding measures and several potential new measures for their effectiveness in reducing or controlling livestock loss, especially with special reference to snow leopard and wolf. The effectiveness of each technique was ranked on a scale from "very effective" to "very ineffective". Figure 2 indicates local perceptions of the relative effectiveness of using guard dogs and shepherds to deter predators from taking domestic stock. In general, herders felt that dogs were more effectively against wolves than snow leopard. This may indicate the difference in hunting methods between the two predators, with snow leopards approaching covertly and taking sheep or goats that have strayed from the flock. By contrast, wolves run directly and overtly at their prey, and are thus more easily detected immediately prior to the final attack.

Figure 2: Relative effectiveness of guard dogs and shepherds for protecting against depredation by snow leopard and wolf.

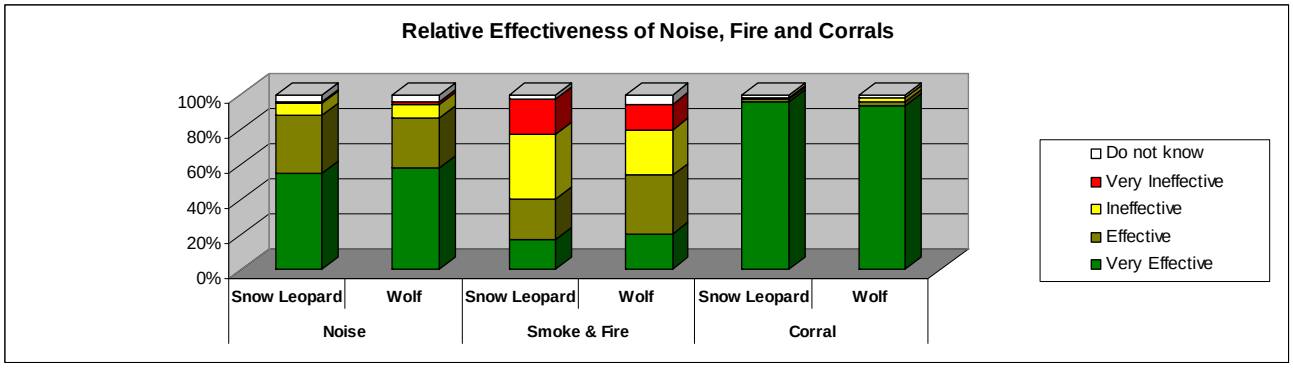


The difference in perceived effectiveness of household or owner shepherds, and others retained by agreement to look after the livestock of one or more families is interesting. One possible explanation for the preference of someone from the owner's household may lie in the perception, whether real or imaginary, that the owner will take much better care of his or her livestock than a third party, even someone from the same village. However, most communities in Hemis rotate the responsibility for looking after the village's sheep and goat flock among all households, and furthermore, usually impose fines on those persons considered to have been

negligent in the event of a depredation loss.

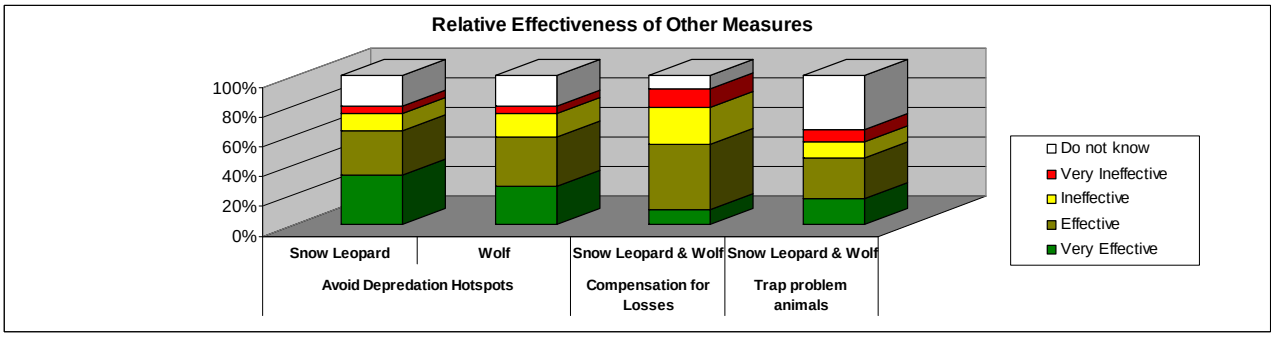
Figure 3 indicates the perceived effectiveness of other traditional livestock protection measures, namely the use of noise-makers, fire or smoke and housing stock within protective night-time enclosures or corrals. Clearly, corrals are rated most highly by herders for their effectiveness in reducing or preventing losses to snow leopard and wolf. Little credence seems to be given to the use of smoke or fire as anti-predator deterrents.

Figure 3: Other traditional measures for preventing or reducing livestock depredation



Finally, we asked villagers to rank the effectiveness of animal husbandry management measures such as avoiding known depredation sites (hotspots), especially during the periods of greatest loss in the past, along with monetary compensation and the trapping of problem animals (Figure 4)

Figure 4: Other Potential Measures for reducing livestock depredation loss



A high percentage of respondents (nearly 40%) noted that compensation represented the best means for addressing problems of livestock depredation in Hemis National Park. As noted in the introduction, however, the Department of Wildlife Protection's 9 year old compensation program has run into serious obstacles, not least of which is the lack of sufficient funds to meet all of the claims that have been filed by the Hemis villagers. Interestingly nearly 60% of

households surveyed felt that losses could be effectively lowered by avoiding pasturing their animals in known depredation hotspots. The main constraint to this strategy lies in the lack or limited availability of alternative pasturages for use during the late winter and early spring when depredation rates are at their highest (Bhatnagar et al. 1999).

Most households interviewed said they took some measure to protect their crops from wildlife: only 4.7% reported taking no preventive action. High dry-stone walls, wire-mesh fences or thorn bushes (87%) were the preferred means of protecting cropland, followed by daytime guarding (13%) by the community's residents. A few respondents (1.9%) observed that they also relied upon the use of scarecrows and other human-like effigies. However, crop damage is a much less contentious issue that loss of livestock to predators, judging by the more favorable sentiments expressed toward ungulates (next section).

4.4 Knowledge and Attitudes toward the Conservation of Predators and Other Wildlife

The second questionnaire that we administered explored the local residents' knowledge of wildlife and attempted to assess their attitudes toward Hemis National Park. We were especially interested in exploring how they perceived the imposition of the park's rules and regulations that affected their options for dealing with wild predators, crop damage, resource management and other sources of people-wildlife conflict.

Clearly, these villagers had a good understanding of which large mammal species inhabited the area. Almost all of the persons we interviewed correctly marked species from the list provided. No-one reported the presence of tigers, common leopards or black bear, all of which are absent from this protected area or its vicinity.

A surprisingly high percentage of respondents (99%) reported that they or another member of their household had seen a snow leopard. But, this rare and elusive large cat is surrounded by myth and imbued with superhuman qualities. For example, most Ladakhi's believe that the snow leopard subsists on the blood its sucks from its victim's necks, along with some meat, and "air, grass, water and mud." These convictions may stem from local of its behavior. Firstly, snow leopards not infrequently kill in excess of 50 sheep or goats in a single event, with all animals bearing canine punctures to the throat. There is usually little or no evidence of the cat having consumed much meat. Clearly, however, there is way more meat than the cat could possibly consume, even if it were given the opportunity to eat at will. And unlike wolves, snow leopards are slow eaters. They may not start feeding until an hour or more after the killing its prey, ample time for the owner to return or find the kill and chase the predator away. The more observant herders are well aware that snow leopards kill large ungulates at infrequent intervals of two weeks or more, and argued that they had the power to survive on air, mud and water. This belief of special superhuman powers is further explored in the discussion (see later).

Interestingly, the more observant persons that we interviewed commented on the presence of the shrub *Myricaria* in snow leopard droppings. This plant is primarily consumed during the months of January to March, and may have some medicinal value, possibly with respect to alleviating the cat of infections of tape-worms or other internal parasites.

Besides their overall attitude to wildlife in general, we asked the respondents to indicate to what extent they "liked" or "disliked" the dominant mammalian predators and ungulates found in Hemi National Park (Figure 5). There is a clear liking of the herbivores over the predators, with some 90% of respondents expressing a liking of wildlife in general. Perceptions toward snow leopard tend to be more favorable than their feelings toward the wolf, which suffers from an almost globally-wide dislike, fear and mistrust on the part of humans. By contrast, the lynx achieved the highest favorability rating of the three predators involved in this survey, likely reflecting its almost negligible impact in terms of livestock depredation, at least in this part of Ladakh.

The next questions we posed to the villagers focused on the role of snow leopards and wolves in the mountain ecosystem, whether they should be protected, and whether they represented a potential threat to human safety (Figure 6 and Figure 7). We asked each person if they agreed or disagreed with a particular statement (see Appendix 1), and if so, how strongly they felt about the sentiment espoused by the statement.

Over 90% of respondents agreed with the statement that the presence of snow leopards or wolves was a sign of a healthy environment. By contrast, barely 60% of villagers concurred with the statement that these two predator species should be protected in Hemis National Park. The generally weak support for predators very likely reflects the negative impact that both snow leopards and wolves have on livestock, the mainstay of the local economy.

Figure 5: Perceptions of Selected Wildlife Species by Local Residents

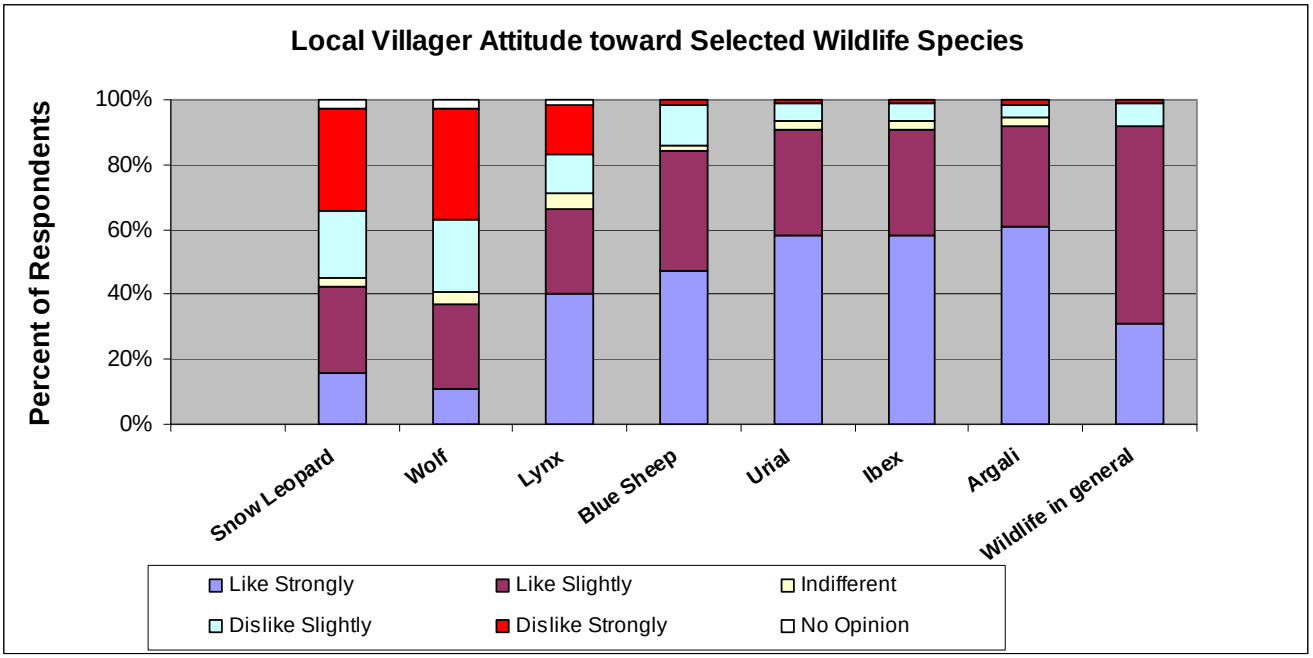
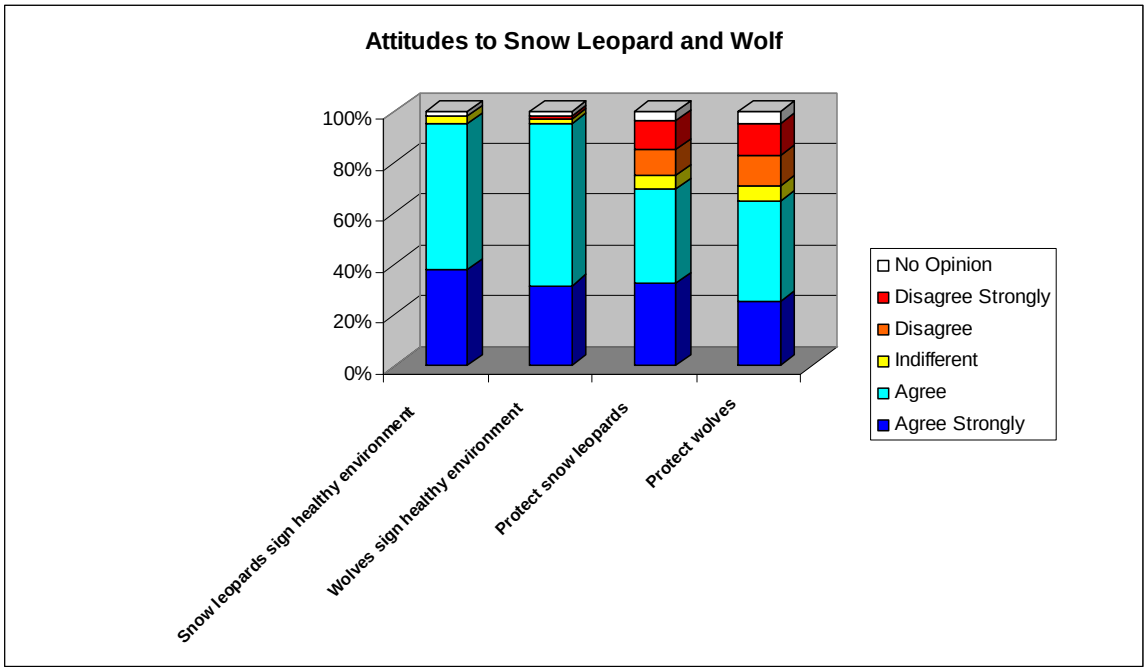


Figure 6: Local attitudes toward the snow leopard and wolf



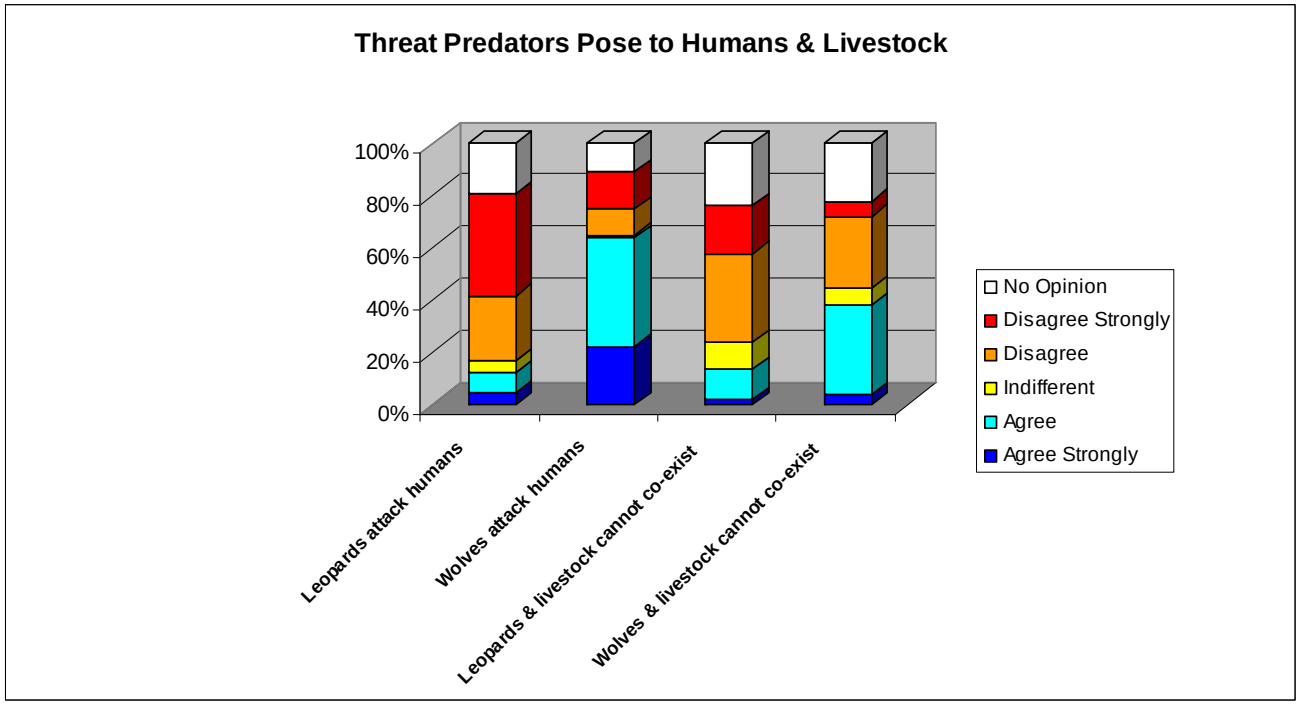
Respondents felt that wolves were a significant greater threat to humans than snow leopards (nearly 60% versus some 10% of the sample) (Figure 7). Interestingly, the majority did not agree with the statement that these two predators represented an unacceptable threat to livestock, despite widespread anger resulting from the loss of livestock. The fact that a relatively large number professed to no opinion on the subject may reflect the controversial nature of the statement viewed against the Park's strict rules against hunting and the strong emphasis upon protection of wildlife.

Respondents were then asked if there had been any change in the numbers of large predators or ungulates over the past 5-10 years. Virtually all respondents felt that the number of snow leopard, wolf, and blue sheep had increased during this time span.

Most believed levels of crop damage (94%) and livestock depredation (96%) had increased moderately or greatly over the last few decades. A majority of respondents (87%) felt that predator control is essential in order to reduce livestock losses to snow leopard and wolf, along with the other species causing livestock damage (wild dog 60.2%, fox 60.2 %, and golden eagle 40.7%).

Figure 7: Perceptions relating to potential or known threats posed by snow leopards and wolves

toward humans and their livestock



We posed several general questions related to the national park's rules and regulations. While nearly 80 percent of persons interviewed indicated their willingness to abide by the regulations, less than 40% felt that the national park was actually benefiting the local populace (Figure 8). Nevertheless, they appeared to be quite pragmatic, with less than 30% of respondents supporting that notion that the only solution to depredation would be to trap, kill or remove all snow leopards from the area. More people (40%) were willing to entertain the idea of removing wolves. A surprisingly high number disagreed with the statement that, "Allowing us to hunt or trap a predator which kills our livestock would be a good thing." To what extent these respondents really supported this position statement could of course be debated, but their underlying Buddhist religious belief system certainly augurs against the killing of wildlife, and virtually all of the park's residents were well aware of the strict rules against any hunting within its boundaries.

Figure 9 indicates acceptance (or rejection) for more frequent contact with Wildlife Department staff and the establishment of a permanent field office within the park's boundaries. Currently, the nearest facility is in Leh, some 15 km distant.

We asked each person interviewed if they were aware of the laws of the National Park promulgated by the Wildlife Department, and how often their community met with a staff member to discuss any matter of concern. Just over half of the households sampled claimed to "know about HNP's laws," while 37% said that they had no understanding or knowledge of such
Figure 8: Attitudes toward the regulations of Hemis National Park.

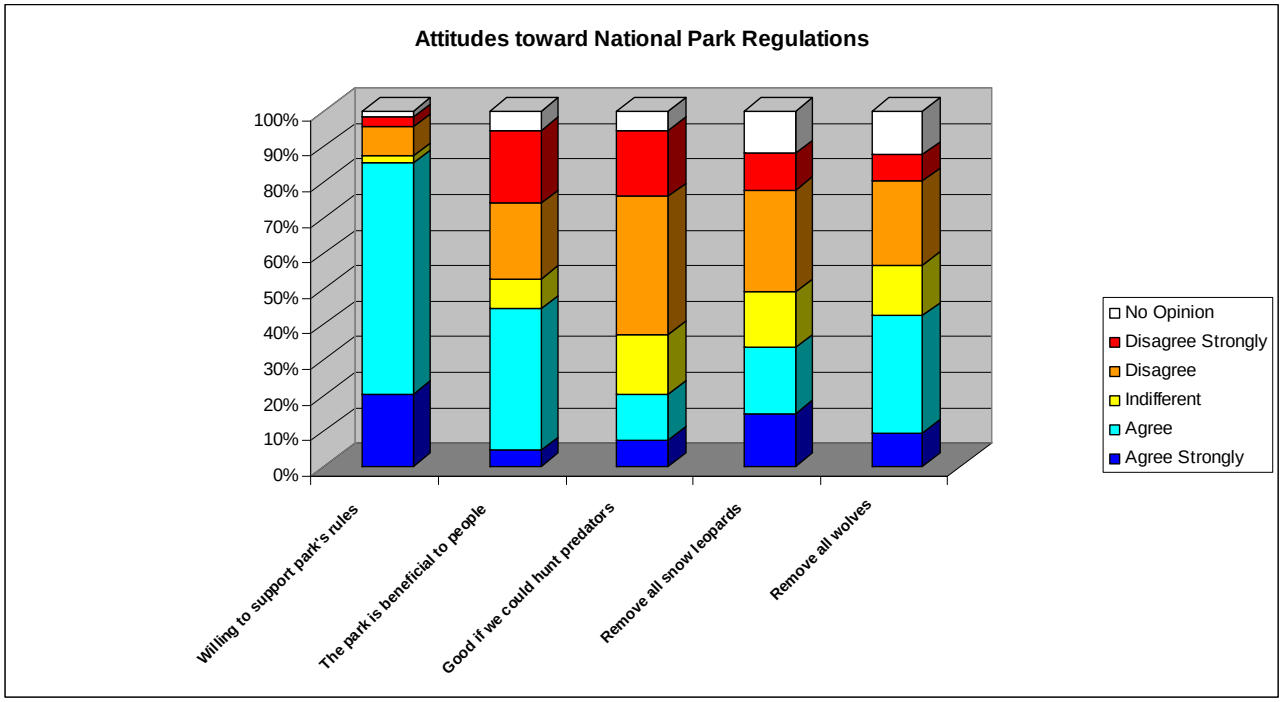
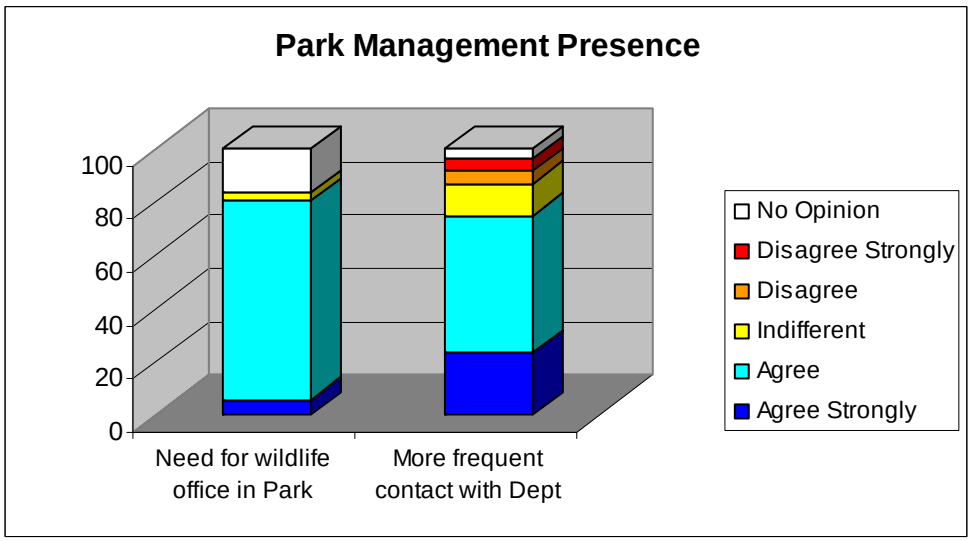


Figure 9: Feelings toward the need for improved park management authority presence



rules and regulations. Although answers to the second question were somewhat varied, it is apparent from the survey that there is little contact between individual villagers and the park authority. Ninety-six percent of respondents reported that it was the responsibility of the village leader to meet with the Wildlife Department, while 26% said that contact only occurred following

a depredation incident when they visited the Park HQ to file their claim for compensation. Another sign of the limited dialog and general mistrust between the authorities and local people was the relatively low response rate to the question asking how the park could help residents to reduce crop or livestock damage rates.

4.5 Limitations of the Survey: All questions were given in Ladakhi by two enumerators, who had been previously instructed by Jackson and Wangchuk on the specific intent or meaning of each question. This was followed by further review and training after the first set of questionnaires had been completed. One enumerator, Jigmet Dadul, had a working knowledge of the English language, but it was evident some questions were not interpreted consistently, suggesting that more training and supervision of the interviewers would have been desirable.

Clearly, many of the questions that we posed to villagers are outside their normal sphere of experience. For example, none had ever been exposed to a multiple choice question, or asked to report how much they agreed or disagreed with a statement. Some of the questions we asked concerned complex concepts, ethics and other potentially sensitive cultural topics. Thus, the survey results must be cautiously interpreted in light of our current understanding of traditional knowledge, beliefs, customs and social or political values.

The questionnaires were very lengthy and took too long to administer. They need to be shortened and simplified, which will require refining the issues and key questions to shed more light on local attitudes to wildlife conservation --- especially in relation to predators like the snow leopard and wolf. Priority should be given to those variables likely to prove most useful to tracking changes in conservation awareness and behavioral perceptions related to or resulting from the project actions undertaken. It is anticipated that these will revolve around answering questions such as (1) What is the gulf between perceived and actual losses (the latter monitoring by recording depredation incidents and actual losses on an ongoing basis, rather than once every year or two); and (2) What conservation and development actions by project sponsors like SLC seem to contribute most toward improved opinions of Hemis National Park and its management.

5. Discussion

With further depletion of the snow leopard's prey base, or increases in livestock numbers, conflict between local herders and predators can only intensify and thereby further undermine the security of the affected protected area (Mishra 1997; Saberwal 1994). Depredation often leads to retributive killing by herders (Hussein 2000; Mallon 1984, pers. observation). Although a sound understanding of local people's attitude to wildlife is a vital pre-requisite to conflict management, remarkably few studies exist to guide conservation decisions. Most surveys are really socio-economic assessments, focusing on broad questions related to community-based resource or protected areas management (e.g., Fiallo and Jacobsen 1995; Infield and Namara 2001; Mehta and Kellert 1998). The available literature on human-predator relations is heavily biased toward developed or industrial countries, which differ significantly socio-economically from their counterparts in developing countries who are primarily subsistence herders. Here harsh climate, demanding nutritional parameters and a sparse prey base greatly increases the risk of living alongside large predators. As Mishra (1997) has aptly noted, it is the loss that herders perceive, more than the actual loss, which leads them to retaliate against carnivores.

Sekhar (1998) and Saberwal et al (1994) suggest that such negative feelings are closely related to the amount of time and money that local people invest in protecting damage to their livestock or crops.

Conducting a wildlife attitudinal survey in an illiterate community is not simple nor straight forward. For example, the questionnaires must be delivered orally, enumerators have to ensure that respondents understand each question, and special measures have to be taken to avoid or minimize potential bias to survey results. Quantitative surveys may carry more credence than qualitative "opinion" surveys in the minds of protected area managers or decision-makers. But statistically-based surveys are not necessarily more valid or reliable than a survey in which information is amassed through a set of thoughtfully constructed open-ended questions applied through the key informant interview process. Irrespective of the survey type, the greater the level of clarity over the survey's goal, its objectives and the targeted audience, the more likely a useful outcome. There are many factors that potential bias the survey's outcome, all of which need to be carefully considered well in advance of administering the actual questionnaire. It is beyond the scope of this report to detail these, and the reader is referred to basic texts on the topic (for example, Salant and Dillman 1994; Fowler 1998).

It is imperative that all questions be developed with input from someone who is familiar with the local culture. Toward this end, the feedback offered by our Ladakhi associates was most useful, and greatly helped to streamline pre-testing of the questionnaire. However, questions which are too open-ended may produce information that is difficult to tabulate or compare between households and communities. Even simple transliteral wording may have a radically different meaning across different socio-economic, gender or ethnic groups, making translation all the more problematic. Each question has to be carefully thought out before it can be posed to intended respondents. It must be translated and sensitively worded in light of local customs and beliefs. For example, the question "do you like ibex?" has a radically different meaning whether one's viewpoint is utilitarian or moralistic. For example, in Pakistan ibex are widely hunted for food, whereas in Ladakh they are not, so values come from fundamentally different viewpoints.

We found that people were more cautious when answering questions relating to park benefits and protected area management procedures or regulations, presumably reflecting the antagonistic relationship between local people and the park authority. The list of potential pitfalls is lengthy, and we by no means claim to have been successful in avoiding all of these. However, we do believe that the information collected during the course of this survey, and our subsequent field work with the same group of stakeholders, will permit us to reach conclusions about the efficacy of different interventions and to identify important cultural issues or belief systems related to the wildlife and nature conservation in Ladakh.

Kellert (1993) offered a typology for how animals are perceived in North America, in which he recognized nine categories (utilitarian; naturalistic; ecologistic-scientific; aesthetic; symbolic; humanistic; moralistic; doministic and negativistic). The categories that seem to best capture the Ladakhi villager's perceptions are those relating to understanding or harmony with nature (naturalistic and aesthetic), and involving strong affinities, spiritual reverence or ethical concern for nature (symbolic and moralistic). However, it is clear that the same individuals may also take a negativistic or practical (utilitarian) viewpoint which enables the taking of a predator's life

(especially if that of a wolf or if recent depredation losses are perceived as excessive and detrimental to the household's livelihood). This dichotomy is shown elsewhere too. For example, herders in Norway from areas of high depredation had significantly higher scores in these scales than farmers from low risk areas (Viterso et al. 1999). To what extend this may also pertain to the mountains of Central Asia has yet to be determined. There is much work to be done, and this is study only a start.

How local people perceive the snow leopard: Compared to Buddhists from other regions of the Himalaya, the residents of Hemis National Park display a remarkably high degree of tolerance toward snow leopards. Thus, a survey of four settlements in the Manang District of Nepal indicated that twice as many respondents (over 60%) strongly disliked snow leopards (Oli et al. 1994). Both populations, however, showed strongly negative perceptions toward the wolf. A majority (51.9%) felt that total eradication of snow leopards was the only remedy worth considering. Oli reported that nearly 69% of the 102 households he sampled (each of which owned an average of 26 animals) had lost stock to snow leopard, representing 2.6% of the total livestock holding. Goats and sheep comprised over 50% of the losses, a somewhat rate than that recorded during our survey. The value of depredated stock was estimated US $ 3,866, about $48 per household or a quarter of the average per capita income in Nepal. These villagers, like their counterparts in Hemis, were overwhelmingly more favorable toward blue sheep, which caused little or no crop damage but are primary prey for the snow leopard.

Only one resident from the Manang study, the owner of a tourist trekking lodge, expressed a strong liking for snow leopards. Residents of one village, Khangshar which suffered a 5.1% loss, had significantly more negative attitudes toward snow leopard than people living along the main trekking trail. This may suggest that people are more willing to co-exist with snow leopards if they have other sources of income to help offset adverse economic impacts due to depredation.

Although most Buddhists are innately against hunting and the taking of life, they may exclude snow leopards and other predators from such religious beliefs. Oli noted that pastoralists "killed snow leopards whenever opportunity permitted, and this was associated with considerable prestige and substantial financial reward." Similarly, villagers in Mustang (Nepal) and Zanskar (India) used to travel between neighboring settlements parading the stuffed carcass of a snow leopard trapped following a depredation bout (Peissel 1965; Nath 1982; Spearing 2002; Som Ale, pers. comm.).

Even where wildlife are heavily hunted, as in Pakistan, some ethnic groups believe that snow leopards have special, superhuman powers. In writing about the Gojal people of Northern Pakistan, Mock (1998:382) noted, "…..the following story in Wakhi of his father and his special relationship with the *mergichan*, who appeared to him in the guise of a snow leopard. A snow leopard, *pes* in Wakhi, is a *mergich* animal found only in *mergich* areas. It rarely interacts with people, is hard to see, powerful, beautiful, and potentially dangerous. As such, it exemplifies many of the qualities of the *merchigan*, and so is an appropriate animal shape for them."

Mergich areas are typically high altitude alpine pastures and valleys, which constitute core habitat for snow leopards, which usually only descend to lower elevations during the winter because of deep snow or a scarcity of food. Humans occupy the merglich habitat for only a

brief period each summer, when they take their livestock to the summer pastures for grazing. Among the Gojals, shepherding is assumed by the women rather than the men. The spirits also belong to the female realm, they embody purity (whereas humans are impure and imperfect), and ibex are their "livestock."

In Pakistan, men are more likely to visit alpine areas to hunt the ibex, a wild goat. Before a hunter sets off in pursuit of ibex, however, he must receive "permission," usually afforded through a dream said to be directly the *merchigam* itself. Failure to do so will certainly place the hunter at risk of his life, and the hunt will very likely end in failure. Such fear ensures that all hunting expeditions are preceded by special ceremonies or personal interactions with the spirits; otherwise they are most unlikely to take place. Interestingly, such visions of supernatural "snow leopard spirits" appear to be most closely associated with communities located within the geographic range of the ibex, a species of wild goat that extends from Ladakh westward through the Karakorum range and northward into Central Asian republics, China, and Mongolia. Ibex and blue sheep (another caprid or member of the goat and sheep family) best delineate the snow leopard's range within Central Asia.

In other parts of the Himalaya, alpine areas are home to the infamous *yeti,* which tends to visit human settlements during the winter. It is thought-provoking to speculate that the cry of the *yeti*, which carries far over the noise of a winter snowstorm, may in fact be the mating call of the snow leopard.

Another story in which a human assumes the shape of a snow leopard involved Milarepa, Tibet's great Buddhist poet-saint, who lived from 1052 to 1135 AD. A mountain snowstorm stranded Milarepa for six months in the Great Cave of Conquering Demons, where he had gone to live in solitude and pursue his devotions. When the snow finally melted, six of his followers went to find his body, but found that he had been transformed into a snow leopard, and was resting on ledge in the sun. They too ran away in fear. This may help explain why residents in places as far-flung as Ladakh, India and Manang, Nepal heed the advice of religious leaders or *lamas* not to hunt or kill snow leopards. Maintaining these cultural beliefs and values could constitute a potentially powerful conservation tool across the Himalayan and Tibetan mountain ranges.

The real power of religion lies in motivating people to protect the snow leopards despite conflict arising from depredation: A lama settled on the remote village of Phu in Manang District, Nepal, where blue sheep and snow leopard had been mostly poached out. He told the villagers he would leave unless they protected wildlife. Reluctant to part with their revered guru or teacher, the villagers promised not to kill again. Several decades later, wildlife has rebounded with blue sheep wandering close to the village (Nepali Times, 20 June 2003). The Lama was recently the recipient of a special wildlife award.

Similar actions could be encouraged in other areas in the Himalaya, but we will need to address legitimate concerns of herders related to depredation by snow leopard. These require having a good understanding of the root causes of depredation and how local herders perceive wildlife and protected areas.

6. Conclusions and Recommendations

We used the attitudinal survey to better understand how people perceive snow leopards, wildlife in general, and Hemis National Park with its top-down regime of regulations. This instrument enabled us to explore people's beliefs, opinions, preferences, motivations, and perceptions, all of which influence their willingness to protect predators, prey species and wildlife habitat within this internationally important national park. As noted, few attitudinal surveys have been conducted in developing countries. Understanding local people's perceptions is an essential pre-requisite to the effective management of all predator populations, and any remedial management prescription must address perceived as well as real causative factors for depredation. The willingness of stakeholders to co-exist with a large predator like the snow leopard may hinge upon what has been termed "acceptance capacity" (Riley and Decker 2000a), which in turn may require undertaking a "risk perception assessment" (Riley and Decker 2000b) to determine how and why decisions may differ according to the particular area, culture and predator species in question.

Baseline surveys of local attitudes are urgently needed from other parts of the snow leopard's range. Among the more important questions that such surveys need to ask are:

- To what extent can negative feelings toward wildlife be offset or reversed, and neutral perceptions made more positive, by ensuring tangible benefits from income derived from wildlife-related activities such as nature guiding?

- How can one build upon existing cultural and religious values to broaden acceptance of predators, whether endangered or not, species that are primarily viewed as being responsible for killing valuable livestock? Are there other beliefs and cultural mechanisms that could be used to increase local people's tolerance of predation, and if so, how can these belief systems be encouraged to spread from one community to another?

- To what degree are negative perceptions directly related to actual loss rate, as opposed to the amount of time and money spent guarding livestock and crops? Under what circumstances will negative perceptions and attitudes far exceed actual losses incurred, and what can one do to bring such perceptions more in line with the reality?

- How much of the negativity shown toward predators and wildlife pests is also related to park regulations which prohibit any form of predator control? And to what extent do attitudes differ between those communities living within national parks versus those located outside, but also situated in suitable or good wildlife habitat?

Attitudinal surveys are best undertaken during the winter, when people have more time to devote to interviews. Even so, the questionnaire needs to be shortened, and supplemented with pair-wise matrix ranking and informal discussion groups in order to identify depredation "hotspots" or prospective communities for implementing conservation initiatives aimed at protecting a viable population of the endangered snow leopard. Local people can be directly engaged in monitoring (by the keeping of depredation records), and depredation loss reduced through herder awareness raising, education outreach targeting schools and teachers, and by

encouraging community debate on what constitutes good indicators for measuring environmental health and household prosperity. An especially demanding future challenge lies with encouraging local herders people to protect wolves in addition to snow leopards.

Acknowledgements: We are grateful to the villagers of Hemis National Park for their cooperation and willingness to devote their valuable time to this project. The survey was ably organized and supervised by Rinchen Wangchuk, SLC's Ladakh Field Director, while Jigmet Dadul and Dorje served as enumerators. Barbara Palmer and Jerry Roe assisted in data entry and cross-validation, while Rodney Jackson conducted the data analysis.

Funding was provided under a generous grant from the Leonard X. Bosack and Bette M. Kruger Charitable Foundation, with support from Kristin Nowell of the Cat Action Treasury, under which the Snow Leopard Conservancy operates.

For more information on The Snow Leopard Conservancy's programs linking snow leopard conservation, income generation and community-based tourism, please visit our website: www.snowleopardconservancy.org or email us at: info@snowleopardconservancy.org

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8. Appendix

Sample Questionnaire (Note: only questions relating to the study described in this report are shown below. The form was also formatted for visual clarity and ease of use).

Purpose: The purpose of the questionnaires was to gather important baseline information against which to assess the effectiveness of the Snow Leopard Conservancy's (SLC) interventions for (1) reducing livestock depredation loss (especially to snow leopard); (2) increasing household income to help offset unavoidable depredation losses; and (3) improve relations between local people and the park management authorities by highlighting benefits associated with wildlife conservation (APPA promoted and linked small-scale conservation-development initiatives).

The first section is intended to gather information on livestock depredation and traditional animal husbandry practices among herders in Hemis National Park. It is only administered once; other techniques will be used to track depredation rates and patterns over time. Furthermore, questions relating to actual livestock losses and herd size or composition are not included here, but are available upon request.

1. Have you lost any livestock to predators during the last 2 years? YES NO

2. If yes, which of the following predators were involved? (tick all those responsible for loss to your livestock herd)
Fox Wild-Dog Wolf Domestic Dog Snow Leopard Lynx Bear
3. Please give your ranking of the three most important predator species: (list in order by name)
Most Important: _____ 2nd Most Important: _____ 3rd Most Important: _____
4. Do wild animals damage your food crops? YES NO
4a If YES, which crops?_____
4b Which animals?_____
5. Can you tell me how much you lose each year? Slight amount Medium Heavy amount (Circle one only)
6. During which Tibetan months do you suffer such loss? (indicate time of peak loss):_____
_____
Please give me the place names of the places most vulnerable to such crop damage?
_____
7. On the average day, how many family members are involved in guarding your (a) livestock? [ ]; and (b) your crops [ ] from wildlife?

8a. Do you guard your goats & sheep by day? YES NO And by night? YES NO
8b: Indicate by what means during day: Shepherd Dog Noise Slingshot Other _____ (circle all which apply)
8c. And during the night: Corral Shepherd Dog Noise Slingshot Other:_____
9a. Do you guard your large livestock like yak/horses by day? YES NO By night? YES NO
9b. If yes, indicate how you protect them:_____
10. How often do you check your yaks & horses when they are out foraging on the open-range? [ ] (indicate the frequency, and specify what measure, e.g., days or hours)
11. Do you think that it is necessary to control the loss of livestock by the following predators:
Snow Leopard? YES NO
Wolf? YES NO
Wild Dog? YES NO

The Snow Leopard Conservancy. 2003. *Local People's Attitudes toward Wildlife Conservation in the Hemis National Park, with Special Reference to the Conservation of Large Predators.* SLC Field Series Document No 7. Prepared by R. Jackson, R. Wangchuk, and J. Dadul. Sonoma, California. 29 *pages.*

Fox? YES NO
Eagle? YES NO
Other (list): _____ YES NO

12. Which of the following methods work best for deterring (a) Snow leopard and (b) wolf? For each item, please indicate relative effectiveness by entering the number selected next to each species:

1 = very effective 2 = effective 3 = ineffective 4 = very ineffective 5 = don't know or cannot say

Improving day-time and night-time protection through:

a. Use of guard dogs? SNOW LEOPARD WOLF
b. Use of shepherd from within household? SNOW LEOPARD WOLF
c. Use of communally-hired shepherd? SNOW LEOPARD WOLF
d. Use of noise? SNOW LEOPARD WOLF
e. Use of smoke and fire? SNOW LEOPARD WOLF
f. Construction of predator-proof corral: SNOW LEOPARD WOLF
g. Which season is corral most needed for: SNOW LEOPARD_____ WOLF: _____
h. Avoiding areas with high depredation risk? SNOW LEOPARD WOLF
i Financial compensation for loss? SNOW LEOPARD WOLF
j. Trapping problem animal? SNOW LEOPARD WOLF
k. Other methods (please specify): _____ Species: _____

13. What actions do you take to protect your crops from wildlife damage? (INTERVIEWER: This is intended for villagers to describe in more detail how livestock depredation losses could be reduced):

_____
_____

14. Would you like to make any other comments, observations or recommendations?

_____
_____
_____
_____
_____

KNOWLEDGE AND ATTITUDES TOWARD WILDLIFE and HEMIS NATIONAL PARK

The purpose of this portion of the interview was to gain a better understanding of local people's views on snow leopards and wildlife in Hemis National Park. This questionnaire is administered once at the beginning of the project (before interventions) and then again 1-2 years after the agreed-to intervention has been implemented.

1. First, which of the following wildlife species are found in this area?

Tiger Common Leopard Snow leopard Wolf Wild Dog Lynx Black bear
Jackal Red fox Urial Ibex Blue sheep Argali Pika
Musk deer Any others? _____

2. a. Have you ever seen a snow leopard? YES NO
b. How about others in your family? YES NO

3. What do snow leopard's eat? _____

The Snow Leopard Conservancy. 2003. *Local People's Attitudes toward Wildlife Conservation in the Hemis National Park, with Special Reference to the Conservation of Large Predators.* SLC Field Series Document No 7. Prepared by R. Jackson, R. Wangchuk, and J. Dadul. Sonoma, California. 29 *pages.*

4. What do wolves eat? _____

5. Please indicate your attitude towards following wildlife species (tick the category which most accurately describes your feeling toward the species in question) (Please circle the correct selection):

a. Snow leopard: Strongly like Slightly like Indifferent Slightly dislike Strongly Dislike No opinion
b. Wolf: Strongly like Slightly like Indifferent Slightly dislike Strongly Dislike No opinion
c. Lynx: Strongly like Slightly like Indifferent Slightly dislike Strongly Dislike No opinion
d. Blue sheep: Strongly like Slightly like Indifferent Slightly dislike Strongly Dislike No opinion
e. Urial: Strongly like Slightly like Indifferent Slightly dislike Strongly Dislike No opinion
f. Ibex: Strongly like Slightly like Indifferent Slightly dislike Strongly Dislike No opinion
g. Argali: Strongly like Slightly like Indifferent Slightly dislike Strongly Dislike No opinion
h. Wildlife generally
Strongly like Slightly like Indifferent Slightly dislike Strongly Dislike No opinion

6. How would you describe your attitude toward the following statements? (Circle which best reflects person's viewpoint):

6a. "The presence of snow leopards is a sign of a healthy environment." Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

6b. "The presence of wolves is a sign of a healthy environment." Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

6c. "Snow leopards should be protected." Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

6d. "Wolves should be protected." Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

6e. "Snow leopards have been known to attack and injure people." Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

6f "Wolves have been known to attack and injure people." Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

6g. "Snow leopards are an unacceptable threat to livestock." Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

6h. "Wolves are an unacceptable threat to livestock." Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

7. Are you allowed to trap or kill animals that are found in fields damaging crops or attacking livestock?
YES NO I do not know

8. If NO, then who prohibits you from hunting (Circle ALL OPTIONS which apply)?
The government Village council Monastery Other (describe)

9. If you know of any incidents in the PAST when snow leopards or another predator species has been

killed? If so could you please describe (a) which predator species; (b) the date or year in which it occurred; (c) where (name of place); (d) the method used to catch the predator; (e) the number killed; and (e) the reason why they were killed.

Enter the information in the table (one line for each incident):

Species	**Date trapped**	**Location**	**Method used**	**Number**	**Reason**

10. Which of the following actions do you think should be taken against problem livestock predators?
Protect all Unlimited hunting Limited control Immediate Removal of problem animal
Other Action (please explain):
_____

11. What actions could Hemis National Park do to help you reduce depredation problems? (Please give specific action the Wildlife Dept could take to reduce losses):
_____
_____

12. Please tell me about any folklore stories involving about snow leopards, wolves, blue sheep or other wildlife?
_____

Specific questions regarding Hemis National Park: Now I would like to ask you some questions on how the wildlife numbers and damage control measures may have changed over the last 5-10 years (INTERVIEWER: please probe how the person has concluded there has been a change - the underlying reasons): (Only circle one per line)

13. In your view has the number of snow leopards:
increased decreased not changed do not know

14. In your view has the number of wolves:
increased decreased not changed do not know

15. In your view has the number of lynx:
increased decreased not changed do not know

16. In your view has the number of blue sheep:
increased decreased not changed do not know

17. In your view has the number of livestock killed by predators (Circle ONE only from following selection):
increased greatly increased moderately increased little not changed
decreased greatly decreased moderately decreased little I do not know

18. In your view has the amount of crops eaten or damaged by wildlife (Circle ONE from following selection):
increased greatly increased moderately increased little not changed
decreased greatly decreased moderately decreased little I do not know

19. For each of the following statements, which most accurately describes your feelings? (Circle One only for each question)

19a "I am willing to support the wildlife regulations of the Hemis National Park" Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

19b "The Hemis National Park is beneficial to our community" Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

19c "Allowing us to hunt or trap a predator which kills our livestock would be a good thing" Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

19d "The only solution to depredation of livestock by snow leopard is to trap and kill all snow leopards in the area" Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

19e "The only solution to depredation of livestock by wolf is to trap and kill all wolves in the area" Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

19f. "More frequent contact with wildlife staff would be desirable." Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

19g. "A permanent wildlife field office in the park would be a good thing." Do you…
Agree strongly Agree Indifferent Disagree Disagree strongly No opinion

20. Could you please tell me how often your community meets with a staff member of the Wildlife Department and who is involved in such meetings?
_____

21. Do you know about the laws of the Wildlife Department and Hemis National Park?_____

22. Would you like to make any comments, observations or recommendations that would be helpful to addressing the depredation problem, while also conserving wildlife?
_____
_____
_____
_____

THANK-YOU very much for your time and participation!
Use space below for INTERVIEWERS Notes: