Asian black bear, Ursus thibetanus: Human-bear conflict in the Palas Valley, Kohistan, Pakistan

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ABSTRACT: The Asian black bear, Ursus thibetanus Cuvier was widely distributed throughout Pakistan few decades ago, but now it is vulnerable restricted to moist temperate forests of the Himalayan mountains of Hazara forest division, Kohistan and Azad Jammu Kashmir, Pakistan. The present research was conducted to know about human-bear conflict (n=120) in the Palas valley, Kohistan, Pakistan during May-July 2010. The biggest problem of livestock of people was predation by U. thibetanus (60%). People mostly hunted it due to its crop raiding (57%) and attacking on the livestock (39%). It is actually omnivores but it was known as carnivores among people (57%) with ferocious behavior (82%). It attacked on different crops by tearing and eating (73%) on fruiting (75%) of maize, Zea mays L., in early morning (48%) and recognized by footprints (76%), therefore, people stayed at night in fields to prevent their crops (57%). Its the highest population was found in summer (48%). People had not reported of crops raiding, livestock damages and humans injuries, therefore, they kill them to prevent from further damages. Regular assessment should be conducted to know the human-bear conflict in Palas valley. Damage compensation schemes should be launched in the area to control the retaliatory killings and conserve the declining population of U. thibetanus.

Keywords: Himalayan mountains, human-bear conflict, Kohistan, moist temperate forests, Palas Valley, urbanization, Ursus thibetanus

INTRODUCTION

The Asian black bear, Ursus thibetanus Cuvier is known as the Tibetan black bear, Himalayan black bear or moon bear. It is a medium-sized black-colored bear with a distinctive white or cream "V" marking on its chest. It is a close relative of the American black bear with which it is thought to share a common European ancestor. Rare brown faces are also known and recently, a blond color face was discovered in Cambodia, Thailand and Laos (Galbreath et al., 2000). Although, U. thibetanus is protected in India and Pakistan, due to being listed as vulnerable in the Red Data Book, Appendix I of CITES and in Schedule I of the Indian Wildlife Protection Act and its 1991 amendment. It has been difficult to prosecute those accused of poaching U. thibetanus due to lack of witnesses and lack of Wildlife Forensic Laboratories to detect the originality of confiscated animal parts or products. Moreover, due to India's wide stretching boundaries with other nations such as Pakistan, Tibet, China, Nepal, Bhutan, Bangladesh and Myanmar, it is difficult to police such borders, which are often in mountainous terrain (Garshelis and Steinmetz, 2008).

The U. thibetanus is intermediate in size between the sloth and sun bear. It grows to approximately 130-190 cm (4¼-6¼ ft.) in length. Males weigh is 100-218 kg and females with 50-125 kg, the tail is 4.4 inches long (MacDonald, 1984). Its neck is remarkably thick and its ears large for its size. The sharp-claws are comparatively weak (Brown, 1990; Beckmann et al., 2004). The bear belongs to the family Ursidae. It consists of two subfamilies:

Ailurinae and Ursinae (Beckmann et al., 2004). Members of the bear family, Ursidae, currently inhabit North America, Europe, Asia and South America. Species found in Asia include the brown bear, Ursus arctos; Asian black bear, Ursus thibetanus; sun bear, Ursus malayanus; sloth bear, Ursus ursinus and polar bear, Ursus maritimus. Brown bear and polar bear are found in Europe and these two species plus the American black bear, Ursus americanus inhabit North America. The spectacled bear, Tremarctos ornatus is the only member of Ursidae in South America (Beecham, 1980). Ursidae is placed in the order Carnivora but except the largely carnivorous polar bear, all bears are omnivorous, feeding mostly on plant materials, insects, fish, and mammals. They are generally large, stocky, and powerful animals. All bears are plantigrade, walking on their entire foot. The radius-ulna and tibia-fibula are separate, which enables bears to rotate their limbs, improving their ability to dig, manipulate food and facilitating climbing by some species. Bears' teeth reflect their omnivorous habits by lacking the carnassials common in other mammalian carnivores and having flattened molars adapted to crushing and grinding vegetation. Bears' premolars are reduced in size and utility, creating a gap between incisors and molars similar to that found in many herbivores mammals (Beckmann, 2008).

District Kohistan means the land of mountains located in Khyber Pakhtunkhwa (KP), Pakistan with a total area of 7,492 km^2 and a population of 472,570. It is used for an area from the border with Azad Kashmir extends from the eastern Afghanistan province of Nuristan in the west (Biddulph, 2004; Perveen, and Husain, 2010a). Palas is situated between 34°52'E to 35°16'E and 72°52N to 73°35N and covers an area of 1,413 km² (Figure 1). The valley widely regarded as the best example of moist temperate forest remaining in Pakistan and runs east to west. In lower Palas, breh, Quercus baloot; olea, Olea europaea and ficus trees, Ficus sycomorus are present while in higher altitude of Palas consist of tilonj oak, Quercus floribunda and deodar, Cedrus deodara trees and then the mixed coniferous forest having Norway spruce, Picea abies; west Himalayan fir, Abies pindrow and Bhutan Pine, Pinus wallichiana are present. Topographically, it is deep, steep-sided and precipitous slopes. The major river traversing the area is the Musha'ga, which extends from the point where it enters the Indus for about 75 km eastwards to its source. In bottom of the main valley, numerous tributaries, e.g., boulder-strewn river and streams are fast-flowing. The oak, Quercus spp. are dominating shrub and woodland covers much of the lower slopes up to 1,900 m (Figure 1; Perveen, 2013; Zhiwotschenko, 1990). The objective of present study is to know about the human-bear conflict in the Palas valley, Kohistan, Pakistan to provide a base for further studies.
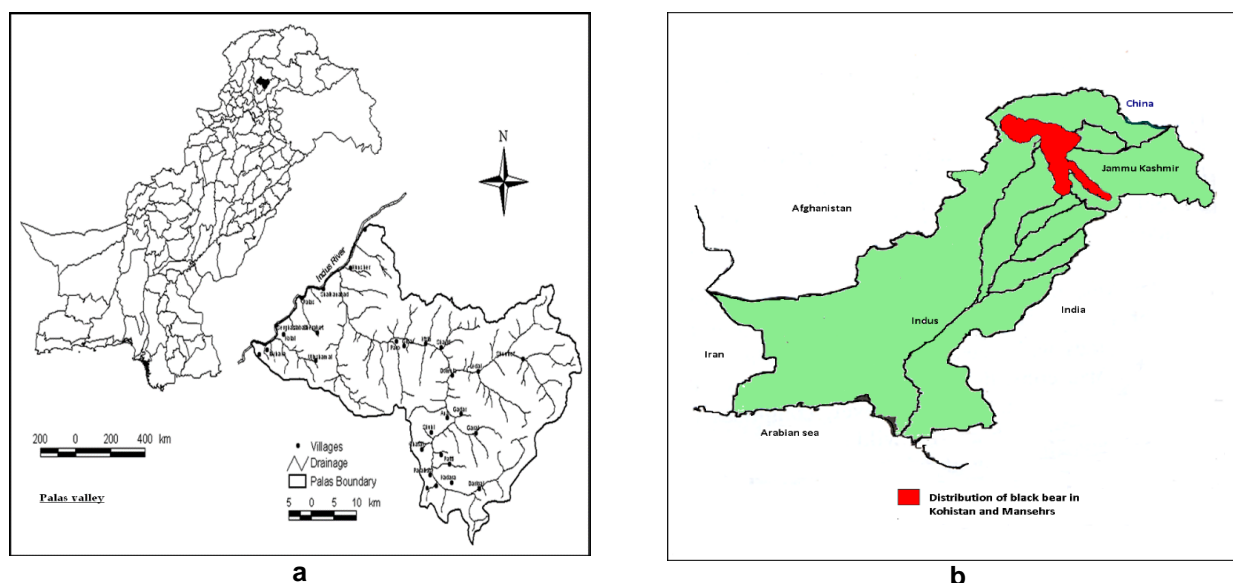

| a | b |

Figure 1. Map of Kohistan where the present survey was conducted about Asian black bear, Ursus thibetanus Cuvier during May-July 2010; a: Location map of Palas valley, Kohistan, Pakistan with 7 sites, i.e., Bar Geddar, Bar Paro, Karoser, Kunsher, Kuz Kalyar, Kuz Paro and Sharaid where questioners (n=120) were distributed; b: distribution of U. thibetanus in Pakistan limited to Kohistan and Mansehra; (Robert, 1977)

Table .1 .The livestock were kept by people in the Palas valley, Kohistan, Pakistan found in the present survey during May-July 2010

SNo	Type	Total numbers	% of total cattle	Purpose
1.	Goats	3976	73	Milk and meat
2.	Sheep	84	1.5	Wool and meat
3.	Cows	768	14	Milk and milk products
4.	Bulls	296	5.5	Cultivation of crops
5.	Buffalos	56	1	Milk and milk products
6.	Donkeys	168	3	Carrying luggage
7.	Horses	112	2	Carrying luggage

Seven sites were surveyed, i.e., Bar Geddar, Bar Paro, Karoser, Kunsher, Kuz Kalyar, Kuz Paro and Sharaid in the Palas valley, Kohistan, Pakistan, where questionnaires (n=120) were distributed
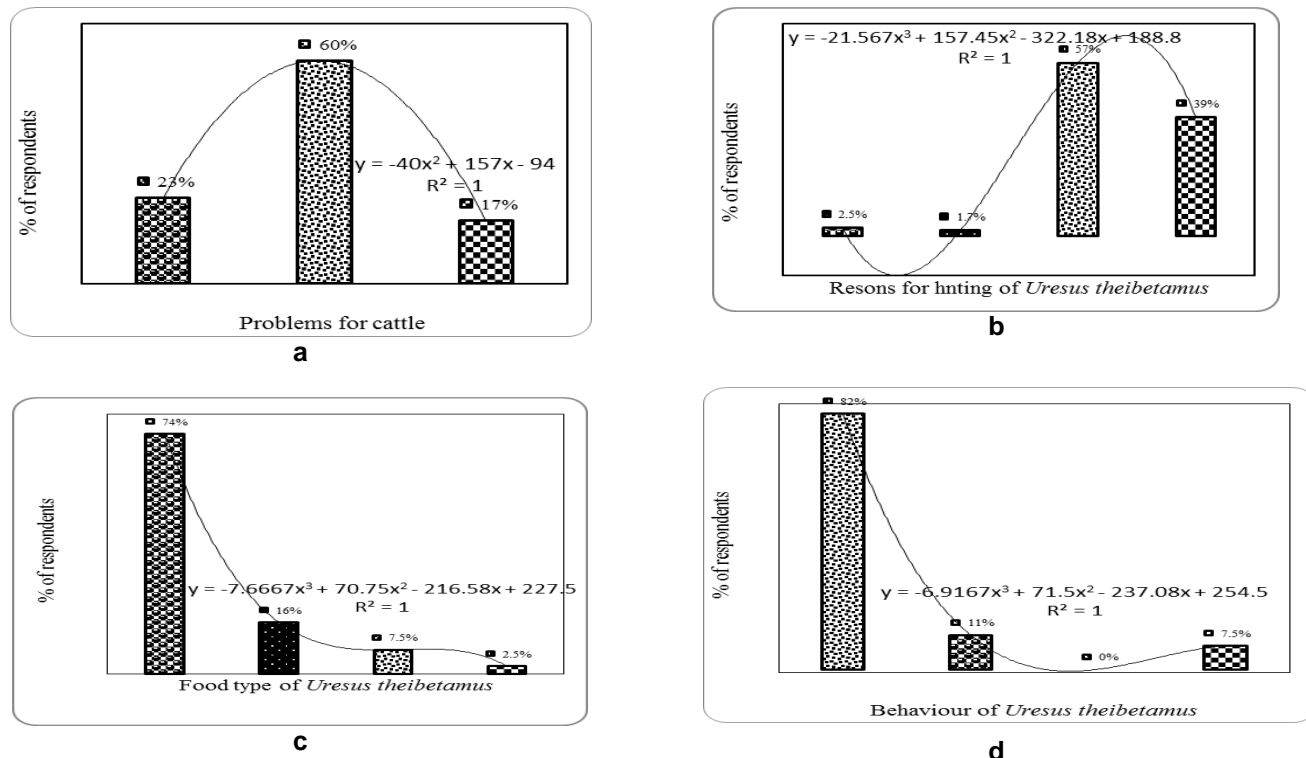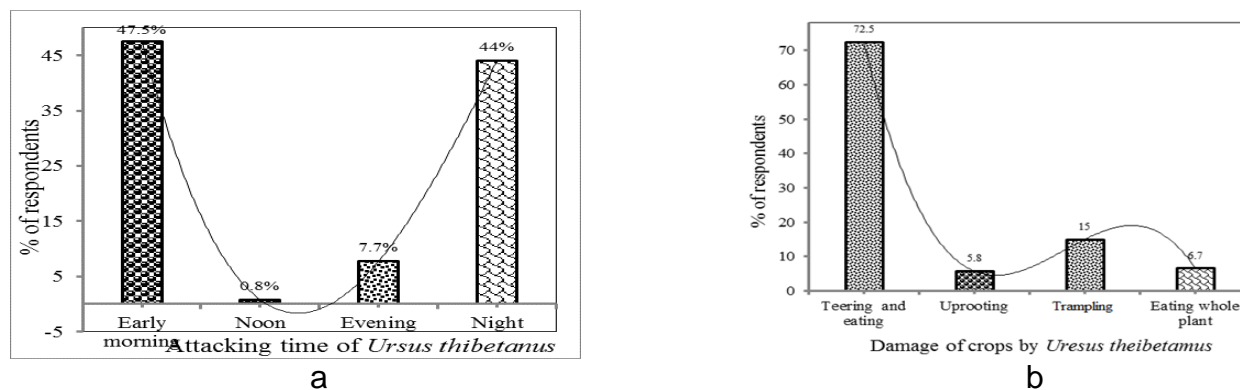

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Figure 2. The present survey, human-bear (Asian black bear, Ursus thibetanus Cuvier) conflict during May-July 2010 in 7 sites, i.e., Bar Geddar, Bar Paro, Karoser, Kunsher, Kuz Kalyar, Kuz Paro and Sharaid, Palas valley, Kohistan, Pakistan, where questionnaires (n=120) were distributed; polynomial line: trend line; A: problems faced by cattle of the local peoples; B: reasons for hunting of U. thibetanus; C: opinion of the local peoples about food type; D: opinion of the local peoples about behavior of U. thibetanus
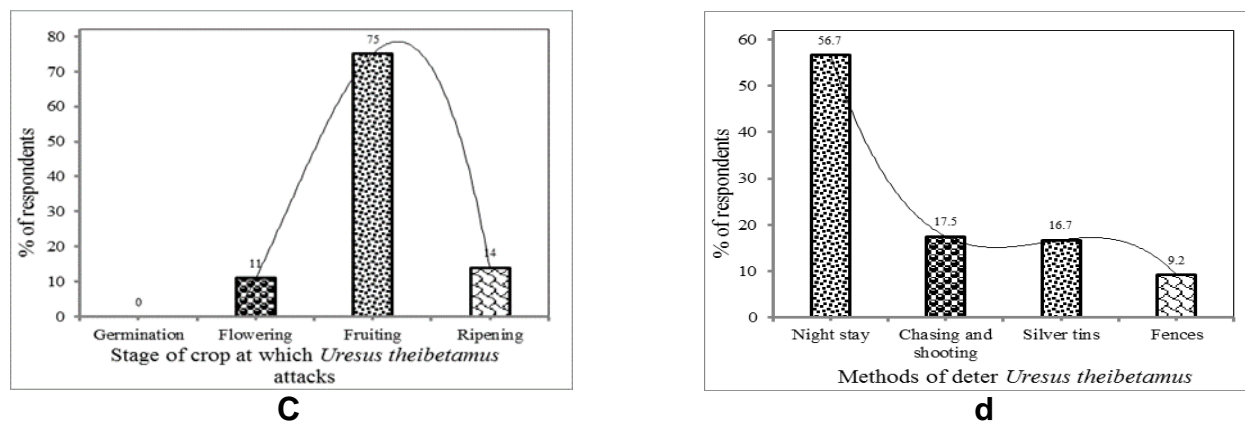

a

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Figure 3. The present survey, human-bear (Asian black bear, Ursus thibetanus Cuvier) conflict during May-July 2010 in 7 sites, i.e., Bar Geddar, Bar Paro, Karoser, Kunsher, Kuz Kalyar, Kuz Paro and Sharaid, Palas valley, Kohistan, Pakistan, where questionnaires (n=120) were distributed; polynomial line: trend line; a: the time of attack on different crops by U. thibetanus; b: nature of damage of crops by U. thibetanus; c: the stage of crop, Zea mays L. at which U. thibetanus attacked; d: the methods used to deter U. thibetanus
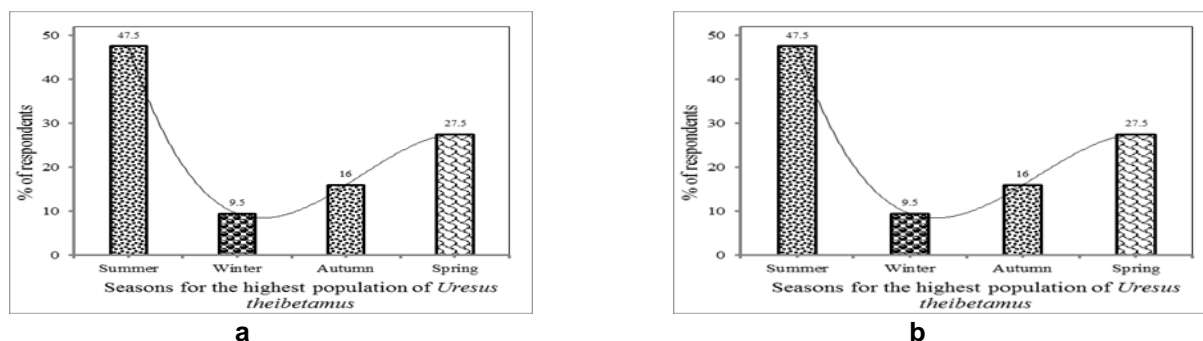

Figure 4 .The present survey, human-bear (Asian black bear, Ursus thibetanus Cuvier) conflict during May-July 2010 in 7 sites, i.e., Bar Geddar, Bar Paro, Karoser, Kunsher, Kuz Kalyar, Kuz Paro and Sharaid, Palas valley, Kohistan, Pakistan, where questionnaires (n=120) were distributed; polynomial line: trend line; a: the percieption of the presence of U. thibetanus; b: the opinion of the local peoples about season in which the highest population of U. thibetanus were observed

MATERIALS AND METHODS

The survey was conducted during May-July 2010 in Palas valley, Kohistan, Pakistan using both direct and indirect methods to collect the data about Asian black bear, *Ursus thibetanus* Cuvier. The Palas valley divided into 7 potential sites of *U. thibetanus*: Bar Geddar, Bar Paro, Karoser, Kunsher, Kuz Kalyar, Kuz Paro and Sharaid for survey, after discussion and logistic support of WWF and Wildlife, Departments of Kohistan, Pakistan. During survey, binocular, GPS (Global Positioning System) meter and digital camera were used.

Use of questionnaire

To know about the human-bear conflict in the area, questionnaire (Perveen and Rahman, 2012) in which the hunters and local public were asked 30 questions, which explain all about the *U. thibetanus* food type, predation, crop-cattle damages, reasons for hunting, behavior, time of attacking the crops, type of damage, methods used to deter, stage of the maize, season for the highest population, percieption of presence. The 120 questionnaires were distributed among the local people and hunters (Perveen and Hussain, 2012a).

Discussions and cross conversation were held with the local community. Local residents have adopted a lifestyle, which triggers their seasonal mobility to summer pastures and back to their winter settlements during fall. Such trance human migration and movements enable them to have incidentally more authentic observations about wildlife species. Such useful information about occurrence of *U. thibetanus* were collected from those peoples. Data collected were analyzed by Computer Program Microsoft Excel (CPME) (Perveen and Hussain, 2012b).

RESULTS AND DISCUSSION

Results

The present survey was conducted in Pals valley in district Kohistan. The potential sites of Asian black bear, Ursus thibetanus Cuvier, Bar Geddar, Bar Paro, Karoser, Kunsher, Kuz Kalyar, Kuz Paro and Sharaid were visited to know about the human-bear conflict in the Palas valley, Kohistan, Pakistan during May-July 2010.

The people of Palas valley (n=120) relied heavily on their cattle for their daily requirements. The total number of cattle kept by respondents was 5460 for various purposes. These cattle were maximum in number included goats and minimum in number was buffalos. Horses and donkeys were kept for transportation of luggage and other materials from one place to another. They were used for carrying the old agers and patients from one place to another (Table 1). The local peoples faced the biggest problem of their cattle is predation by U. thibetanus (Figure 2a).

The people and hunters (respondents) filled 120 questionnaires (n=120) for the present survey about U. thibetanus. Out of them 85% were keeping livestock. They have the serious problem that their cattle eaten by U. thibetanus, therefore, it was the biggest threat to their animals and 17% peoples said that their animals faced problems other than disease and predation, i.e., scarcity of food and slipping from mountains (M±SD: 34±20) (Figure 2a). The respondents hunted U. thibetanus due to: their crop raiding: 57% > attacks on livestock: 39% > for recreation: 2.5% > for medical uses: 1.7% (M±SD: 30±28; Figure 2b). All the respondents (n=120) said that they had not launched report the cases of different crops raiding, livestock damages and humans injuries by U. thibetanus to any authority instead they wanted to kill the concerned animals to prevent themselves from further damages. In answer to the question about food type of U. thibetanus, they said: carnivores: 74% > herbivores: 16% > omnivores: 7.5% > they didn't know: 2.5% (M±SD: 30±34; Figure 2c). When asked about its behavior, they said: ferocious: 82% > calm or shy: 11% > they didn't know: 7.5% > man-eater: 0% (M±SD: 30±40; Figure 2d).

In answer to the question, i.e., the time of attacking on different crops by U. thibetanus, they said: early morning: 47.5% > night: 44% > evening: 7.7% > noon: 0.8% (M±SD: 30±25; Figure 3a). About nature of damage of the maize crop, Zea mays L. by U. thibetanus, they replied: tore and ate: 72.5% > trampled: 15% > ate whole plant: 6.7% > uprooted: 5.8% (M±SD: 30±34; Figure 3b). In answer to the question about the stage at which attacked on Z. mays by U. thibetanus, they replied: fruiting stage: 75% > ripening stage: 14% > booting or flowering stage: 11% > germinating stage: 0% (M±SD: 30±32; Figure 3c). The measured had been taken by respondents in prevention of attacked of crop, Z. mays by U. thibetanus: they night stayed at fields: 56.7% > they used chasing and shooting methods: 17.5% > they used silver tins with stones attached with crops to deter it: 16.7% > they used wood fence: 9.2% (M±SD: 30±27; Figure 3d).

In answer to the question, i.e., how they perceived the presence of U. thibetanus in Palas valley, they said: by the presence of its footprints: 76% > by the presence of its fecal materials: 16.7% > when their cattle get frightened: 7.5% > by hearing its roaring: 0% (M±SD: 30±42; Figure 4a). In answer to another question, i.e., in which season U. thibetanus were observed in the highest population, they replied: in summer: 47.5% > in spring: 27.5% > in autumn: 16% > in winter: 9.2% (M±SD: 30±28; Figure 4b).

Discussions

As human populations expand and animals' natural habitats shrink, people and animals are increasingly coming into conflict over living space and food. The impacts are often huge. People lose their crops, livestock, property and sometimes their lives. The animals, many of which are already threatened or endangered are often killed in retaliation or to prevent future conflicts. Human-wildlife conflict is one of the main threats to the continued survival of many species in many parts of the world, and is also a significant threat to local human population. Conflicts between humans and U. thibetanus present a growing problem for wildlife managers. A significant factor contributing to this situation is the growth of human population and expanding development of habitat along the wild land, urban interface (Wilson and Theobald, 2008).

The present findings indicate that salient beliefs about the advantages and disadvantages of living with U. thibetanus can produce a reliable measure of urban U. thibetanus attitudes for use in segmenting diverse stakeholder population. To address the likelihood of increasing human and U. thibetanus encounters in the Palas valley, Kohistan, Pakistan, wildlife managers of the same area will need both proactive measures aimed at eliminating the proximate cause of conflict and reactive response options for dealing with individual incidents. Although the present findings delivered here imply that the public expects proactive (education) and non-lethal approaches, a combination of techniques is likely to define future protocols. This complex management scenario suggests the need for an integration of biological and social science methods to inform protocol development, implementation and evaluation in this area. While not suggesting any easy answers, applied human dimensions

research can help with this process and play a vital role in moving toward comprehensive solutions to human-U. thibetanus conflict in this area. The source of conflict between human and wildlife in the protected area is manifested by livestock loss to wild carnivores. They are allocating in this area, looping, sweeping, tearing and digging. For Z. mays, respondents reported that it tore the plant and then ate. Habit of sweeping was commonly addressed. People reported that the U. thibetanus consumed grains of Z. mays. The practice of chasing and shouting, night stay and bell ringing were acknowledged as accustomed practices to deter U. thibetanus from the crops.

The most common opinion (95%) of the locals about the reason of human-U. thibetanus conflict was crops raiding problems and damages to livestock while 5% locals said that U. thibetanus were killed for other than these reasons. Other reasons for this conflict are:

Habitat destruction
Demographic and social changes place people in direct contact with wildlife; as human population grows, settlements expand into and around the protected areas as well as in urban and sub-urban areas (IUCN, 2003). Species habitat loss, degradation and fragmentation are also connected to population growth. All these factors resulted in the conflict. In the Palas valley, Kohistan, Pakistan In the last 5 years, illegal cutting, timber smuggling and increased fruit plantation replacing forests has resulted in a drastic decline of forest cover. This resulted in an increase of human-U. thibetanus encounters.

Misconceptions about the behavior of U. thibetanus
In the Palas valley, Kohistan, Pakistan, misconception regarding the behavior of *U. thibetanus* among the locals resulted in an increased intolerance towards *U. thibetanus*. Whenever a *U. thibetanus* was sighted in the area, instead of giving safe passage and allowing it to reach the forests the local people made a huge mob surround it and tried to kill the *U. thibetanus*. Because of the Wildlife's officials of the area were not able to rescue the animal. Sometimes being unable to reach the animal in time and sometimes not being able to disperse the mob determined to kill *U. thibetanus* has led to the loss of them.

No proper demarcation between maize fields and forest areas
During the survey, it was observed that there was no buffer area between Z. mays fields and the forested areas. That is why, U. thibetanus easily got into fields and, begun to eat and tear the crops habitually.

How to minimize the human-U. thibetanus conflict in Palas valley
Human-U. thibetanus conflict study
In the absence of good information, scale and nature of human-wildlife conflict becomes a matter of personal opinion. Conflict with wildlife is an emotional issue and as a result reports and opinion can be biased, creating a false impression of the size of the problem. The systematic and objective gathering of information allows the managers to understand the problem and to develop management policies to reduce the conflict. Therefore, the human-U. thibetanus conflict has to be studied properly throughout the valley and with a specific focus on local conditions.

Awareness
Education and training activities at different levels would have the objective of disseminating innovative techniques, building local capacity in conflict resolution and increasing public understanding of human-U. thibetanus conflict. Educating rural villagers in practical skills would help them to deal generously with dangerous wild animal species and to acquire and develop new tools for defending their crops and livestock. In long term, these awareness programs will be promoted commitment towards conservation. As corn fields are the main attraction for U. thibetanus, fencing can be constructed along the edge of the fields using wood or steel fences.

Ursus thibetanus are present in many parts of Palas valley. Negative feelings have been developed by the locals because due to its depredation to crops, attack on cattle and human. Its favorite food is corn-ear of Z. mays. It attacks on the crops at night or early morning, tears the crops and then eats the corn-ear. Nights stay, chasing and shooting, silver tins with stones and fence are the common methods used to deter them. The damage reports are not launched to any authority instead people themselves try to take revenge from concerned animal. They are hunted due to human-bear conflicts. The potential threats to the population of U. thibetanus are human-bear conflicts, legal and illegal forest cutting and urbanization. If the ecological conditions have not remained constant, the population of U. thibetanus will be declined its level of occurrence in Palas valley.

Recommendations

Scientific research on the ecology of U. thibetanus is necessary and information on feeding habits, habitat utilization and ranging patterns are crucial for the long term conservation and management of the species. Rescue centers are needed to establish for the species conservation within its habitats. Wild-life Department should be conducted regular assessment studies to know the human-bear conflict in the area. The mitigating measures should be developed and provided to the communities to protect themselves and their property from the damages. Damage compensation schemes should be launched in the area to control the retaliatory killings of the species.

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