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HUMAN-SUN BEARS CONFLICT IN MIZORAM, NORTH EAST INDIA: IMPACT AND CONSERVATION MANAGEMENT

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Abstract

Interactions between Malayan sun bears (Helarctos malayanus) and humans in Mizoram state. We carried out informal interview in 40 villages out of 60 villages covered, locating in and around the protected areas of Mizoram, North-eastern state, during 2008 to 2010. In total, there were 33 human casualties by sun bear during 2000-2010. Males were attacked *(n=26, 78.8%) and female were attacked (n=7, 21.2%). Injuries were caused to face, nose, eyes, neck, hand and legs. Mark yearly variation of human sun bear casualties, the highest casualties (24.1%) during the year of 2002 and less casualties (3.0%) during the 2006. Bear attacks were recorded in all the seasons, but maximum cases occurred during autumn and winter months. During December, November, September, April, October and August 27.3 %, 21.2 %, 12.1 %, 9.1% and 6.1 % casualties respectively occurred. Out of 33 cases, victims were mainly in the age group of 31-40 years (45.5 %), followed by 21-30 years (33.3 %), and 41-50 years (12.1 %). Bear accounted for only 6.1 % and 3.0 % cases in the age group of 11-20 years and 51> years respectively. Information on sun bear attacks on human beings and circumstances are presented and discussed. Maximum cases i.e. 21 (63.6 %) occurred in forests, followed by 9 (27. 3 %) cases in crop fields and 3 (9.1%) cases in the vicinity of villages. These victims were involved in cattle grazing, farming or crop protection or moving in forests or vicinity of villages or non-timber forest produce collection. Most of these incidents occurred during morning, evening and night time when bears remained most active. Recommendations have been made for reducing conflict and conservation of sun bear.*

Keywords: *human sun bears conflict, Mizoram, North-eastern state, India.*

Introduction

In India, exponential increase in human and livestock populations has caused tremendous pressure on almost all the natural resources including forests and wildlife. Due the lack of of knowledge about the numbers of bears, distribution, population fragmentation, and mortality rates, sun bears are threatened throughout their range. Many sun bear population have already gone extinct due to a combination of habitat loss and excessive human caused mortality. It is likely that populations in many areas are now fragmented and isolated into small sub-populations that are sustaining increasing mortality [1]. In India, sun bear populations are severely threatened due to loss, degradation and fragmentation of habitats, poaching for trade in body parts, by keeping them as pets in villages and due to human-sun bear conflicts. Human-sun bear interactions include attacks on people, crop depredation and hunting for consumption,

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the sale of bear parts and effects of human resource extraction activities on bears [2]. These are still occurring at an increasing rate till date [3].

In Southeast Asia, sun bears (*Helarctos malayanus*) probably commenced crop raiding when attractive foods were first planted close to forest habitat, even when adjacent forest habitat was still extensive. Increased human encroachment on Mizoram forests has led to increased human-wildlife conflicts, although little information is available on conflicts specifically with sun bears.

Scattered information is available in India on human casualties, livestock predation and agricultural crop damage by bears. In Jammu and Kashmir, Himachal Pradesh and a few North-eastern states, human casualties and livestock killings caused by leopard and bears is a serious problem [4-6]

Another study by [7] revealed that 16 incidences of human casualties by sloth bear during 1988-93 over a period of five years in the same area. In North Bilaspur forest division, sloth bear population has developed aberrant behavior and is causing a lot of nuisance; incidences of human mauling and killing are quite frequent and now it has become beyond tolerable levels. 370 cases of human injury and 25 cases of killing occurred during the years 1978 to 1998 [8-11]. Information on sloth bear-human conflicts from 23 forest divisions and protected areas of Madhya Pradesh shows that 607 human casualties have occurred in the state during 1989-94 [12, 13]. In Andhra Pradesh, there have been 20-30 mauling cases by sloth bears in different years [14]. Bears are known to attack on people and cause damage to agricultural and horticultural crops in countries of their occurrence. In Japan, Canada, Mexico and United States, black bears caused damage to agricultural crops, apiaries, fish farms, livestock and human casualties [15-17]. In Scandinavia, the brown bear population is increasing and dispersing, resulting in more interaction with humans [1]. Cases of people injury by brown bear over the years have been analysed.

Bears, as to their association with man, they have been exterminated or driven out by man from many parts of their former domains. Contact with man has naturally affected the habits of bears. Where subject to constant menace from man they become much more alert, shyer and more rigidly nocturnal in habit. Contact with man also gives bears the opportunity to raid the fields and orchards. Individuals developing this habit may become notorious pests [18]. In Southeast Asia, sun bears (*Helarctos malayanus*) probably commenced crop-raiding when attractive foods were first planted close to forest habitat [19].

Ordinarily, bears fear and avoid human, except when defending their young, or when wounded. Attacks on man are usually sudden and unprovoked. Short of sight and hard of hearing, the bear is likely to be surprised at close quarters. Taken unawares, it rushes to furious attack in self defense. Many people are attacked mostly as a result of these sudden meetings. Naturally, this is more frequent with species which live near human settlements [18].

Here we (i) provide the information on the nature and extent of human sun bear conflict in the state of Mizoram, (ii) suggest mitigation strategies to minimize the conflict so as to provide knowledge for sustaining both human and sun bear in these areas.

Study area

The study was carried out in Mizoram, the extreme southern state of the north-eastern India, which lies between 21^{o} 57' and 24^{o} 30' N latitude and 92^{o} 15' and 93^{o} 29' E longitude, sandwiched by its international bordering countries such as Myanmar in the east and south, Bangladesh in the west; and a national border of Tripura, Manipur and Assam in the north. The total geographic area is 21081km^{2} (0.6% of the country). The terrain is hilly and mostly undulating with altitude ranging from 500 to 800m and maximum altitude is 2157m. Average annual rainfall ranges from 2160mm in Aizawl (state capital) to 3500mm in Lunglei (district capital). During winter, the average temperature varies from 11 to 24°C and in summer from 18 to 29°C. The forest cover is 18430km^{2} which constitutes 87.42% of the total geographic area.

The reserved forest constitutes 44.7%, protected forests 22.4% and un-classed forest 32.9%. The climate, terrain and heavy precipitation have resulted in landscape rich semi-evergreen forests. According to [21], the forests of Mizoram can be classified as Tropical wet evergreen, Tropical semi-evergreen and Sub-tropical hill forest. Mizoram has 20 species of bamboos, and one species *Melocanna baccifera* dominates with more than 75% of the area under bamboo forest. Other key bamboo species include *Dendrocalamus longispathus* and *Oxytenanthera parreifollia.*

In Mizoram, there are two national parks, seven wildlife sanctuaries, one tiger reserve reservation and more than 25 reserved reservation forests (Fig. 1). Each of the protected areas is surrounded by human habitation as well as within it. The Majority of the people inhabiting these villages belong to Mizo tribe and to a few villages of Chakma tribe in the western part that borders Bangladesh. The main economy of the village people depends on agriculture and of which most of them practice shifting (jhum) cultivation. Collection of resources like timber, NTFP, etc. are still very common and is the basic way of sustaining their needs for livelihood.

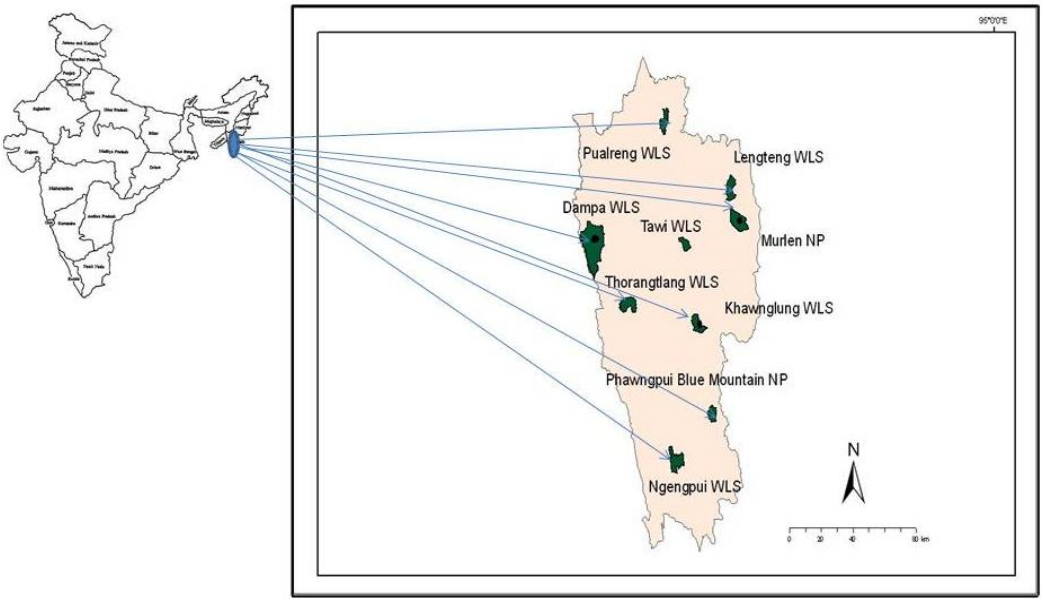

Fig. 1. Map showing different protected areas in Mizoram State

Methodology

During the study from 2008 to 2010, information was collected from the records of the forest department, survey of affected villages and by direct interview of the victims or their family members and by analysis of human attack cases in Mizoram. To know the nature and extent of the human-sun bear conflict, questionnaire survey of affected villages in the study area was carried out.

Informal household interviews were conducted, people inhabiting the villages in and around protected areas. The interview is carried out to collect information on the presence of sun bear in their respective village forest area, indirect or sign evidences, places of occurrence, sun bear body parts, forest dependency by the people on collection of timbers and NTFPs such as fuel wood, food plants, fodder plants, medicinal plants, bamboos and canes, thatches, etc.,

human casualties caused by sun bear attacks, agriculture crop damage; quantitative assessment, damage pattern, time of damage, control methods, etc. The above information is collected by using a well defined questionnaire formats.

We posed questions regarding ethnic origin of farmers, farming history, farming practices, types and amount of crops grown, and location of the farm in relation to the forest edge. Information on crop damage was recorded through interviews with as much detail as possible, including species and quantity of crops fed upon, number of trees damaged and type of damage, frequency of bear visits, bear crop raiding behavior, damage to crops by other wildlife species, and methods used to reduce wildlife-related crop damage. Whenever possible we directly observed crop damage in the gardens

In this study, as we have to find out the presence of sun bear in this state, method of sampling are done by interviewing respondents who have came across direct sighting of sun bear so as to be assured of the presence of sun bear in their locality. Apart from the information collected from the questionnaire, secondary information such as reports and record files from the Forest Department of their respective ranges are also collected.

Results

We carried out survey in a total 60 villages locating in and around the different protected areas in Mizoram. A total of 885 house hold survey in and around protected areas in Mizoram state. Out of 245 (27.7%) respondent confirm the presence of sun bear (Table 1). Of the total, we could find 245 respondents in 40 villages who could confirm the presence of sun bear by way of which they had came across direct sightings.

Table 1. Protected area with confirmed occurrence of Malayan sun bear in Mizoram (n = 245) during (2000-2010).

No	Protected area	Area (km^2)	No of total fringe village	No of village with confirmed occurrence of sun bear	No of respondents from the area
1	Dampa Tiger Reserve	500	11	6	59
2	Sairep Reserve forest	n/a	1	1	8
3	Thorangtlang WLS	50	2	2	7
4	Ngengpui WLS	110	11	5	40
5	Phawngpui NP	50	11	8	29
6	Khawnglung WLS	37.75	3	3	27
7	Tawi WLS	35	5	3	11
8	Pualrengtlang WLS	50	6	3	17
9	Lengteng WLS	60	4	3	13
10	Murlen NP	100	6	6	34
	Total		60	40	

The majority of the families interviewed are engaged in agriculture. Sun bear used to come into their field during the harvesting season of the crops. These depredations of crops were considered to be great economical loss for each family who practices agriculture. These crops are mainly annual which may be due to the system of agriculture i.e. Jhum (Shifting cultivation). 65 respondents reported that their agricultural crops are depredated by sun bears, and 26 of them have no reports and among which most of them do not practice agriculture at all.

Among the 91 respondents who reported 219 plot crop damage by sun bear. Out of 219 crop plot damage, the highest: 27.4 % in maize crop plot damage by sun bear reported in the month of June, July and August, followed by 21.9% Pineapple plot damaged in the month of June, July and August, 18.7% Pump kin plots damage in July to December, 11.4% Jack fruit plots damaged in June to September, 9.6% Bananas plot damaged in no specific time, 8.7% Sugar cane plots damage during all the month, 0.9% Water melon plots damage in June and

July, and there were same percentage 0.5% crop plots Ash gourd, Colocasia and Capsicum respectively damage by sun bear in Mizoram (Table 2). Sun bears are eating these fruits during the night while the people are inactive; they leave during the day and come back at night as reported by the villagers.

Table 2. List of crops plot damage by sun bear with damage pattern (n = 219) during (2000-2010).

No	Name of Crops	No of plot crop depredation	Crop damage (%)	Time of depredation in a year
1	Maize	60	27.4	Jun, Jul, Aug
2	Pineapple	48	21.9	Jun, Jul, Aug
3	Sugar-cane	19	8.7	All through-out the year
4	Pump-kin	41	18.6	July - Dec
5	Jackfruit	25	11.4	June - Sept
6	Ash gourd	1	0.5	Nov, Dec
7	Water melon	2	0.9	June, July
8	Banana	21	9.6	No specific month
9	Colocasia	1	0.5	Sept
10	Capsicum	1	0.5	July

The livelihood of the people largely depends on forest resources which result in extensive exploitation of the forest as well as sun bear habitat. The main forest produces which they used to collect were firewood, timber, fodder, medicinal plants, food plants, bamboos and canes for construction and handicrafts and thatches for roofing materials. All the 245 respondents reported that they used fuel wood for cooking purposes which are collected from the forest area.

Human casualties

During 2000 up to 2010, a total of 33 human injury cases were caused by Malayan sun bear in Mizoram states. Out of 33 human casualties, the majority of attacks were on males (n = 26, 78.8%) and there were only 7 attacks (21.2%) on females. In Damapa tiger reserve, one male succumbed to injuries caused by bear. This may be correlated with the intense activity pattern of men in forests in this region. Men regularly visit forests for hunting purpose and collection of fuel wood and fodder for their livestock, medicinal plants or to graze their livestock and also they spend more time in farming activities. Whereas women had restricted activity in forests and agricultural areas. All the casualties were accidental due to sudden encounters when villagers ventured into the forests. Sun bear occurred in the tropical rainforests and dense mixed coniferous forests interspersed with villages and crop fields, making them the best available bear habitats. This could be corroborated with occurrence of 28 incidences of bear attacks in the vicinity of the protected areas and reservation forests in the state.

As elsewhere in Southeast Asia, villagers recognized close encounters with sun bears to be potentially or extremely dangerous [1]. Sun bears are known as fierce animals in its range and would attack humans and inflict serious wounds when surprised in the forests [22]. Reports of black bear attacking humans, killing livestock and subsequent public backlash are regular in Himalayan region [23]. Human casualties by brown bear have been reported in the Great Himalayan national park [24] and Ladhak and Suru valley [23] in India. Human casualties by sloth bear are common in many states in India [12, 13]. In Madhya Pradesh, Bihar and Orissa, sloth bears caused 607, 47 and 67 human casualties respectively during 1989-1994**.** Human casualties by sun bear have been reported in Ukhrul and Chandel districts of Manipur, India [6].

In Japan, Canada, Mexico and United States, black bears were found to cause human casualties [15, 16]. In North America, approximately 100 people have been killed by grizzly bear in the past 100 years [25]. In Scandinavia, the brown bear population is increasing and dispersing, resulting in more interaction with humans [26].

Year-wise human casualties

Marked annual variation in human casualties by Sun bear was recorded in Mizoram states. Human injury cases occurred almost every year from 2000 to 2010. Maximum casualties (24.2%) were recorded during the 2002, followed by (12.1% each) cases in 2000 and 2009, (9.1% each) cases were in 2004 and 2008. There were (6.1%) human injury cases in each 2001, 2003, 2005, 2007 and 2010. As such there was (one, 3.0%) pattern of human casualties during 2006 (Fig. 2). Annual variation in the sun bear attacks on people could be directly correlated with the increasing human activities in forests, degradation and fragmentation of bear habitat and resources utilization. Due to reduction, fragmentation and deterioration of habitat, there has been direct impact on bear populations [27, 28]. Sloth bear habitat has been altered drastically with the major impact from forest cutting and intrusion into forests by local settlements [29]. As a result, human beings got increasingly exposed to bears in their habitats [28].

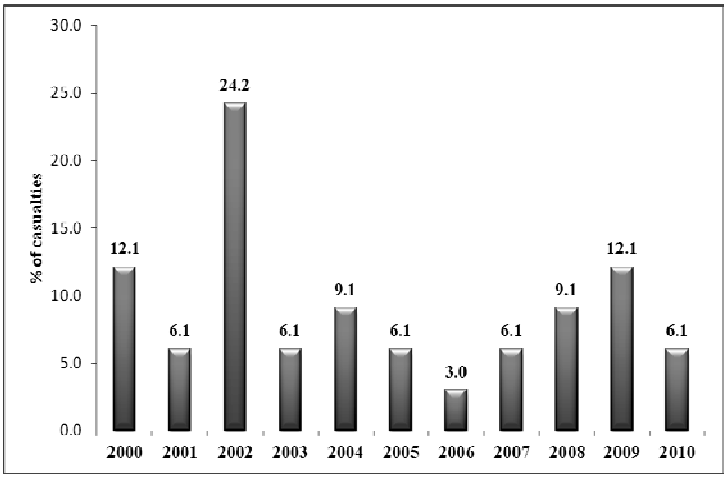

Fig. 2. Mark yearly variation in human casualties by sun bear in Mizoram state during 2000-2010. (n = 33)

Monthly variation in human casualties

There was marked a monthly variation in human casualties by Sun bear In Mizoram states during 2000-2010. Bear attacks were recorded in all the seasons, but human injury cases were high during spring and winter months**.** Out of 33 cases, highest number of casualties occurred in December (n = 9, 27.3%) followed by November (n = 7, 21.2%) and September (12.1%). Human casualties were also high during April (n = 3, 9.1%) followed by October and August (n = 2, 6.1% each) and there were January, February, March, May, June and July (3.0% each) human casualties were recorded (Fig. 3). Monthly variation in human casualties seems to be correlated with influx of villagers visiting forests for hunting purpose and collection of non-timber forest produce (NTFP).

The conflicts arise simply when human beings and wildlife come into contact and share resources. Bear's wide-ranging movement, their opportunistic nature, and capacity for learning also increased the probability of encounters with humans [28]. Some black bear-man encounters took place in wilderness, while bears were most active in its feeding on seasonal flowers and fruits, and villagers were engaged in collecting non-timber forest produce. Besides, local people were also found collecting mushrooms, bamboo (*Dendrocalamus strictus*) shoot and rhizomes as food and medicinal items during August to December. Bears living near human settlements raid the ripening crops, which leads to direct encounters with people guarding their crop fields [29, 11, 12]. When bears were with their cubs, people entering into their habitat for the collection of firewood were vulnerable to their attacks.

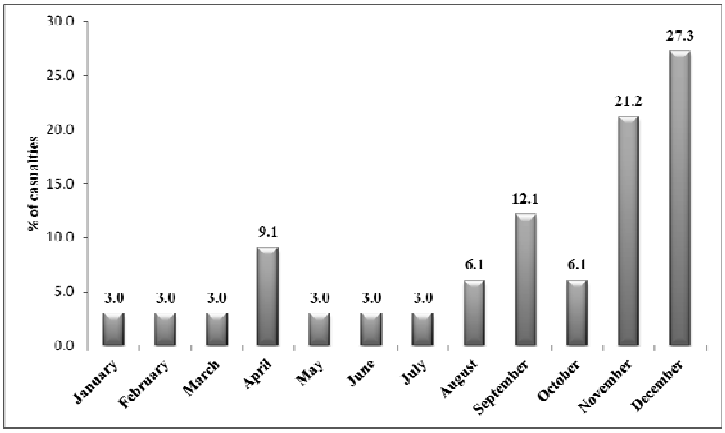

Fig 3. Human casualties by sun bear in Mizoram state during 2000-2010. (n = 33)

Age group of victims

Out of 33 human injury cases, highest number of the victims was in the age group of 31-40 years and 21-30 years (Fig. 4). There were 15 (45.5%) human casualties in the age group of 31-40 years, followed by 11 cases (33.3%) in the age group of 21-30 years and 4 cases (12.1%) in the age group of 41-50 years. Bear attacked two (6.1%) boys of age group 11-20 years and one case (3.0%) was of more than 51 years of age. The extent of human injuries by sun bear are related to the involvement of people of 31-40 years and 21-30 years age visiting forests more and more for hunting purpose and collection of NTFP.

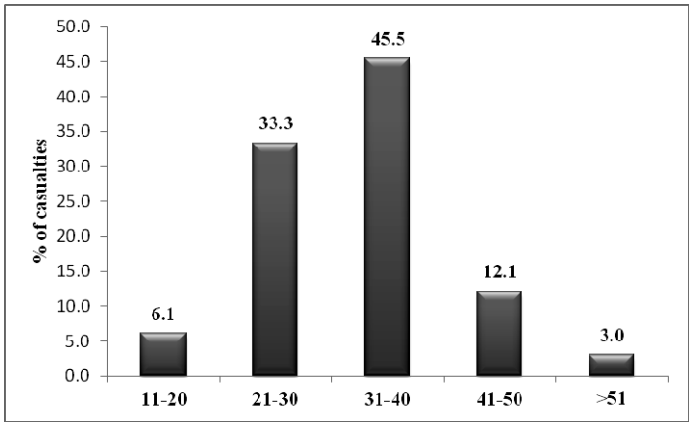

Fig 4. Human casualties in different age groups caused by sun bear in Mizoram state during 2000-2010. (n = 33)

Types of attacks and place of human casualties

Out of 33 human injury cases, the maximum cases Sun bear were found to attack the people and cause injuries in the head, face, chest, hands, abdomen and legs (Fig. 5). Highest number of victims had facial injuries (n = 13, 39.4%) and head injuries (n = 7, 21.2%). There were five victims (15.2%) with chest injuries, four victims (12.1%) with leg injuries, three victims (9.1%) with injuries in hands, and one victim (3.0%) with abdominal injuries. Whereas (n = 21, 63.6%) occurred in forest areas, nine cases (27.3%) in crop fields and three case (9.1%) in the vicinity of village. Most of the attacks were in the morning and day time, and few

incidences took place in the evening time. Interviews with the survived victims of sun bear attacks revealed that bears have poor sight and become aware of human presence only when they are encountered very closely.

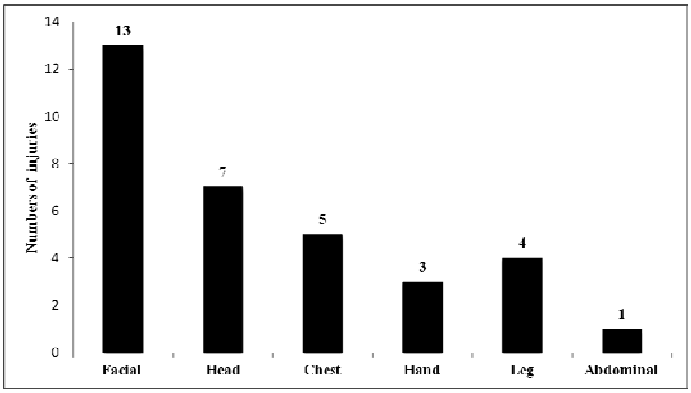

Fig 5. Human casualties in different types of injuries caused by sun bear in Mizoram state during 2000-2010. (n=33)

Discussions

Bears, as to their association with man, they have been exterminated or driven out by man from many parts of their former domains. Contact with man has naturally affected the habits of bears. Where subjected to constant menace from man, they become much more alert, shyer, and more rigidly nocturnal in habit. Contact with man also gives bears the opportunity to raid his fields and orchards. In search of food, bears frequently invade human habitation and cultivation areas and cause human casualties and extensive damage to agricultural and horticultural crops. Consequently, human-bear conflicts have increased to alarming levels. These activities inside the forest area often lead to human sun bear encounter. As a result, it may be related to the majority of human casualties attacked by sun bear which happened inside the forest areas. When encounter with bears, short of sight and hard on hearing, the bear is likely to be surprised at close quarters not because bears are aggressive in nature

During 2000 to 2010, a total 33 human injury cases were caused by Malayan sun bear in Mizoram states. Out of 33 human casualties, majority of attacks were on males. Human injury cases occurred almost every year. Maximum casualties were recorded in 2002. Bear attacks were recorded in all the seasons, but human injury cases were high during spring and winter months. The extent of human injuries by sun bear are related to the involvement of people of 31-40 years and 21-30 years age visiting forests more and more for hunting purpose and collection of NTFP. Sun bear were found to attack on people and cause injuries in the head, face, chest, hands, abdomen and legs, highest number of victims had facial injuries

Sun bears face numerous threats throughout their range. Sun bear numbers, as with those of the other bear species in Southeast Asia (the Asiatic black bear and the sloth bear), are rapidly decreasing due to the intense pressure exerted by rapidly expanding human populations. Humans cut down the bears' forest homes for timber or to make room for agriculture. These timber practices are destroying sun bear habitat and sources of food, as well as fragmenting bear populations. The proliferation of plantations in bear -bear contact as the bears exploit this new food source – typically resulting in sun habitat is also increasing the chances of human bears being destroyed to prevent crop damage or simply out of fear. Sun bears are also being exploited for the pet-trade, or killed for food or sale of bear parts, especially for the gall bladder which is used in traditional medicines [30]. In the north-eastern states of India, continuous degradation of forest and poaching are the major threats [3]. The sun bear body parts which the

respondents reported of which they came across, clearly indicates that illegal hunting is still at large which may be due to different reasons. As personal communication with the villagers, hunters in villages are given a high status in their respective community plus it's a kind of a habit which they could not let it go at an instant. Perception against wild animals is still very primitive that when seen, the desire to kill is the first thought in their mind. Poverty is also a major factor that plays a huge threat to wild animals and their habitat; they are the source of meat for rural village people. Interestingly enough, sun bears are killed mainly for the consumption of meat; there are no specific hunts for sun bears as there are no particular uses reported. Gall bladders are considered as traditional medicines for stomach ailment, but as per communication, sun bear gall bladders are less preferred than black bear's as their gall bladders are comparatively small. Each and every village had their own issue in bear killings as sun bear body parts reported are from their own respective villages.

Poverty also increases the need to extract forest resources which often lead to wild animal habitat exploitation. In rural areas, they have to depend on forest resources like timber and non-timber produces for their daily need, apart from the agriculture harvest. Fuel wood, timber, bamboos and food plants are the biggest needs from the forest, minor needs such as medicinal plants practice, fodder plants as life stock rearing are no where to be seen at a large scale, canes, thatches, etc. results into forest exploitation. The extents of extraction of forest produces are more or less at the same level in all the villages. These activities inside the forest area often lead to human sun bear encounter. As a result, it may be related to the majority of human casualties attacked by sun bear which happened inside the forest areas. When encountering with bears, short of sight and hard on hearing, the bear is likely to be surprised at close quarters not because bears are aggressive in nature [18].

In rural areas especially in the periphery of protected areas, majority of the people still depends on shifting cultivation which continuously leads into degradation of forest habitat every year as a result of slash and burn. This is the major factor that plays a role in the sun bears wildlife habitat destruction and fragmentation. During the years 2001-2003, there was a 5476 km^2 loss of forest due to shifting cultivation, including 687km^2 in Mizoram [30].

There are many cases of agricultural crop depredation by sun bear. Crops grown in these areas are mainly annual crops but the quantities are not even enough to supply a family for a year. So when it gets damaged by any factors or sun bear for instance, it imposes a huge loss for the family. So whatever the amount of damage, it becomes a problem for the people. People came more aggressive to animals because of the loss of property. They have to do anything in order to retain as much harvest as they could. So when it comes to this condition, conservation can be a very difficult issue. Most species of bears are opportunistic omnivores that may be considered pests when attracted to human-related foods [19].

As suggested by the result of this study, the circumstances that lead to sudden encounters can be avoided and thereby the frequency of attacks can be reduced. The problem solving required here involves management of human behavior in bear habitats.

Impact and Conservation Management

Sun bear is found only in the north-eastern states of India, and very little management is practiced for protection of the populations. The sun bear is listed as "Vulnerable" in the Red Data Book (IUCN, 2012). It is also listed as a Appendix I of CITES and on Schedule I of the Indian Wildlife (Protection) Act, 1972. Other than this legal protection, no active measures are in place to protect sun bear population

No habitat management practice exists for sun bears in Mizoram. Sun bear are at times poached for trade in body parts, and they are also killed by villagers in relations against crop damage. No specific management action has been taken up by state forest department for the protection of sun bear and its habitat

In Mizoram state, human population is constantly on the increase and as a result, there are increasing biotic pressure on protected areas and reserve forests. There were 33 human casualties by sun bear over period of 8 years. Recommendations for mitigation of human-sun bear conflict and a conservation strategy for sun bear include: People are required to be alert and vigilant moving in wildlife areas and restrict their activities. There should be complete ban on hunting of sun bear. Strict punishment should be imposed on people involved in such activity. Livestock grazing should be restricted in forest areas. The graziers should avoid livestock grazing in forests. There should be strict regulation on collection of sun bear food items from wilderness areas and non-timber minor forest produce. Public education and awareness with respect to species conservation, natural history and wildlife damage is important. Unless, these damage problems can be reduced, the local inhabitants will not support wildlife conservation.Public education and awareness programmes towards conservation and natural history of sun bear must be initiated by the forest department. Study on ecology and management of sun bear is also necessary for formulation of action plan for mitigation of human-sun bear conflict and long term conservation of the species.

In Mizoram, sun bear populations are severely threatened due to hunting as well as poaching for trade in its body parts. Poaching of sun bear is a critical problem in their areas of occurrence and was reported 27.7% respondents comprising of forest officials. The villagers suffer from both economic loss due to crop damage (rice, maize, sweet potato, pulse, oilseeds, pumpkin and sugarcane.

The study investigated the effect of human impacts on sun bear habitat. Regardless of conflict levels or sun bear population stability, hunting might generate broader political support or funding for bear conservation. However, conflicts between people and bears, as well as on-going impacts on bear habitat, are of concern. Conflicts mostly arise when bears seek out foods that people provide through garbage, beehives, fruit trees, farm waste, or “goodies” in campground coolers. Bears that become conditioned to those foods or that simply wander into areas where humans live often have to be destroyed. Some bears die as a result of poaching and natural death. People also affect bears by altering their habitat through logging or by removing it completely for hydro reservoirs, farms, highways, and settlements. The presence of humans in occupied sun bear habitat is a reality, and the livelihood of local people is linked with it. Conservation planning based on the exclusion of people and implemented with force therefore has a very poor chance to succeed.

To control poaching and smuggling requires additional well-trained wildlife staff to protect and manage PAs in Mizoram. Adequate facilities, incentives, remote area allowances, equipment, and motivation are required for wildlife staff in all areas. Wildlife awareness programs for the Assam riffles, border security force and student personnel, and the general public are needed. The Government should regulate all developmental activities, such as dam and road construction in Mizoram. The short cycle of jhumming in north eastern states needs to be replaced with longer cycles

Conclusions

The sun bear is listed as “Vulnerable” by the IUCN (2012), Appendix I of CITES (GoI, 1992), and Schedule I of the Indian Wildlife (Protection) Act as amended in 2003 (GoI, 1972, 2003). Therefore, the sun bear has been accorded highest protection in India. The consolidation of the PA network through creation of Pas including new categories such as Conservation Reserve and Community Reserve, rationalization of PA boundaries, stricter regulations for forest and environmental clearances, have contributed significantly to the protection of sun bear and its habitat. Whenever bear is encountered, one should not run. Sudden reaction or running away may provoke the animal to attack. Walk back slowly facing the bear and talking in a low voice. Even if the bear approaches you to get a better look or stand on hind legs and nod its

muzzle, continue withdrawing slowly and talking in a soft voice.The sun bear is the least known of the world's bears. Basic research on the sun bear is the highest priority research need. Basic information on the status, ecology, food habits, and distribution of the sun bear is needed everywhere in its range in Southeast Asia. Strengthen and enforce existing hunting and trade regulations, including training and equipping of enforcement and customs staff, and ensuring that government staff at all levels are aware of existing regulations.
Complete a national system of protected areas, buffer zones, and forested corridors, and develop other habitat protection measures as appropriate.

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